放射医学与辐射防护国家重点实验室

State Key Laboratory of Radiation

Medicine and Protection

年度工作报告

ANNUAL REPORT

2018

苏州大学

Soochow University

二零一八年十二月

目　录

前　言

2018 年 9 月 10 日，科学技术部、江苏省人民政府批准建设省部共建放射医学与辐射防护国家重点实验室（国科发基[2018]161 号），这是江苏省首个省部共建国家重点实验室，实现了苏州市和苏州大学国家重点实验室零的突破。

放射医学与辐射防护国家重点实验室依托苏州大学，是为了满足我国人民健康、核安全和核能可持续发展的重大需求而建立的。实验室前身为江苏省放射医学与防护重点实验室和干细胞与生物医用材料重点实验室，经过十多年的建设，实验室现已有一支由院士、国家重大专项首席科学家、“千人计划”入选者、杰青、长江学者等组成的放射医学及交叉科学研究的人才队伍，科研团队专业结构合理，涵盖放射医学、辐射防护、血液学、临床医学、药学、材料学、化学、核科学等多学科领域，苏州大学放射医学已经是我国该领域中唯一的国家重点学科。

放射医学与辐射防护国家重点实验室的定位是“以放射生物效应为基础、以放射诊治和辐射防护为目标”。围绕国家中长期发展规划和区域发展的战略布局，面对核技术在医学领域中的广泛应用，瞄准国际放射医学与辐射防护的重大科学问题，围绕放射生物效应及机理、先进放射诊断和治疗、辐射防护等3个重点研究方向开展高水平前沿研究，通过平台建设以及体制机制创新，建设和完善高水平研究团队，努力提高研发能力，通过科技创新，促进区域经济社会发展，促进放射医学及相关学科可持续发展。

2018 年在科学研究、人才队伍、对外交流、开放服务和实验室科学规范管理等方面均取得了一定成绩。实验室现有成员 87 人，其中院士 2 人，杰青 6 人，千人 9 人，优青 5 人。王殳凹获得第一届中国环境科学学会青年科学家奖，刘芬菊等的“肿瘤辐射增敏机制及其临床应用研究”等项目获中华医学会科学技术奖。实验室平台先进，管理规范，一大批仪器高效运行，并对外开放。

在科研方面，2018 年实验室新增包括国家自然科学基金、江苏省高校自然科学研究重大项目等科研课题 43 项，资助总金额 10844.7 万元。值得指出的是，时玉舫获国家重点研发计划资助，王殳凹和杨凯分别获得国家自然科学基金委杰出青年和优秀青年基金资助，华道本和涂彧同时获得国家自然科学基金委-中核联合创新基金重点项目资助。依托重点实验室，共发表 SCI 研究论文 197 篇，其中影响因子大于 10 的 27 篇，论文被引用共计 7066 次。获得授权专利 34 项，专利转化取得了新的进展。

今年实验室在研发合作和成果转化方面继续保持良好势头。与中广核技、好医生医药集团、中陕核、鞍山肿瘤医院、华克、华益、超敏等公司的合作稳步向前。其中与中广核技公司的合作，在加速器产业园建设和重离子治疗等方面具有重大战略意义。

2018 年国家重点实验室举办了系列筹备和建设会议。4 月 27 日省部共建放射医学与辐射防护国家重点实验室专题协商会在京顺利召开，6 月 13 日国家重点实验室建设运行实施方案通过论证，10 月 30 日国家重点实验室启动会暨揭牌仪式举行，12 月 1 日国家重点实验室第一届学术委员会第一次会议成功举行，12 月 2 日，放射医学与辐射防护行业联盟筹备工作会议成功召开。

同时实验室共有 78 人次被邀请在国际国内学术会议上作报告；共有 88 人次被邀请来作学术报告。另外，实验室成功举办了第四届分子影像与纳米医学国际学术研讨会（11.4-8），空间生命与医学工程学术研讨会（10.12）和中国辐射防护学会建筑物室内氡测量与控制专业委员会第六次会议（12.10）等学术会议。

学术委员会成员名单

职务	姓　名	职称	单位	研究方向
顾问	陈洪渊	院士	南京大学	生命分析
顾问	阮长耿	院士	苏州大学	血液学
主任	詹启敏	院士	中国医学科学院/北京大学	肿瘤学
副主任	陈凯先	院士	上海中医药大学	药物化学
副主任	于金明	院士	山东省肿瘤医院	放射医学
副主任	赵宇亮	院士	国家纳米中心	纳米毒理学
委员	王红阳	院士	上海交通大学	肿瘤与细胞信号转导
委员	欧阳晓平	院士	西北核技术所	核技术
委员	田　禾	院士	华东理工大学	材料化学
委员	叶朝辉	院士	中国科学院武汉物理与数学研究所	核磁共振技术
委员	柴之芳	院士	苏州大学	放射医学
委员	Tom K.Hei	教授	美国哥伦比亚大学医学中心	放射医学
委员	汪小琳	教授	中国工程物理研究院	核安全
委员	吴宜灿	教授	中科院合肥物质科学研究院核安全所	核技术
委员	常学奇	教授	中国辐射防护研究院	辐射防护
委员	周平坤	教授	军事医学科学院	放射医学
委员	邵春林	教授	复旦大学	放射生物学
特邀委员	郭子建	院士	南京大学	生物无机化学

一、研究队伍

实验室研究队伍建设的总目标：建设一支素质优良、结构合理、精干高效的科研队伍。实验室人员由三部分组成：专职研究团队、技术人员团队和管理团队。目前，实验室有固定人员 87 人，其中院士 2 人，杰青 6 人，千人 9 人，优青 5 人，已建立了年龄层次和知识结构合理的研究团队。

实验室人员组成情况

序号	姓　名	性别	出生年月	专　业	技术职务
1	柴之芳	男	194209	放射化学/放射医学	主任（院士、教授）
2	时玉舫	男	196010	肿瘤学	副主任（教授、千人）
3	高明远	男	196703	分子影像与核医学	副主任（教授、杰青）
4	华道本	男	197404	放射化学/辐射防护	副主任（教授、青蓝工程）
5	戴克胜	男	196508	血液学	副主任（教授）
6	朱　力	男	195908	血小板与血管性疾病	副主任（教授）
专职研究团队					
（一）放射生物效应及机理					
1	时玉舫	男	196010	肿瘤学	教授、千人计划
2	周如鸿	男	196612	定量生物医学	千人计划、教授
3	张学光	男	195111	免疫学	教授、杰青
4	吴庆宇	男	195710	血液与血管生物学	教授、千人计划
5	周光明	男	197007	放射医学/特种医学	特聘教授
6	曹建平	男	196205	放射医学/特种医学	教授
7	徐　璎	女	196204	细胞生物学	教授、杰青
8	刘芬菊	女	195412	放射医学/特种医学	教授
9	胡士军	男	198002	细胞生物学	教授、青年千人
10	杨红英	女	197211	放射医学	教授

11	张舒羽	男	198302	放射医学	副教授、优青
12	朱　力	男	195908	血小板与血管性疾病	教授
13	武　艺	男	196503	血栓与血管生物学	教授
14	何玉龙	男	196701	淋巴管与肿瘤	教授、新世纪人才
15	黄玉辉	男	197212	病理学与病理生理学	教授、省特聘教授
16	周泉生	男	195505	病理学与病理生理学	教授
17	王建荣	男	196205	细胞生物学	教授
18	杨　林	男	196408	免疫学	教授、省“双创”
19	陈　秋	女	197608	辐射免疫学	教授
20	孙　巧	女	197407	定量生物医学	教授
21	邵常顺	男	196210	遗传学	特聘教授
22	杨再兴	男	198209	定量生物医学	副研究员
23	孟烜宇	女	198306	定量生物医学	副研究员
24	于　冬	男	197008	放射医学	教授
25	王　畅	女	197601	放射医学	副教授
（二）先进放射诊断和治疗					
26	阮长耿	男	193908	血液学	院士、教授
27	吴德沛	男	195802	血液学	教授、主任医师
28	高明远	男	196703	分子影像与核医学	教授、杰青
29	钟志远	男	197404	药物化学	特聘教授、杰青
30	陈新建	男	197905	分子影像学	青年千人、特聘教授
31	陈华兵	男	197811	纳米毒理学	教授、优青
32	李　桢	男	197608	分子影像与核医学	青年千人、特聘教授、 江苏双创人才
33	史海斌	男	197803	分子影像与核医学	教授、青年千人
34	许玉杰	男	196311	放射医学与核医学	教授
35	夏利军	男	196203	血液学	教授
36	戴克胜	男	196508	血液学	教授

37	赵利	男	198302	放射医学	副教授
38	俞家华	男	198102	放射医学/特种医学	副教授
39	崔凤梅	女	197510	放射毒理学	副教授
40	余自强	男	196311	血液学	主任医师
41	韩　悦	女	197002	血液学	主任医师
42	汪　勇	男	198309	放射医学	副教授
43	焦　旸	女	197711	放射医学	教授
44	尚增甫	男	198209	放射医学	副教授
45	朱　巍	男	197009	放射医学	副教授
46	朱　然	女	197508	放射医学	副教授
（三）辐射防护					
47	柴之芳	男	194209	放射化学/放射医学	院士、教授
48	朱秀林	男	195510	材料化学	教授
49	路建美	女	196010	材料化学/辐射防护	教授
50	王殳凹	男	198506	放射化学	特聘教授、杰青、 青千、优青
51	涂　彧	男	196507	放射医学/辐射防护	教授
52	华道本	男	197404	放射化学/辐射防护	教授、青蓝工程
53	郭正清	男	198105	放射医学	副教授
54	李瑞宾	男	198209	辐射纳米毒理学	特聘教授、青年千人
55	第五娟	女	198604	放射化学	教授
56	张乐帅	男	198002	毒理学	教授
57	刘玉龙	男	196608	放射损伤临床	教授、主任医师
58	葛翠翠	女	198311	辐射纳米毒理学	副教授
59	李永强	男	198210	放射医学	副教授
60	杨　凯	男	198308	放射医学	副教授
61	万　骏	男	196411	放射医学/辐射防护	副教授
62	孙　亮	男	197410	放射医学/辐射防护	副教授

63	胡　亮	男	198402	核科学与技术	特聘副教授
64	肖成梁	男	198410	放射化学	副教授
65	刘志勇	男	198101	放射化学	副教授
66	王杨云	女	198610	放射医学	副教授
技术团队					
1	张保国	男	196308	医学物理/辐射防护	研究员
2	白　霞	女	196809	血液学	高级实验师
3	王敬东	男	197004	放射医学	实验师
4	陆启凤	女	199010	实验平台管理	研究实习员
5	吴安庆	男	198706	放射免疫学	实验师
6	商冰雪	女	198612	免疫学	助理研究员
7	陈永井	男	197712	免疫学	助理研究员
8	聂　晶	女	197304	生物化学	实验师
9	盛道鹏	男	198507	放射化学	助理实验师
10	封　琼	女	198710	放射医学	助理研究员
11	陈兰花	女	198707	放射化学	实验师
12	吴　艳	女	198107	免疫学	高级实验师
13	刘胜堂	男	198702	放射医学	助理实验师
14	闫思齐	女	198905	核物理	实验师
15	畅文娟	女	198704	核物理	助理实验师
管理团队					
1	徐加英	女	197201	肿瘤放射生物	副研究员
2	朱本兴	男	197012	机关管理办公自动化	实验师
3	易　剑	女	196403	机关管理办公自动化	主管技师
4	彭　蓉	女	197704	机关管理办公自动化	科员
5	何伟伟	男	198710	高分子化学与物理	副教授
6	赵　琳	女	198710	放射医学	讲师

二、研究方向

2018 年 6 月 13 日下午，江苏省科技厅会同科技部基础研究司对省部共建放射医学与辐射防护国家重点实验室建设运行实施方案组织专家论证。与会专家从实验室定位、研究方向和研究内容设置等方面提出建设性的意见和建议。实验室将以放射生物效应为基础、以放射诊治和辐射防护为目标，开展高水平的基础研究和应用基础研究。具体如下：

（1）**放射生物效应及机理：**探讨不同 LET 辐射生物效应、辐射对干细胞的作用及机理、空间辐射生物效应，不仅可以阐明电离辐射损伤的分子机制，还可以为提高放射治疗的精准性和载人航天的的安全性奠定科学理论基础；

（2）**先进放射诊断和治疗**：开展放射诊疗一体化分子影像、核医学影像组学、纳米诊疗药物和质子/重离子辐射治疗的研究，为恶性肿瘤、心脑血管病、神经退行性疾病的精准放疗提供三维空间影像数据和图谱，实现恶性肿瘤等重大疾病的早期诊断、转移预警、疗效评估；

（3）**辐射防护**：进一步开展辐射防护新原理、新机理和新方法研究，构建新型辐射防护药物体系，实现辐射剂量的精确测定和核能放射性污染的有效治理，为辐射防护和核应急提供科学依据和技术保障。

三、代表性科研成果

（一）放射生物效应及机理

1、发现重离子有效杀灭肿瘤细胞的分子机制

重离子治癌在临床上取得了非常好的疗效，但是其生物学机制尚不清楚。细胞骨架是细胞运动、有丝分裂、物质运输、信号转导、维持基因组稳定等诸多生物学过程的物质基础，也是多种肿瘤治疗的靶点。我们对碳离子放疗后肿瘤细胞中长链非编码 RNA（lncRNA）的表达谱进行研究，发现了对碳离子辐照特异性高表达的 LNC CRYBG3；采用多种分子生物学技术，揭示了 LNC CRYBG3 直接结合 G-actin，抑制微丝骨架的组装、阻断缢缩环的形成，导致细胞分裂无法完成，从而抑制肿瘤生长；另外，LNC CRYBG3 与 G-actin 的结合阻断 MAL 蛋白的核定位，导致血清反应因子（SRF）无法结合到 JUNB 和 Arp3 等细胞增殖、粘附、转移等必需基因的启动子区域，从而抑制这些基因的表达。该研究发现了第一条与细胞微丝骨架直接作用的 lncRNA，阐明了调控肿瘤进程的 lncRNA-actin-MAL-SRF 通路，揭示了碳离子治癌有效性的分子机制。相关研究工作发表在 Cancer Res., 2018, 78, 4563。

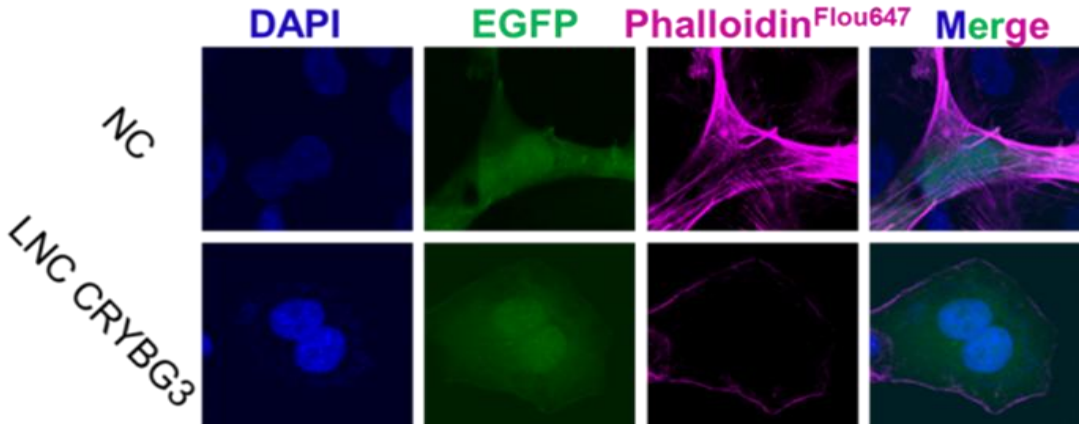

图 1. LNC CRYBG3 抑制微丝骨架的形成。

2、放射辐照后的间充质干细胞（MSCs）促进小鼠乳腺癌肺转移

间充质干细胞（又称间充质基质细胞，MSCs）因具其调节炎症过程的能力而备受关注。研究表明，MSCs 以多种分子方式对先天性和适应性免疫应答发挥免疫调节作用。为探究辐射是否通过改变肿瘤微环境影响肿瘤进程，我们把经不同辐

照剂量（12Gy、14 Gy）处理的小鼠 MSCs，同 4T 小鼠乳腺癌细胞混合，通过尾静脉或原位脂肪垫注射到小鼠体内，2 周后将小鼠安乐处死，取小鼠肺组织，观察肺组织中转移结节数量的变化。结果显示，辐照处理 MSCs 组的肺部转移性结节数量明显多于对照组或是未辐照的 MSCs 组，证明放射辐照后的 MSCs 能够促进小鼠乳腺癌肺转移。相关成果发表在 Nat. Rev. Nephrol., 2018, 14, 493。

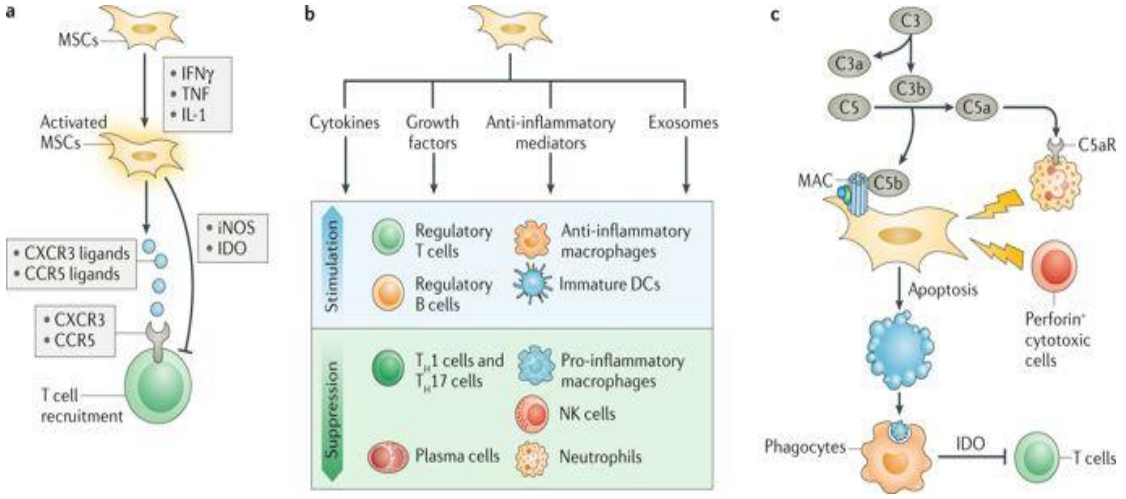

图 2. 间充质干细胞介导的免疫调节作用机制。

3、发现羊毛甾醇抑制辐射导致人眼晶状体蛋白积聚的分子机理

紫外线等辐射导致人眼晶状体蛋白的损伤，误折叠，并进一步大规模积聚成淀粉样纤维是引发白内障的重要诱因。目前，手术是白内障的最主要治疗手段，无外用特效药物。羊毛甾醇的发现被认为打开了白内障治疗的新篇章，是相关领域的一个重要里程碑。其能够彻底逆转白内障的病程（Nature, 2015, 523, 607; Science, 2015, 350, 636; Science 2015, 350, 674）极有可能第一次被制作成外用药眼水用来治疗白内障，改变以往白内障的治疗策略。然而，相关分子机理并不清楚。我们通过大规模全原子分子动力学模拟，自由能计算，第一次揭示了相关的分子机理：羊毛甾醇通过结合到误折叠晶状体蛋白 C 端积聚界面上的疏水基团，比如，亮氨酸等，抑制了淀粉样化过程，达到逆转积聚进程的效果。我们的发现为相关的药物设计和改进奠定了重要的科学基础。相关研究工作发表在 J. Am. Chem. Soc., 2018, 140, 8479。

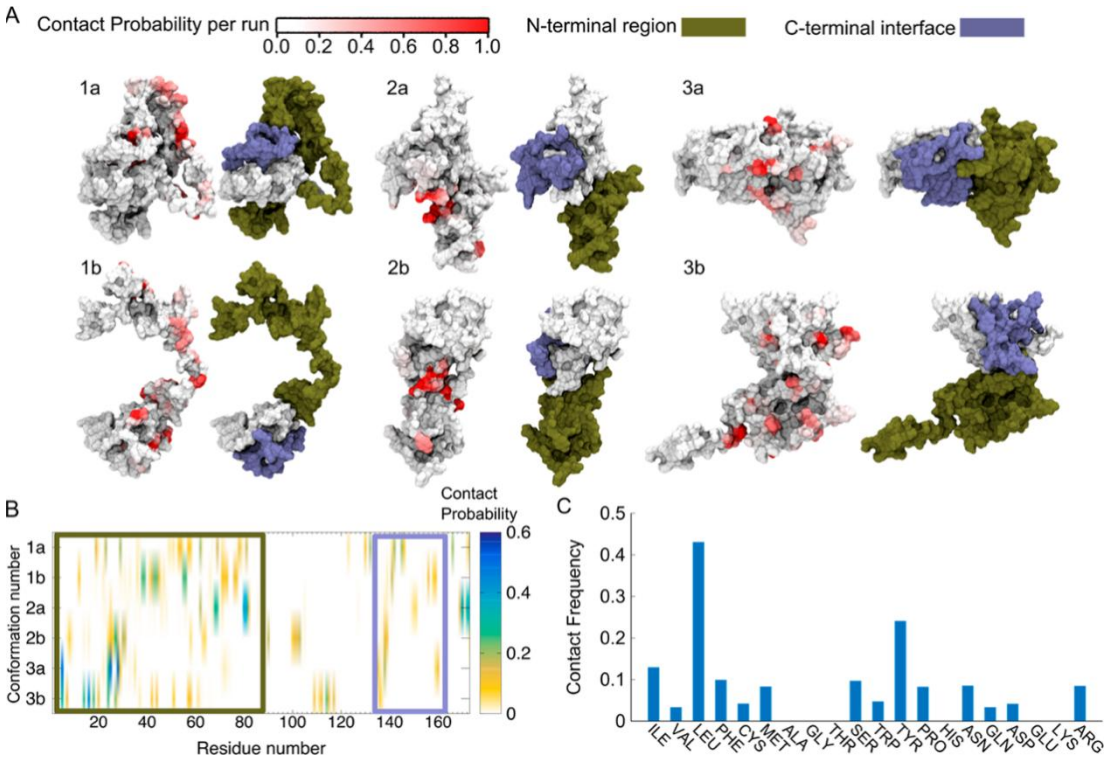

图 3. （A 和 B）羊毛甾醇与误折叠人眼晶状体蛋白质不同构型的结合模式。（C）羊毛甾醇与不同氨基酸的结合概率。

4、免疫性血小板减少症发生机制研究

2018 年 10 月 18 日，国际著名期刊《美国科学院院刊》（PNAS）在线发表题为“Akt-mediated platelet apoptosis and its therapeutic implications in immune thrombocytopenia”（Akt 调控的血小板凋亡及其在治疗免疫性血小板减少症中的应用）的研究论文，报道了放射医学与防护国家重点实验室、江苏省血液研究所戴克胜教授团队揭示免疫性血小板减少症（Immune thrombocytopenia，ITP）发生机制及其新的治疗策略。

免疫性血小板减少症是严重威胁人类健康的疾病，可导致内出血死亡。长期以来，尽管国内外学者一直在对 ITP 进行研究，由于其发生机制尚未完全阐明，仍有一部分病人对现有的多种治疗策略反应性较差或无反应。以往研究中，戴教授及国际上其他学者已研究证实，具有抗血小板膜糖蛋白（glycoprotein，GP) Ib-IX 自身抗体的 ITP 病人，对现有的多种常规治疗策略反应较差。本研究中，戴教授团队研究发现，抗 GPIb-IX 抗体可导致血小板 Akt 活化，Akt 通过磷酸二酯酶（PDE3A）调控的蛋白激酶 A(PKA)活性减低诱导血小板凋亡，同时，血小板通过

Akt 途径导致活化。凋亡和活化的血小板暴露膜表面的磷酯酰丝氨酸（PS），使得血小板被肝脏的库弗细胞识别并吞噬清除。研究发现，抑制 GPIb-IX、PDE3A、PKA、PS 等的生物学活性，或基因敲除相关蛋白，均可抑制抗体导致的血小板被清除，提升血小板数量。因此，本研究揭示了免疫性血小板减少症的发生机制，尤其是，抑制抗体导致血小板被清除信号通路的多个关键环节，均可抑制血小板被清除，从而为研制治疗血小板减少症药物提供了多种新的靶点和策略，具有广阔应用前景。

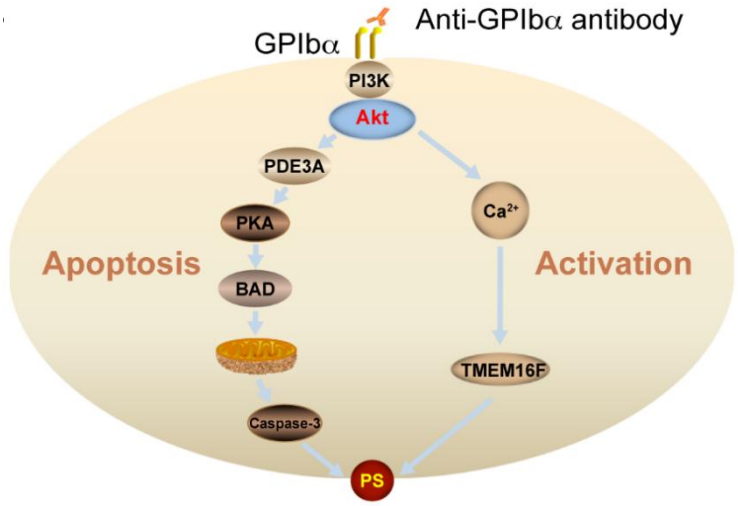

图 4. 免疫性血小板减少症发生机制。

（二）先进放射诊断和治疗

1、基于生物高分子材料的肿瘤放射免疫联合治疗

杨凯副教授与功能纳米与软物质研究院刘庄教授合作在《自然》子刊 Nature Biomedical Engineering（《自然-生物医学工程》）发表论文，报道了一种基于生物材料的放射免疫联合治疗新策略。该研究将有治疗功能的放射性同位素碘 131 标记在过氧化氢酶上，然后将其与免疫佐剂 CpG 以及海藻酸钠均匀混合得到复合注射液。在这个体系中，过氧化氢酶可以高效地分解肿瘤组织间的内源性过氧化氢产生氧气，通过改善肿瘤乏氧以增强放疗疗效；CpG 作为免疫佐剂，可以与内放疗摧毁肿瘤后其残留物中的肿瘤相关性抗原相互作用，产生肿瘤特异性的免疫反应；而海藻酸钠在局部注射到肿瘤内后，可以和肿瘤细胞间隙液中的钙离子结合快速形成凝胶，将碘 131 标记的过氧化氢酶固定在肿瘤内，从而增强其效果并且降低对正常器官的辐射副作用。研究表明，该策略可以使用较低的放射性剂量，通过单次注射，在小鼠肿瘤模型，人源异种移植模型以及兔肿瘤模型上完全杀灭

原位实体瘤；并进一步触发抗肿瘤免疫反应，通过联用免疫检查点抑制剂，可利用机体自身的免疫系统追击远端转移的肿瘤细胞，从而有效抑制肿瘤转移；随后，研究人员还观察到一种类似疫苗的免疫记忆效应，能够保护小鼠不受肿瘤复发的侵袭。

这种策略的特点是，通过增强的内放疗摧毁可见实体肿瘤的同时触发机体自身免疫反应消除转移的隐匿肿瘤病灶同时预防其复发。这种方法有望应用于治疗多种类型的实体瘤，给那些处于发生肿瘤转移以及癌症中晚期且不能通过手术或者化疗治愈的患者或将带来新的机遇。值得一提的是，该策略中使用的所有的试剂都是基于天然生物材料，具有很好的生物相容性。

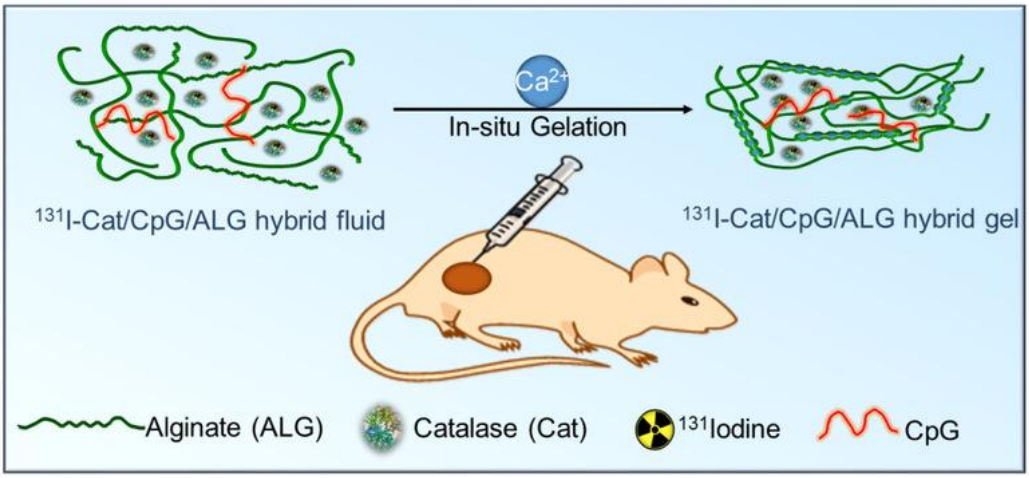

图 1. 碘 131 标记的过氧化氢酶（蛋白）、免疫佐剂 CpG（核酸）以及海藻酸钠（多糖）复合物肿瘤内局部注射原位成胶示意图。

2、联合放疗和肿瘤血管正常化的 CAR-T 实体瘤治疗

研究团队在国际上率先发现CTLA4和PD1抗体治疗通过诱导血管正常化来改善组织供氧，可增加癌细胞对放疗的敏感性，为临床优化放疗与免疫治疗联用提供了新思路。首次在国际上证明携带 PD-1 scFv 的靶向 MUC1 的四代 CAR-T 细胞，以静脉给药方式，在特定实体瘤患者上出现临床疗效（VGPR、胸腔积液基本消失），且治疗安全性高。更大规模的临床验证正在开展之中。工作发表在：J. Clin. Invest., 2018,128, 2104; Nat. Rev. Immunol., 2018,18, 195。

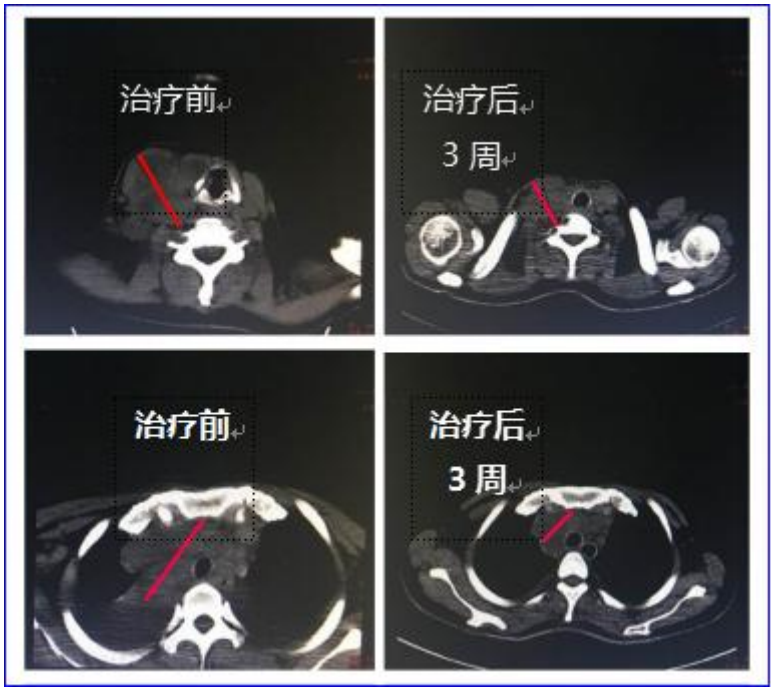

图 2. CTLA4 和 PD1 抗体联合放疗实体瘤。

（三）辐射防护

1、新型铀基闪烁体材料用于辐射探测

铀元素在现代核能利用中扮演着“基石”角色，除了广泛利用的核裂变性质外，它的物理化学性质也极具吸引力，发展铀基功能材料对于优化利用核资源具有重要意义。同时，开发含铀功能材料一直是锕系固体化学研究前沿，目前含铀化合物在分子磁体、电催化分解产氢、小分子活化、超导体等领域均有广泛研究。闪烁体是一类具有闪烁效应的材料，广泛应用于医学成像、高能物理、国防安全、环境监测等领域。闪烁体通过吸收高能射线或高能粒子，发出能量较低的荧光从而实现对高能射线的“可视化”。从发现闪烁体至今，闪烁体材料开发已经囊括了元素周期表中大部分发光元素，其中一个重要的特点是利用一些重发光元素实现能量高效沉积，广泛使用的闪烁晶体有 NaI:Tl, CsI:Tl, $Bi_4Ge_3O_{12}$, $PbWO_4$, $LuAlO_3$:Ce 等。铀作为地球上稳定存在的最后一个元素，具有得天独厚的射线阻滞能力；同时，铀元素的主要化学物种——铀酰在紫外光照射下能发射出本征的绿色荧光，使其在闪烁体领域极具优势。然而利用天然最重的元素实现闪烁性能从未见报道，基于铀的本征优势，项目团队在国际上首次提出含铀材料作为闪烁体的概念，该项工作近期以封面论文形式发表在德国《应用化学》上（Angew. Chem. Int. Ed., 2018, 57, 7883）。

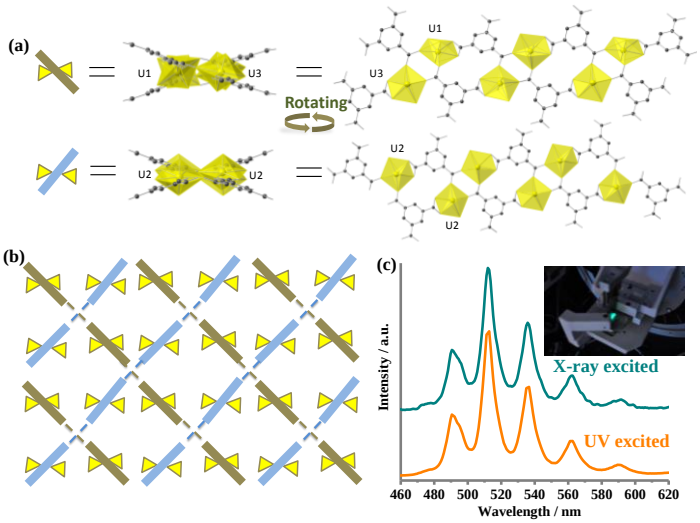

图 1.含铀有机无机杂化材料 SCU-9。

本工作首先合成了含铀有机无机杂化材料 SCU-9，均苯三酸连接铀酰金属中心形成两条不同取向的链状结构。同时，两条链上都存在一个未配位均苯三酸作为端基，进而形成氢键连接的三维超结构。由于强烈的氢键存在，使得该化合物在紫外照射下具有极高发光效率，其量子产率（58%）是目前已知所有含铀材料之最。由于较高的量子产率，使得项目组能够首次发现铀酰化合物在高能辐射场中发光的现象。闪烁性能表征显示该化合物对射线响应程度接近商用闪烁体 CsI：Tl。由于铀的本征物理特性，该化合物在射线阻滞能力上明显优于商用闪烁体 CsI:Tl，这对于实现较低剂量医学成像具有潜在优势。同时，有机无机杂化晶格的引入使得 SCU-9 化合物在辐照稳定性、水稳定性上比离子化合物更具优势，为进一步设计高性能铀基闪烁体提供了指导。

2、新型阳离子骨架材料用于分离 TcO_4^-

^{99}Tc 是一种长寿命的放射性核素，其半衰期为 2.13×10^5 年。在水中主要以 TcO_4^- 的形式存在，溶解度高，迁移快，天然矿物无法有效阻滞，对环境造成严重的危害。另外，^{99}Tc 在乏燃料后处理中价态多变，影响铀镎钚的分离回收，如果不分离，在之后的玻璃固化时又会以 Tc_2O_7 的气态形式挥发泄露，但要从高酸度高辐射且大量竞争离子共存的核废液中选择分离 TcO_4^-非常具有挑战。针对这个难题，我们前期创新性地采用阳离子金属有机框架（MOFs）材料选择分离放射性 TcO_4^-，取得了一系列成果。本年度又通过四（1-咪唑苯基）乙烯与 α,α-二溴对二甲苯合成了一类新颖的耐酸耐辐照的共价有机阳离子聚合物材料，SCU-CPN-1。该类材料合成

简单，产率高，且对 TcO_4^-/ReO_4^-的分离具有吸附动力学快、对 ReO_4^-的吸附容量高、选择性好、耐酸性好和耐辐照等明显优势。

图 2. 新型阳离子骨架材料 SCU-CPN-1 用于分离 TcO_4^-。

SCU-CPN-1 一方面解决了传统阴离子交换树脂材料在选择性、动力学及耐辐照性能方面的缺陷，另一方面解决了阳离子金属有机框架材料和无机阳离子骨架材料在强酸条件下结构不稳定的缺点，是目前从高酸性核废液中分离 TcO_4^-的最佳材料。相关结果已正式发表在 Nature Communications 上（Nat. Commun., 2018, 9, 3007）。

四、新增科研项目

序号	项目编号	项目名称	项目类别	负责人	总经费（万）
1	SS12800118	省部共建放射医学与辐射防护国家重点实验室	国家重点实验室	柴之芳	3300
2	2018YFA0107500	炎症微环境中间充质干细胞对肝肾纤维化的调控作用及干预策略	国家重点研发计划干细胞及转化研究专项	时玉舫	2962
3	SX12800117	省放射医学协同创新中心	省级协同中心	柴之芳	800
4	2018YFA0208800	新型纳米氧化铁磁共振造影剂的宏量制备及临床转化研究	国家重点研发计划“纳米科技”重点专项	李　桢	343.56
5	21825601	环境放射化学	国家自然科学基金杰出青年科学基金	王殳凹	350
6	31822022	功能纳米材料在肿瘤放疗中的应用探索	国家自然科学基金优秀青年科学基金项目	杨　凯	130
7	U1867206	多离子印迹硅基材料用于高盐低放废水深度净化的应用基础研究	国家自然科学基金联合基金重点项目	华道本	268
8	U1867204	流出物中放射性核素对敏感水生动物的辐射影响	国家自然科学基金联合基金重点项目	涂　彧	268
9	81820108003	膜糖蛋白 GPIb-IX 受体对血小板凋亡和活化的调控及其在相关疾病发生中的作用研究	国家自然科学基金重点国际合作项目	戴克胜	240
10	81870325	非典型 C-C 类趋化因子受体样蛋白 2（CCRL2）促动脉粥样硬化作用的机制及转化研究	国自然面上项目	朱　力	68.4
11	81872431	PTPROt 和 JAK-STAT 信号通路在多发性骨髓瘤发病和耐药机制中的作用	国自然面上项目	杨　林	68.4
12	81873566	蛋白酶 hepsin 在调节肝脏糖与脂代谢中的功能研究	国自然面上项目	吴庆宇	73.2

序号	项目编号	项目名称	项目类别	负责人	总经费（万）
13	51873143	用于肿瘤光动力/光热协同治疗的低氧依赖性聚合物囊泡研究	国家自然科学基金面上项目	陈华兵	59
14	2018YFA0208803	特异性探针的构建及体内成像应用评估	国家重点研发计划纳米科技”重点专项课题（合作）	朱　然	158.7
15	SQ2018YFC010163-4	乏氧肿瘤多线束放疗的生物学机制研究与生物标志物鉴定	科技部重点研发计划课题（子课题）	周光明	95
16	21874097	肿瘤转移酶响应型智能分子探针的构建及乳腺癌骨转移多模态诊疗应用	国家自然科学基金面上项目	汪　勇	79.2
17	21876124	阳离子金属-有机框架材料的设计及选择分离放射性高锝酸根的机制研究	国家自然科学基金面上项目	肖成梁	79.2
18	51873137	原位高灵敏水凝胶放疗剂量计的构建	国家自然科学基金面上项目	胡　亮	78
19	81872548	基于 CRISPR/Cas9 系统的 HR 和 NHEJ 修复基因筛选及其调控放射敏感性的功能研究	国家自然科学基金面上项目	俞家华	69.6
20	81872552	四氢生物蝶呤及其代谢产物在放射性肺损伤进展及早期预警中的作用与机制研究	国家自然科学基金面上项目	曹建平	69.6
21	XXX	XXXX	装发预研	华道本	40
22	FJ12100718	国重点	总装备部（预研管理中心）	王殳凹	30
23	FG12101318	国重点合作	中国工程物理研究院材料研究所	王殳凹	60
24	JD201820	核技术利用辐射安全与防护职业人员专业技能技术支持	生态环境部核与辐射安全监督专项	涂　彧	5
25	K412862418（经费卡号）	编制《粒籽源治疗执法监督技术指南》	卫计委委托项目	涂　彧	8
26	K412863418（经费卡号）	核医学治疗场所防护与监督现况调查	政府购买服务项目	涂　彧	4
27	BK20180094	功能纳米材料在肿瘤放疗中的应用探索	江苏省优秀青年基金项目	杨　凯	50

序号	项目编号	项目名称	项目类别	负责人	总经费（万）
28	BE2018655	基于智能化分子影像探针的胃癌诊疗技术研究	江苏省重点研发计划（社会发展）项目	史海斌	200
29	BE2018653	构建非小细胞肺癌 PDO 模型用于 EGFR-TKIs 耐药患者精准治疗的研究	江苏省重点研发计划（社会发展）项目	李瑞宾	200
30	18KJA310006	血根碱通过调节炎症通路重塑肠道菌群防治放射性肠损伤	江苏省高校自然基金重大项目	徐加英	30
31	SYS2018021	射线响应型高分子纳米缓释药物的开发与恶性黑色素瘤放射免疫联合治疗应用	医疗卫生应用基础研究	王杨云	5
32	2016YFC0101200	肿瘤诊疗与原位疗效评价一体化探针构建及应用研究	市厅级项目政策性资助	史海斌	6
33	2016YFC0904702	分子功能影像与生命组学引导肿瘤多线束放疗敏感性预测	市厅级项目政策性资助	曹建平	15
34			江苏省双创团队	胡士军	300
35	SWYY-081	长链非编码 RNA-LNC01405 调控多能干细胞干性和心肌分化的机制研究	江苏省六大人才高峰高层次人才	胡士军	10
36	18KJA180012	淋巴管稳态维持与老化的调控机制	江苏省高等学校自然科学研究重大项目	何玉龙	30
37	P112800218	基于晶格差异性原理的乏燃料稀土分离技术预研合同	横向项目	王殳凹	56.82
38	P112810318	肿瘤治疗联合研发中心	横向项目	曹建平	50
39	P112100218	89Zr 标记 KN035 抗体及其评价研究	横向项目	王敬东	7.725
40	P112100318	抗体标记 68Ga 及体内外药效研究	横向项目	王敬东	30
41	P112800118	丁孚靶点体内药理药效动物实验	横向项目	王敬东	31.9
42	P112810218	院士工作站资金	横向项目	王敬东	30
43		LFG 内源性抗凝血机制研究	横向项目	武　艺	18
合计					**10844.7**

五、国内外学术交流

1、专家来访

序号	时间	报告人	主题	单位
1	2018 年 01 月 03 日 9：00	Prof. Scott Oliver	CationicMaterials and Mesoporous Nanoparticles for Environmental Applications	美国加利福尼亚大学
2	2018 年 1 月 18 日 上午 9：00-11:00	李莹辉　主任	航天医学挑战与思考	航天医学基础与应用国家重点实验室主任
3	2018 年 3 月 7 日 10：00	王光毅 博士	空间辐射探测技术	兰州空间技术物理研究所
4	2018 年 3 月 23 日 上午 10:15	李敬源 教授	生物分子界面作用的理论模拟研究	浙江大学
5	2018 年 3 月 27 日 上午 11:00	章真	肿瘤放射治疗现状与未来	复旦大学附属肿瘤医院放射治疗科主任医师，教授
6	2018 年 4 月 4 日 上午 9:30	张涛　主任	空间探测技术回顾与展望	中国科学院上海技术物理研究所工程一室主任
7	2018 年 4 月 8 日 上午 09:00	梁高林教授	自组装在分子影像中的应用	中国科学技术大学化学系教授
8	2018 年 4 月 8 日 上午 10:00	谢贺新教授	基于 beta 内酰胺酶的耐药病菌快速检测研究	华东理工大学药学院
9	2018 年 4 月 8 日 上午 11:00	叶德举教授	多模态分子影像探针应用于活体成像分析研究	南京大学化学化工学院
10	2018 年 4 月 10 日（周二）上午 9:00	Chenjie Xu 教授	MICRO/NANOTECHNOLOGY FOR TREATMENT AND DIAGNOSIS OF ABNORMAL SCAR	Nanyang Technology University, Singapore
11	2018 年 4 月 10 日 14:00-15:00	Prof. Aijun Du	Computational Screening 2D Materials as Efficient Catalysts for Energy and Environmental Applications	*Queensland University of Technology, Gardens Point Campus, Australia*
12	2018 年 4 月 12 日 下午 3：30-5：30	唐军 主任，孙亮 副教授	放射医学专业讲座—核医学与医学物理	苏州九龙医院核医学科主任，苏州大学医学部放射医学与防护学院
13	2018 年 04 月 17 日 上午 10:00	徐亚东教授	新型半导体核辐射探测用晶体材料与器件	西北工业大学
14	2018 年 4 月 21 日（周六）上午 8：30	王仲奇研究员	辐射防护计算中粒子输运模拟的几个关键问题研究	中国原子能科学研究院
15	2018 年 4 月 24 日 下午 14:00	张志	CFETR 氚工厂系统氚安全催化剂研究进展	中国工程物理研究院
16	2018 年 5 月 21 日 上午 9:00	申利国副教授	膜技术与辐射	浙江师范大学
17	2018 年 5 月 24 日 上午 10:00-11:00	Dr. Zi (Sophia) Gu	Engineering clay nanoparticles as activatable MR imaging contrast agent for accurate tumour detection	*School of Chemical Engineering University of New South Wales, Sydney, Australia*

序号	时间	报告人	主题	单位
18	2018 年 6 月 4 日 上午 10:00-11:30	赵旭东 研究员	基于肿瘤干细胞及新型 动物模型的癌症研究	中科院昆明动物研究所
19	2018 年 06 月 05 日 （周二）下午 15:00	肖乐辉 博士	单分子、颗粒光学显微成像研究	南开大学化学学院
20	2018 年 6 月 12 日 （周二）上午 10:00-11:30	Guenther Reitz 教授	Phantom experiments in space	德国宇航员中心航天医学研究所辐射生物 研究室主任
21	2018 年 6 月 14 日 上午 10:00-11:30	张宏 教授	核医学分子影像精准诊治	浙江大学医学院
22	2018 年 6 月 22 日 下午 14:00-15:00	李富友教授	上转换纳米材料及生物应用	复旦大学
23	2018 年 6 月 26 日 13:30	葛渝成 教授， 张明	核物理的发展方向以及空间科 学实验仪器的研究及进展	北京大学物理学院， 国家剂量科学研究院
24	2018 年 07 月 23 日 上午 9:00-10:30	Prof. Shengqian Ma	Task-Specific Design and Functionalization of Advanced Porous Organic Polymers for EnvironmentalRemediation	University of South Florida
25	2018 年 07 月 23 日 上午 10:30-12:00	Praveen K. Thallapally	Metal organic frameworks for energy and environmental applications	Chief Scientist, Pacific Northwest National Laboratory
26	2018 年 7 月 26 日 9:00	Thierry LOISEAU 教授	Actinide chemistry: coordination polymers and high nuclearity cluster system with Th, U and Np	Unit of Catalysis and Solid State Chemistry / MATHYB Group, University of Lille – France
27	2018 年 7 月 26 日 10:00	Christophe VOLKRINGE R 教授	MOFs for the capture of radionuclides	Unit of Catalysis and Solid State Chemistry / MATHYB Group, Institut Universitaire de France, University of Lille - France
28	2018 年 8 月 21 日 星期二下午 14:00-15:00	施孟超 博士	多功能硅基介孔生物活性材料 在骨组织工程中的应用	健康与生物医学创新研究所，澳大利亚昆士兰科技大学
29	2018 年 9 月 14 日 14 时	唐军	茁壮成长的临床核医学	苏州九龙医院核医学科 主任、主任医师
30	2018 年 9 月 14 日 15 时	陆赛全	医学物理专业导航	复旦大学附属肿瘤医院 放射治疗科高级工程师
31	2018 年 10 月 20 日 星期六下午 16:00-17:00	江波 博士	免疫检查点分子的非免疫学功能	首都医科大学附属北京 世纪坛医院肿瘤中心
32	2018 年 10 月 25 日 上午 9:00-11:00	孟幻 教授	Development of Nano immunotherapy using immunogenic cell death and reversing immunopression principles in gastrointestinal cancer	北京大学和中国科学院 大学
33	2018 年 11 月 1 日 14:00	王霖 研究员	极端压力条件下凝 聚态物质研究	北京高压科学研究中心 终身研究员
34	2018 年 11 月 8 日 上午 9:00-11:00	王方军 教授	基于质谱的蛋白质结构普分析 新方法	中国科学院大连 化学物理研究所

序号	时间	报告人	主题	单位
35	2018 年 11 月 13 日 上午 9 时	杨巍 副教授	Increase of Immunogenic Cell Death Triggered by Radiotherapy using DSF/Cu through ROS and IRE1α/XBP1s pathways in cancer stem cells	苏州大学
36	2018 年 11 月 22 日 上午 9:30	Prof. Xiaogang Liu	Upconversion Nanocrystals: The Expanding Toolbox	Department of Chemistry, National University of Singapore, Singapore 117543
37	2018 年 11 月 28 日 星期三下午 3:00	Simon K. Cheng, M.D., Ph.D.	Clinician's View of the Non-targeted Immunotherapy Response with Radiation	Department of Radiation Oncology, Center for Radiological Research, College of Physicians & Surgeons of Columbia University
38	2018 年 11 月 28 日 下午 1 点 30	马红娟 副教授	辐射接枝制备纤维吸附材料及其在海水提铀中的应用研究	中科院上海应用物理研究所
39	2018 年 12 月 6 日 上午 9:30	Prof. AlexanderEychmüller	The Journey of Colloidal Semiconductor Nanocrystals	Professor for Physical Chemistry, TU Dresden
40	2018 年 12 月 7 日 下午 4:00	江海龙 教授	金属有机框架的催化功能化	中国科技大学化学系
41	2018 年 12 月 26 日 上午 9：00	沈智渊 教授	Genomic Instability and Tumorigenesis: confounding roles of an essential caretaker gene BCCIP	美国罗格斯新泽西癌症研究所，罗格斯新泽西州立大学
42	2018 年 12 月 23 日 下午 15:00	步文博 教授	新型功能材料调控活性氧用于肿瘤高效治疗和神经调控研究	华东师范大学教授
43	2018 年 12 月 23 日 下午 15:00	Prof. Lianzhou Wang,	Designing Semiconductor Materials for Integrated Photo-electrochemical Energy Conversion	澳大利亚昆士兰大学化工学院终身教授
44	2018 年 12 月 18 日 14：30	刘信宽 博士	铀硅酸盐和氢氧化合物的高温高压水热合成	台湾中央大学博士后研究员
45	2018 年 12 月 21 日 14：30	唐江 教授	钙钛矿 X 射线探测器	华中科技大学武汉光电国家实验室
46	2018 年 9 月 16 日 上午 9：00	Kazunori Kataoka 教授	Self-assembled supramolecular nanosystems for smart diagnosis and targeted therapy of intractable diseases“	东京大学
47	2018 年 10 月 6 日	Michael A. Hill	Mineralocorticoid Receptors, Sodium Channels and Endithelial Cell Stiffness in Obesity	美国密苏里大学 道尔顿心血管中心
48	2018 年 10 月 7 日	Jose Lopez	von Willebrand factor Self-association and Regulation by lipoproteins	美国华盛顿大学
49	2018 年 10 月 7 日	Xiaoping Du	Signal transductions of integrins and a novel anti-thrombotic strategy	美国伊利诺伊大学 芝加哥分校
50	2018 年 10 月 7 日	Heyu Ni	Food, Sleep and Thrombosis: The role of apolipoprotein A-IV in platelet activities	加拿大多伦多大学

序号	时间	报告人	主题	单位
51	2018 年 9 月 10 日 下午 3:00-4:00	李凌衡博士	Overcoming immune escaping of cancer stem cells	美国 Stowers 医学研究所
52	2018 年 9 月 10 日 下午 1:00	Dr. Lawrence F. Brass	Using systems biology to understand hemostasis and thrombosis	University of Pennsylvania
53	2018 年 7 月 6 日 下午 2:00	王皞鹏 研究员	Explore new cancer therapeutic targets in T cell signaling pathway using proteomic and genetic approaches	上海科技大学
54	2018 年 6 月 25 日 上午 9:30	Dr. Hongbo Luo	Regulation of neutrophil function by inositol hexakisphosphate kinase 1	Harvard Medical School
55	2018 年 5 月 16 日 上午 10:00	Dr. Peisong Ma	Feedback regulation of G protein-coupled receptor signaling in platelets	Thomas Jefferson University
56	2018 年 5 月 5 日 上午 9:00	高明远 研究员	纳米探针与肿瘤诊疗应用	中国科学院化学研究所研究员、苏州大学讲座教授
57	2018 年 4 月 18 日 下午 2:00	Dr. Felice Elefant	Epigenetic control of higher order brainfunction in Alzheimer's disease	Drexel University
58	2018 年 4 月 11 日 下午 2:00	魏文毅 教授	Targeting cell signaling pathways for cancer therapy	哈佛医学院
59	2018 年 4 月 9 日 下午 3:50	Dr. Shentong Fang	Stem cell and their niches	University of Helsinki
60	2018 年 4 月 9 日 下午 3:10	Dr. Wei Deng	Structural basis of the mechanosensing mechanism of Von Willebrand factor and platelet receptor GPIb-IX complex	Emory University
61	2018 年 4 月 9 日 上午 11:00-12:00	Dr. Chingyu Huang	How to publish Nature/Nature Communications	Nat Commun Associate Editor
62	2018 年 1 月 5 日 上午 10:00-11:00	刘保池 教授	细胞治疗临床应用	上海市公共卫生临床中心
63	2018 年 11 月 7 日 9：00	许杰	寻找未知血流感应受体	美国诺华基因组研究所
64	2018 年 11 月 7 日 10：00	向芙莉	FixtheBrokenHeart	美国诺华基因组研究所
65	2018 年 9 月 17 日 14:00	JosephWu	StemCells&Genomics for Precision Medicine	美国斯坦福大学
66	2018 年 9 月 17 日 15:00	兰峰	基于等位基因特异性编辑的遗传性心脏病治疗研究	首都医科大学
67	2018 年 9 月 17 日 16:00	王永明	Human Pluripotent Stem Cell-derived Cardiomyocytes for Modeling TOF Disease and Identifying microRNAs Promoting Cell Proliferation	复旦大学
68	2018 年 9 月 17 日 17:00	李宗金	MSC 来源的外泌体在治疗性血管新生中的应用	南开大学
69	2018 年 6 月 16 日 10:00	于浩	走进芯片实验室	中国科学院大连化学物理研究所

序号	时间	报告人	主题	单位
70	2018 年 6 月 15 日 8:00	付小兵	如何实现损伤组织的完美修复与再生	解放军总医院
71	2018 年 6 月 15 日 8:30	杨黄恬	干细胞心肌修复：希望与挑战	中国科学院上海健康营养研究院
72	2018 年 6 月 15 日 9:00	徐国彤	干细胞与眼睛疾病	同济大学
73	2018 年 6 月 15 日 9:30	张宏	干细胞核医学分子影像	浙江大学
74	2018 年 6 月 15 日 10:00	周斌	遗传示踪及操作新技术的建立和应用	中国科学院生化与细胞生物学研究所
75	2018 年 6 月 15 日 10:30	刘兴国	Mitochondria remodeling in somatic cell reprogramming to iPSCs	中国科学院广州生物医药与健康研究院
76	2018 年 6 月 15 日 11:00	丁福森	血管微环境调控肺的再生和纤维化	四川大学
77	2018 年 6 月 15 日 11:30	甘振继	Skeletal muscle mitochondrial remodeling and diseases	南京大学
78	2018 年 6 月 15 日 14:00	高绍荣	Epigenetic regulation of early embryo development and somatic cell reprogramming	同济大学
79	2018 年 6 月 15 日 14:30	段才闻	骨髓微环境：亦正亦邪	上海交通大学
80	2018 年 6 月 15 日 15:00	柴人杰	建立神经干细胞移植和人工耳蜗植入相结合的新综合技术体系的研究	东南大学
81	2018 年 6 月 15 日 15:30	钟桂生	Investigate cytoskeleton structures by super-resolution fluorescence imaging	上海科技大学
82	2018 年 6 月 15 日 16:00	袁凯	基因组高度重复序列在胚胎发育与疾病中的功能	中南大学
83	2018 年 3 月 26 日 上午 10:00	Douglas R. Green, PhD	Science Matters: How your science can make a difference	St. Jude Children's Research Hospital
84	2018 年 6 月 13 日 上午 10:00	Jim Xiang 教授	The critical role of focal adhesion and FAK/RhoA signaling in regulating microgravity-induced alterations in cell biology	加拿大萨斯卡彻温大学
85	2018 年 7 月 18 日 上午 10:00	Gobardhan Das 教授	Immunotherapy of TB is a Difficult Proposition: Mission Supersedes Vision	印度尼赫鲁大学
86	2018 年 9 月 17 日 下午 14:00	Joseph C. Wu 教授	Stem Cells & Genomics for Precision Medicine	斯坦福大学
87	2018 年 11 月 16 日 下午 14:00	杨亚平教授	The Role of Exome Sequencing in Diagnoses and Discoveries	美国贝勒医学院
88	2018 年 12 月 3 日 下午 14:00	Shisan Bao 教授	Novel cytokines in atherogenesis	悉尼大学

2、外出参加交流

序号	会议名称	会议时间	会议举办地点	参加人员	会议类别	报告/交流论文题目
1	第一届全国环境化学青年学者论坛	2018.04.20-22	南京	李瑞宾	国内	Chemical Reactions of 2D Materials at Pulmonary Interfaces
2	化学会第 31 届学术年会	2018.05.5-8	杭州	李瑞宾	国内	Pulmonary Toxicity Studies on 2D Materials
3	第四届环境污染与健康国际会议	2018.05.18-20	天津	李瑞宾	国际	Using Engineered Nanomaterials to Overcome Environmental Microbial Resistance
4	纳米生物学学科发展战略研讨会	2018.11.2-3	昆山	李瑞宾	国内	纳米毒理评价方法和技术的发展及潜在问题
5	第九届亚洲纳米科学和纳米技术会议	2018.10.19-22	青岛	李瑞宾	国际	Exploring the interactions between nanomaterials and immune cells
6	第十四期理论物理专题讲学	2018.08.7-28	西安	刘胜堂	国内	
7	第三届全球华人辐射研究大会	2018.05.11-13	天津	焦旸	国内	双硫仑对胰腺癌细胞放射敏感性的影响以及机制的初步研究
8	中华医学会第十一次全国放射医学与防护学术交流会	2018.12.12-14.	遵义	焦旸	国内	1. 双硫仑对胰腺癌细胞放射敏感性的影响及机制研究；2. Fatty acid binding protein 4 confers the radio-resistance of pancreatic cancer in response to X-ray
9	中华预防医学会放射卫生专业委员会第八次全国学术会议	2018.11.22-24.	佛山	曹建平	国内	泛素及泛素蛋白酶体途径调节放射敏感性机制研究（大会报告）
10	FNCA 肿瘤放疗 2018 年研讨会	2018.11.2-7	孟加拉国，达卡	曹建平	国际	肿瘤局部晚期宫颈癌同步化疗中国研究报告（大会报告)
11	中国化学会纪念何炳林院士诞辰 100 周年暨第 19 届反应性高分子学术研讨会	2018.08.24-26	天津	华道本	国内	磷酸酯功能化多孔芳香沥青骨架材料对水溶液中铀的吸附研究
12	生物医药创新与资本高峰研讨会暨放射性药物产业化专题研讨会	2018.09.1	潍坊	华道本	国内	核应急高效辐射防护药物研究
13	第七届全国环境放射化学学术研讨会	2018.10.24-30	南昌	华道本	国内	聚肟-胍基功能化聚丙烯无纺布用于潜在的海水提铀研究（杨森）；偕胺肟功能化荧光共轭微孔聚合物用于铀酰离子选择性吸附和检测（徐美芸）

序号	会议名称	会议时间	会议举办地点	参加人员	会议类别	报告/交流论文题目
14	第十一次全国放射医学与防护学术交流会	2018.12.12-15	遵义	华道本	国内	聚多巴胺功能化纳米药物用于肠道辐射防护研究（张钰烁）;基于普鲁士蓝的纳米药物用于铯的促排和辐射防护研究（蔡苏亚）
15	中国毒理学会放射毒理专业委员会第十二次全国学术会议	2018.10.09-12	衡阳	胡亮	国内	基于荧光比色法构建一种新颖的纳米凝胶剂量计
16	亚太辐射化学会议	2016.11.5-7	上海	胡亮	国际	γ 际秋 2511.5-11.7 习米凝胶剂量计学术会议研讨会 es abscopal bone loss and iron overloadeparednee and Assistance Networ
17	化学会第 31 届学术年会	2018.05.5-8	杭州	刘志勇	国内	中国南部河流沉积物中 239Pu,240Pu 和 241Pu 的同位素特征
18	第一屆「海峽兩岸環境放射化學與核種遷移研討會」	2018.09.20-23	台北	刘志勇	国内	
19	2018 年度核测试与分析学术交流会	2018.12.19-21	西昌	刘志勇	国内	长江及华南流域沉积物中铀(U)和钚(Pu)的指纹分布特征
20	中国辐射防护学会放射生态分会成立大会召开	2018.07.22-23	北京	刘志勇	国内	无
21	第三届全球华人辐射研究大会	2018.05.11-13	天津	徐加英	国际	乳铁蛋白下调 AIM2 炎症小体防治放射性肝损伤
22	第一届空间辐射生物高峰论坛	2018.06.6-7	浙江宁波	徐加英	国内	
23	“放射医学的传承与创新”吴德昌院士学术成就报告会	2018.08.11	北京	徐加英	国内	
24	国家虚拟仿真实验教学项目建设研讨会	2018.09.7-9	北京昌平	徐加英	国内	
25	中国空间科学学会空间生命专业委员会第 22 届学术研讨会和中国宇航学会航天医学工程与科技生物学专业委员会第6届学术研讨会	2018.10.11-13	苏州	徐加英	国内	
26	第四届分子影像与纳米医学国际研讨会	2018.11.4-7	苏州	徐加英	国内	

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27	中华医学会第十一次全国放射医学与防护学术交流会	2018.12.12-14	合肥	徐加英	国内	乳铁蛋白对辐射损伤小鼠肝脏的保护作用
28	航天医学与生物工程）编委会、空间站航医学第一项目指南说明会、中国航天医学 50 年战略研讨会、92-1 航天医学专家委员会	2018.04.18-21	南宁	周光明	国内	讨论
29		2018.04.22.-25	日本广岛	周光明	国际	应邀赴广岛大学原爆放射线医科学研究所签署合作协议
30	第三届全球华人辐射研究大会(GCCRR2018	2018.05.11-13		周光明	国际	
31	第一届空间辐射生物高峰论坛	2018.06.6-8		周光明	国内	Cytoskeleton and space radiobiological effects
32	第十三届全国分析化学年会	2018.6.14-17	西安	汪勇	国内	蛋白仿生纳米探针与生物成像
33	第四届分子影像与纳米医学国际研讨会	2018.11.4-8	苏州	汪勇	国内	Albumin-Bioinspired Gd2O3 Nanoparticles for In Vivo Imaging
34	中国辐射防护学会建筑物室内氡测量与控制专业委员会第六次会议	2018.12.9-10	苏州	涂彧	国内	
35	第三届全球华人会议	2018.5.11-13	天津	王畅	国内	基于GC-MS拟靶标代谢组学的全身照射患者血浆代谢特征的研究
36	中华预防医学会放射卫生专业委员会第八次全国学术研讨会	2018.1.2 -23	佛山	孙亮	国内	
37	建筑内室内氡测量与控制专业委员会第六次会议	2018.12.9-10	苏州	孙亮	国内	
38	ChinaNanoMedicine 2018	2018.1.5-7	大学	陈华兵	国内	Photoactive Nanoparticles for Cancer Therapy
39	SIPCD 2018	2018.1.4-7	大学	陈华兵	国际	Rational Design of Photoactive Nanoparticles
40	第 80 届日本血液学会（JSH）	2018.10.12-14	日本大阪	吴德沛	国际	CD19 CAR-T Bridging to allo-SCT

序号	会议名称	会议时间	会议举办地点	参加人员	会议类别	报告/交流论文题目
41	第 60 届 ASH 年会	2018.12.1-4	美国 圣地亚哥	戴克胜	国际	Akt-Mediated Platelet Apoptosis and Its Therapeutic Implications in Immune Thrombocytopenia
42	第 60 届 ASH 年会	2018.12.1-4	美国 圣地亚哥	夏利军	国际	Chair, Session 331 Pathophysiology of thrombosis
43	International Conference on Emerging Healthcare Materials	2018.11.15-16	韩国 首尔	钟志远	国际	Robust and Reduction-Responsive Polymersomes: A Novel and Advanced Platform for Targeted Tumor Therapy and Imaging
44	Biomaterials International 2018	2018.7.22-26	日本 东京	钟志远	国际	Disulfide-Crosslinked Nanomedicines: A Multifunctional Yet Simple Platform for Targeted Cancer Therapy
45	Bordeaux Polymer Conference	2018.5.28-31	法国 波尔多	钟志远	国际	Robust Degradable Nano-Polymersomes forTargeted Tumor Therapy and Imaging
46	第 60 届 ASH 年会	2018.12.1-4	美国 圣地亚哥	武艺	国际	Coagulation Factor XII Plays an Important Role in Procoagulant Activity of Apoptotic Cells
47	第 60 届 ASH 年会	2018.12.1-4	美国 圣地亚哥	朱力	国际	Tannic acid inhibits protein disulfide isomerase, platelet activation and thrombus formation
48	Advanced Medical Research Series	2018.10.19	美国 克利夫兰	吴庆宇	国际	The heart as an endocrine organ
49	2018 年北美血管生物学组织会议	2018.10.14-18	美国	武艺	国际	Growth arrest-specific gene 6 receptors, Tyro3, Axl, and Mer, differentially participate in platelet activation and thrombus formation
50	第 64 届 ISTH-SSC 年会	2018.07.17-22	爱尔兰	武艺	国际	Novel functions of the contact system in innate immunity.
51	第 5 届 Bradykinin 研讨会	2018.09.5-7	德国 柏林	武艺	国际	The plasma kallikrein-kininogen system ́s contributions to host defense
52	2018 年激肽原国际研讨会	2018.06.17-20	美国	武艺	国际	kininogen：A key player in innate immunity.
53	第二十届国际血管生物学会议	2018.06.17-20	芬兰	何玉龙	国际	Tie2 in the regulation of angiogenesis and lymphatic formation

序号	会议名称	会议时间	会议举办地点	参加人员	会议类别	报告/交流论文题目
54	International Conference on Pharmaceutical Chemistry	2018.07.10-18	法国巴黎	周泉生	国际	雷公藤类脂酮通过选择性地激活肿瘤抑制信号通路 MAPK 有效地抑制胰腺癌细胞致瘤性和肿瘤生长
55	2018 年 Keystone 分子与细胞生物学（血管生物学与人类疾病）研讨会	2018.02.24-03.2	美国	武艺	国际	Plasma kallikrein is critical for synovial neovascularization in the pathogenesis of arthritis
56	Gordon Research Conference on Plasminogen and Extracellular Proteolysis	2018.02.11-16	美国加利福尼亚州	吴庆宇	国际	Membrane-bound serine proteases in liver metabolism
57	NIH Cardiovascular Bioengineering Symposium	2018.3.1 -2018.3.2	美国 Birmingham	胡士军	国际	Non-coding RNA and Cardiac Stem Cell Biology
58	2018 中国南方国际心血管病学术会议	2018.4.5 -2018.4.8	中国广州	胡士军	国际	Pluripotent Stem Cells and Cardiac Regeneration
59	中俄医学研究中心代谢疾病研究所学术会议	2018.5.10 -2018.5.13	中国哈尔滨	胡士军	国际	LncRNAs andCardiacRepair
60	第十二届东方心脏病学会议	2018.5.31 -2018.6.3	中国上海	胡士军	国际	StemCellsandCardiacRepair
61	第五届武汉国际心血管大会	2018.6.22 -2018.6.24	中国武汉	胡士军	国际	多能干细胞与心血管转化医学
62	第八届国际寒地心脏病学会议	2018.7.12 -2018.7.15	中国哈尔滨	胡士军	国际	StemCellsandCardiovascular Diseases
63	Basic Cardiovascular Sciences Scientific Sessions 2018	Basic Cardiovascular Sciences Scientific Sessions 2018	美国 SanAntonio	胡士军	国际	Signature Of Circular Rnas In Human Induced Pluripotent Stem Cells And Derived Cardiomyocytes
64	中国病理生理学会心血管专业委员会（第十七届）暨国际心脏研究学会（ISHR）中国分会（第十四届）学术大会	2018.9.19 -2018.9.22	中国南京	胡士军	国内	干细胞与心血管转化医学
65	第 80 届日本血液学会（JSH）	2018.10.12 -10.14	日本大阪	吴德沛	国际	CD19 CAR-T Bridging to allo-SCT

序号	会议名称	会议时间	会议举办地点	参加人员	会议类别	报告/交流论文题目
66	第 60 届 ASH 年会	2018.12.1 - 4	美国 圣地亚哥	戴克胜	国际	Akt-Mediated Platelet Apoptosis and Its Therapeutic Implications in Immune Thrombocytopenia
67	第 60 届 ASH 年会	2018.12.1 - 4	美国 圣地亚哥	夏利军	国际	Chair, Session 331 Pathophysiology of thrombosis
68	广岛大学与苏州大学学术交流	2018.4.23-26	日本 广岛	刘玉龙	国际	Clinic experience for the treatment of Nanjing 192Ir accident
69	山东济南第一届癌症精准医疗国际研讨会	2018/4/9-/10	山东 济南	时玉舫	国际	Mesenchymal stem cells in the tumor microenvironment（间充质干细胞在肿瘤微环境中的作用）
70	2018 国际肿瘤细胞免疫治疗舟山峰会 -暨 CAR -T 细胞免疫生物治疗学组研讨会	2018/4/19-20	宁波 舟山	时玉舫	国际	间充质干细胞与肿瘤免疫治疗
71	2018 上海交通大学糖尿病当代焦点论坛	2018/5/26	上海	时玉舫	国内	干细胞的基础研究与临床转化
72	第 8 届大脑与干细胞国际研讨会	2018/8/18	云南 昆明	时玉舫	国际	间充质干细胞与疾病
73	第九届全国生物治疗大会	2018/9/7-8	常州	时玉舫	国内	间充质干细胞的免疫调节作用与临床应用
74	首届澳门干细胞研讨会	2018/9/11-12	澳门	时玉舫	国内	间充质干细胞在肿瘤微环境中的作用
75	中国干细胞 第八届年会	2018/9/14-16	济南	时玉舫	国内	Immunoregulatory mechanisms of mesenchymal stem and stromal cells in inflammatory disease
76	The 1st Baodi Forum:Medical Innovations in Health and Disease	2018/10/26-27	天津	时玉舫	国内	Immunoregulatory mechanisms of mesenchymal stem and stromal cells in inflammatory disease
77	2018 World Life Science Conference	2018/10/27-29	北京	时玉舫	国际	Immunoregulatory mechanisms of mesenchymal stem and stromal cells in inflammatory disease
78	中国工程院 2018 医学免疫与临床应用高峰论坛	2018/11/2-3	南京	时玉舫	国内	Immunoregulatory mechanisms of mesenchymal stem and stromal cells in inflammatory disease

六、授权专利目录

序号	发明人	名称	类别	专利号
1	Fenju Liu(刘芬菊), Jie Du, Jiahua Yu, Haowen Zhang, Zengfu Shang, Yushuo Zhang	Method fordeterming the repair activity of non-homologous end joining	国际发明专利美国专利：	US9,863,933 B2
2	Zhanshan Yang (杨占山），Wei Wu,Huiping Qiao,Ling Wen,Yi Shi,Lili Ren, Dong Yu(于冬)	DNA molecule used for recombinant pichia plasmid and recombinant pichia strain expressing PPRI proyein of Deinococcus Radiodurans	国际发明专利美国专利：	US010000761B2
3	李永强	一种细菌的现场快速可视化检测方法及其试剂盒	发明专利	ZL201510304970.5
4	崔凤梅、陈　秋	一种中药组合物及其在制备氚水内污染促排和防护药物中的用途	发明专利	ZL201410348501.9
5	周光明、李朋飞 裴海龙、胡文涛 李冰燕、黑国庆	参与人体细胞电离辐射应激反应的长链非编码 RNA 及其应用	发明专利	ZL201510067989.2
6	刘芬菊、杜　杰 俞家华、张昊文 尚增甫、张钰烁	一种测定非同源末端连接修复活性的方法	发明专利	ZL201510478296.2
7	周光明、胡文涛 李朋飞、裴海龙 李冰燕、黑国庆	参与人体细胞电离辐射应激反应的长链非编码 RNA 及其应用	发明专利	ZL201510067768.5
8	周光明、裴海龙 李朋飞、胡文涛 李冰燕、黑国庆	参与人体细胞电离辐射应激反应的长链非编码 RNA 及其应用	发明专利	ZL201510067423.X
9	周光明、李朋飞 胡文涛，裴海龙 李冰燕，黑国庆	参与人体细胞电离辐射应激反应的长链非编码 RNA 及其应用	发明专利	ZL201510067990.5
10	尚增甫、谷蒙蒙 周平坤、肖倍倍 李　明、薛培君 卢双双	丁香醛在制备电离辐射致肠道损伤防护药物中的应用	发明专利	ZL201610236133.8

序号	发明人	名称	类别	专利号
11	李　桢、张少华	金属硫族化合物多功能纳米探针的制备方法及其应用	发明专利	ZL201610213490.2
12	王殳凹、王亚星 尹雪苗	一种分离镧系元素的方法	发明专利	ZL201610537816.7
13	李　桢、任　峰 高明远	一种含锰氟化物纳米晶体的制备方法	发明专利	ZL201710046027.8
14	李　桢、孙彩侠 赵崇军	一种具有生物相溶性的黑磷纳米颗粒及其制备方法和应用	发明专利	ZL201510968976.2
15	周泉生、曹志飞 傅士龙	木蝴蝶苷 B 的应用及含木蝴蝶苷 B 的药物	发明专利	ZL201410328759.2
16	陈华兵、郭正清 邹烨璘、何　慧 邓益斌、柯亨特 杨　红、饶佳明	一种铂基化氟硼二吡咯类化合物及制备方法和应用	发明专利	ZL201610846899.8
17	陈华兵、杨　涛 邓益斌、汪　勇 柯亨特、郭正清 何　慧、杨　红 邹烨璘、计双双 汪巧莉	具有近红外光热效应的铜基人血白蛋白纳米复合物及其制备方法	发明专利	ZL 201510566206.5
18	陈华兵、邓益斌 杨　红、柯亨特 黄　丽、朱爱军 郭正清	具有近红外光热和体内荧光成像特点的多功能介孔二氧化硅纳米粒及其制备方法和应用	发明专利	ZL 201510490341.6
19	钟志远、邹　艳， 孟凤华	一种侧链含双碘功能基团的生物可降解聚合物及其应用	发明专利	ZL201610078843.2
20	陈新建、郭静云 朱伟芳、陈浩宇	一种基于三维 OCT 图像的全自动分类及分割视网膜分支动脉阻塞的方法	发明专利	ZL201510924198.7
21	文万信、杨　韬 刘汉洲、闫思齐	一种新型三维凝胶剂量计材料及其制备方法	发明专利	ZL201510932342.1
22	刘汉洲、文万信 樊文慧、闫思齐	一种水溶性聚苯乙烯纳米微球的制备方法	发明专利	ZL 201510809345.6

序号	发明人	名称	类别	专利号
23	张　琦、王文洁 唐志成、唐明正 张舒羽	一种微球分离装置 及其分离方法	发明专利	ZL 201610595495.6
24	罗居东、张　琦 张舒羽、宋　琴 周希法、曹建平	一种神经电极	发明专利	ZL201610598554.5
25	刘汉洲、樊文慧 文万信、闫思齐	用于放射治疗三维剂量验证 的凝胶的制备方法及应用	发明专利	ZL201610423188.X
26	程　茹、王秀秀 钟志远	胱胺二异氰酸酯单体、 基于该单体的聚合物及其 制备方法和应用	发明专利	ZL201510952367.8
27	邓　超、武金田 孟凤华、钟志远	基于疏水功能性小分子–亲水 聚氨基酸的生物可降解聚合 物及其制备方法和应用	发明专利	ZL201610307256.6
28	孟凤华、邹　艳 钟志远	一种侧链含双硫五元环功能 基团的碳酸酯聚合物在制备 药物控制释放载体中的应用	发明专利	ZL201510973768.1
29	吴安庆、潘书贤 聂　晶、周光明	用于免疫组化实验的洗片盒	实用新型	ZL2017210997148
30	张舒羽、盛文炯 王文洁、钱宁靖 莫　韦	恒温运输车	实用新型	ZL201721496959.4
31	吴　艳、曾剑锋	一种光声断层扫描分子成 像系统体外样品专用上样 架子组合	实用新型	ZL201820711376.7
32	张　琦、封　琼 吴安庆、邱裕友 曹建平	一种泵车冷冻干燥装置	实用新型	ZL201720972704.4
33	刘汉洲、黎　清 胡　亮、文万信	一种用于制备实验气体装置	实用新型	ZL201720399799.5
34	盛文炯、张舒羽 马延超、朱　巍 唐志成	制冷装置	实用新型	ZL201721487823.7

七、论文目录

序号	论文题目	刊物名称	卷、期、页	作者
1	Rational Design of Conjugated Photosensitizers with Controllable Photoconversion for Dually Cooperative Phototherapy	Advanced Materials	2018, 30, 1801216	Shuyue Ye, Jiaming Rao, Shihong Qiu, Jinglong Zhao, Hui He,* Ziling Yan, Tao Yang, Yibin Deng, Hengte Ke, Hong Yang, Yuliang Zhao, Zhengqing Guo,* and Huabing Chen*
2	Highly In-Plane Anisotropic 2D GeAs2 for Polarization-Sensitive Photodetection	Advanced Materials	2018, 30, 1804541	Liang Li, Penglai Gong, Daopeng Sheng, Shuao Wang,Weike Wang, Xiangde Zhu,* Xingqiang Shi, Fakun Wang, Wei Han, Sanjun Yang, Kailang Liu, Huiqiao Li,* and Tianyou Zhai*
3	Immunoregulatory mechanisms of mesenchymal stem and stromal cells in inflammatory disease	Nature Reviews Nephrology	2018, 14(8), 493-507	Yufang Shi, Yu Wang, Qing Li, Keli Liu, Jianquan Hou1, Changshun Shao, Ying Wang[#]
4	Ultrasmall Hyperbranched Semiconducting Polymer Nanoparticles with Different Radioisotopes Labeling for Cancer Theranostics	ACS Nano	2018, 12, 9142−9151	Xuan Yi, Meiyun Xu, Hailin Zhou, Saisai Xiong, Rui Qian, Zhifang Chai, Li Zhao,* Kai Yang*
5	Surface oxidation of graphene oxide determines membrane damage, lipid peroxidation, and cytotoxicity in macrophages in a pulmonary toxicity model	ACS Nano	2018, 12, 1390−1402	Ruibing Li, Linda M Guiney, Chong Hyun Chang, Nikhita D Mansukhani, Zhaoxia Ji, Xiang Wang, Yu-Pei Liao, Wen Jiang, Bingbing Sun, Mark C Hersam, Andre E Nel, Tian Xia
6	Apolipoprotein E Peptide-Directed Chimeric Polymersomes Mediate an Ultrahigh-Efficiency Targeted Protein Therapy for Glioblastoma	ACS Nano	2018, 12, 11070-11079	Yu Jiang, Jian Zhang*, Fenghua Meng, and Zhiyuan Zhong*
7	Highly Effective Radioisotope Cancer Therapy with a Non-Therapeutic Isotope Delivered and Sensitized by Nanoscale Coordination Polymers	ACS Nano	2018, 12, 7519-7528	Yu Chao, Chao Liang, Yu Yang , Guanglin Wang, Debabrata Maiti†, Longlong Tian, Fei Wang, Wei Pan, Song Wu*, Kai Yang*, and Zhuang Liu*

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8	Calcium Bisphosphonate Nanoparticles with Chelator-Free Radiolabeling to Deplete Tumor-Associated Macrophages for Enhanced Cancer Radioisotope Therapy	ACS Nano	2018, 12, 11541-11551	Longlong Tian, Xuan Yi, Ziliang Dong, Jun Xu, Chao Liang, Yu Chao, Yaxing Wang, Kai Yang*, and Zhuang Liu*
9	Unique Proton Transportation Pathway in a Robust Inorganic Coordination Polymer Leading to Intrinsically High and Sustainable Anhydrous Proton Conductivity	Journal of the American Chemical Society	2018, 140, 6146−6155	Daxiang Gui, Xing Dai, Zetian Tao, Tao Zheng, Xiangxiang Wang, Mark A Silver, Jie Shu, Lanhua Chen, Yanlong Wang, Tiantian Zhang, Jian Xie, Lin Zou, Yuanhua Xia, Jujia Zhang, Jin Zhang, Ling Zhao*, Juan Diwu, R. H. Zhou*, Zhifang Chai, Shuao Wang*
10	The transmembrane protein disulfide isomerase TMX1 negatively regulates platelet responses	Blood	2018 Nov 13	Zhenzhen Zhao, Yi Wu,Junsong Zhou, Fengwu Chen, Aizhen Yang, David W. Essex
11	Increased vessel perfusion predicts the efficacy of immune checkpoint blockade	J. Clin. Invest.	2018, 128(5), 2104-2115	Xichen Zheng, Zhaoxu Fang, Xiaomei Liu, Shengming Deng, Pei Zhou, Xuexiang Wang, Chenglin Zhang, Rongping Yin, Haitian Hu,1 Xiaolan Chen, Yijie Han, Yun Zhao, Steven H. Lin, Songbing Qin, Xiaohua Wang, Betty Y.S. Kim, Penghui Zhou, Wen Jiang, Qingyu Wu, and Yuhui Huang*
12	Monitoring the Opening and Recovery of the Blood-Brain Barrier with Noninvasive Molecular Imaging by Biodegradable Ultrasmall Cu2-xSe Nanoparticles	Nano Letters	2018, 18, 4985-4992	Hao Zhang, Tingting Wang, Weibao Qiu, Yaobao Han, Qiao Sun,Jianfeng Zeng, Fei Yan, Hairong Zheng, Zhen Li*, and Mingyuan Gao
13	Synthesis of Pt Hollow Nanodendrites with Enhanced Peroxidase-Like Activity against Bacterial Infections:Implication for Wound Healing	Adv. Funct. Mater.	2018, 28, 1801484	Wu R, Chong Y, Fang G, Jiang X, Pan Y, Chen C, Yin J, Ge C
14	Palladium concave nanocrystals with high-index facets accelerate ascorbate oxidation in cancer treatment.	Nature Communications	2018, 9, 4861	Chong Y, Dai X, Fang G, Wu R, Zhao L, Ma X, Tian X, Lee S, Zhang C, Chen C, Chai Z, Ge C, Zhou R.
15	Multi-hierarchical profiling the structure-activity relationships of engineered nanomaterials at nano-bio interfaces	Nature Communications	2018, 9:4416	Xiaoming Cai, Jun Dong, Jing Liu, Huizhen Zheng, Chitrada Kaweeteerawat, Fangjun Wang, Zhaoxia Ji & Ruibin Li

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17	Employing an Unsaturated Th4+ Site in a Porous Thorium-Organic Framework for Kr/Xe Uptake and Separation	Angewandte Chemie International Edition	2018, 57, 5783-5787	Wang, Yanlong; Liu, Wei; Bai, Zhuanling; Zheng, Tao; Silver, Mark A; Li, Yuxiang; Wang, Yaxing; Wang, Xia; Diwu, Juan; Chai, Zhifang; Wang, Shuao*
18	Emergence of Uranium as a Distinct Metal Center for Building Intrinsic X-ray Scintillators	Angewandte Chemie-International Edition	2018, 57, 7883-7887	Yaxing Wang , Xuemiao Yin,Wei Liu,Jian Xie,Junfeng Chen, Mark A.Silver,Daopeng Sheng,Lanhua Chen,Juan Diwu, Ning Liu, Zhifang Chai, Thomas E. Albrecht-Schmitt, and Shuao Wang
19	Akt-mediated platelet apoptosis and its therapeutic implications in immune thrombocytopenia	PNAS	2018, 115, 10682-10691	Mengxing Chen , Rong Yan , Kangxi Zhou , Xiaodong Li , Yang Zhang , Chunliang Liu , Mengxiao Jiang , Honglei Ye , Xingjun Meng , Ningbo Pang , Lili Zhao , Jun Liu , Weiling Xiao , Renping Hu , Qingya Cui , Wei Zhong , Yunxiao Zhao , Mingqing Zhu , Anning Lin , Changgeng Ruan , Kesheng Dai*
20	Long non-coding RNA CRYBG3 blocks cytokinesis by directly binding G-actin	Cancer Research	2018, 78, 4563-4572	Hailong Pei, Wentao Hu, Ziyang Guo,Huaiyuan Chen，Ji Ma, Weidong Mao,Bingyan Li, Aiqing Wang,Jianmei Wan,Jian Zhang,Jing Nie,Guangming Zhou, Tom K. Hei
21	Conjugated microporous polymers bearing phosphonate ligands as an efficient sorbent for potential uranium extraction from high-level liquid wastes	Journal of Materials Chemistry A	2018, 6, 13894-13900	Xu, M.; Han, X.; Wang, T.; Li, S.; Hua, D.*
22	Molecular Mechanism of Phosphoinositides' Specificity for the Inwardly Rectifying Potassium Channel Kir2. 2	Chemical Science	2018, 9, 8352-8362	Xuanyu Meng, Seung-gu Kang, Ruhong Zhou*

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23	Superior Compatibility of C2N with Human Red Blood Cell Membranes and the Underlying Mechanism	Small	2018, 1803509	Lu Liu, Shitong Zhang, Lin Zhao, Zonglin Gu, Guangxin Duan, Bo Zhou, Zaixing Yang, and R. H. Zhou
24	A nanoFlare-based strategy for in situ tumor margin demarcation and neoadjuvant gene/photothermal therapy	Small	2018, 1802745	Rong Yan, Jie Chen, Jianhao Wang, Jiaming Rao, Xuancheng Du, Yongming Liu, Leshuai Zhang, Lin Qiu, Bo Liu, Yuandi Zhao, Pengju Jiang, Chunying Chen, Yongqiang Li
25	Ultra-small nanocluster mediated synthesis of Nd3+-doped core-shell nanocrystals with emission in the second near-infrared window for multimodal imaging of tumor vasculature.	Biomaterials	2018,175, 30-43	Ren, Feng; Ding, Lihua; Liu, Hanghang; Huang, Qian; Zhang, Hao;Zhang, Lijuan; Zeng, Jianfeng; Sun, Qiao; Li, Zhen*; Gao, Mingyuan
26	Dendritic cell-mediated delivery of doxorubicin-polyglycerolnanodiamond composites elicits enhanced anti-cancer immune response in glioblastoma	Biomaterials	2018, 181, 35e52	Tongfei Li, Ke Li, Quan Zhang, Chao Wang, Yuan Yue, Zhuo Chen,Shenjun Yuan, Xin Liu, Yu Wen, Min Han, Naoki Komatsu, Yonghong Xu,Li Zhao*, Xiao Chen
27	The tango of ROS and p53 in tissue stem cells	Cell Death& Differentiation	2018, 25(4), 637-639	Youguo Chen, Keli Liu, Yufang Shi, Changshun Shao[#]
28	N-glycosylation in the protease domain of trypsin-like serine proteases mediates calnexin-assisted protein folding	Elife	2018, 7, e35672	Wang H, Li S, Wang J, Chen S, Sun XL, Wu Q*
29	Emerging predictors of the response to the blockade of immune checkpoints in cancer therapy	Cellular & Molecular Immunology	2018 Jul 12	Xiaolei Li,* Wenhui Song,* Changshun Shao, Yufang Shi,[#] Weidong Han[#]
30	Cu-Fe-Se Ternary Nanosheet-Based Drug Delivery Carrier for Multimodal Imaging and Combined Chemo-photothermal Therapy of Cancer	ACS Applied Materials & Interfaces	2018, 10, 43396-43404	Xinxin Jiang, Yaobao Han, Hao Zhang, Hanghang Liu, Qian Huang, Tingting Wang, Qiao Sun, and Zhen Li*
31	Covalent Organic Framework Functionalized with 8-Hydroxyquinoline as a Dual-Mode Fluorescent and Colorimetric pH Sensor	ACS Applied Materials & Interfaces	2018, 10, 15364-15368	Long Chen, Linwei He, Fuyin Ma, Wei Liu, Yaxing Wang, Mark A. Silver, Lanhua Chen, Lin Zhu, Daxiang Gui, Juan Diwu, Zhifang Chai, and Shuao Wang
32	Highly Sensitive Detection of UV Radiation Using a Uranium Coordination Polymer	ACS Applied Materials & Interfaces	2018, 10, 4844-4850	Wei Liu, Xing Dai, Jian Xie,Mark A. Silver, Duo Zhang, Yanlong Wang, Yawen Cai, Juan Diwu, Jian Wang,Ruhong Zhou, Zhifang Chai, and Shuao Wang

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33	Nano-graphene oxide-manganese dioxidenanocomposites for overcoming tumor hypoxiaand enhancing cancer radioisotope therapy	Nanoscale	2018, 10, 5114–5123	Yugui Tao, Longlong Zhu, Yunayuan Zhao Xuan Yi, Longbao Zhu, Fei Ge, Xiaozhou Mou,* Lei Chen,* Liang Sun, Kai Yang*
34	Development of a thermosensitive protein conjugated nanogel for enhanced radiochemotherapy of cancer	Nanoscale	2018, 10, 13976-13985	Debabrata Maiti, Yu Chao, Ziliang Dong, Xuan Yi, Jinlin He, Zhuang Liu, Kai Yang*
35	Acidic pH/reduction Dual-stimuli Responsive Nanoprobe for Enhanced CT Imaging of Tumours in vivo	Nanoscale	2018, 10, 20126-20130	Anna Wang, Ling Yin, Lei He, Huawei Xia, Fei Chen, Meng Zhao, Jianan Ding and Haibin Shi*
36	Construction of dual-functional polymer nanomaterials with near-infrared fluorescence imaging and polymer prodrug by RAFT-mediated aqueous dispersion polymerization	Nanoscale	2018, 10, 10277-10287	Chun Tian, Jinyun Niu, Xuerui Wei, Yujie Xu，Lifen Zhang，Zhenping Cheng，Xiulin Zhu
37	Detection of lymph node metastasis with nearinfrared upconversion luminescent nanoprobes	Nanoscale	2018, 10, 21772-21781	Shanshan Qiu, Jianfeng Zeng, Yi Hou, Lei Chen,Jianxian Ge, Ling Wen, Chunyan Liu, Youjiu Zhang, Ran Zhu*，and Mingyuan Gao*
38	Increased oxidative stress mediates the antitumor effect of PARP inhibition in ovarian cancer	Redox Biology	2018, 17, 99-111	Dong Hou, Zhaojian Liu, Xiuhua Xu, Qiao Liu, Xiyu Zhang, Beihua Kong, Jianjun Wei, Yaoqin Gong, Changshun Shao#.
39	Radionuclide Imaging-Guided Chemo-Radioisotope Synergistic Therapy Using a 131I-Labeled Polydopamine Multifunctional Nanocarrier	Molecular Therapy	2018, 26, 1385-1393	Zhiqiang Li, Baikui Wang, Zheng Zhang, Bo Wang, Qiangqiang Xu,Wenjie Mao, Jie Tian, Kai Yang*, Fu Wang*
40	High-Mobility Group Box 1 From Hypoxic Trophoblasts Promotes Endothelial Microparticle Production and Thrombophilia in Preeclampsia	Arterioscler Thromb Vasc. Biol.	2018, 38(6), 1381-1391	Yae Hu , Ruhong Yan , Ce Zhang , Zhichao Zhou , Meng Liu , Can Wang , Hong Zhang , Liang Dong , Tiantian Zhou , Yi Wu , Ningzheng Dong* , and Qingyu Wu*
41	The Protective Role of Autophagy in Nephrotoxicity Induced by Bismuth Nanoparticles Through AMPK/mTOR Pathway	Nanotoxicology	2018, 12, 586-601	Liu Y, Yu H, Zhang X, Wang Y, Zhao J, Shi H, Li R, Wang Y*, Zhang L*
42	Noninvasive Multimodal Imaging of Osteosarcoma and Lymph Nodes Using a 99mTc-Labeled Biomineralization Nanoprobe	Analytical Chemistry	2018, 90, 4529–4534	Zhiming Xu, Yangyun Wang, Jianshan Han, Qingqing Xu, Jiawei Ren, Jiaying Xu, Yong Wang,* Zhifang Chai

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44	Phosphonate and Carboxylic Acid Co-FunctionalizedMoS2 Sheetsfor Efficient Sorption of Uranium and Europium: Multiple Groups for Broad-SpectrumAdsorption	Journal of Hazardous Materials	2018, 354, 191-197	Yang, S.; Hua, M.; Shen,L.; Han, X.; Xu, M.; Kuang, L.*; Hua, D.*
45	On-off-on gold nanocluster-based fluorescent probe for rapid Escherichina coli differentiation, detection and bactericide screening	ACS Sustainable Chemistry & Engineering	2018, 6, 4504−4509	Rong Yan, Zhangxuan Shou, Jie Chen, Hao Wu, Yuan Zhao, Lin Qiu, Pengju Jiang, Xiaozhou Mou*, Yongqiang Li*
46	Biomineralized Enzyme-Like Cobalt Sulfide Nanodots for Synergetic Phototherapy with Tumor Multimodal Imaging Navigation	ACS Sustainable Chemistry & Engineering	2018, 6, 12061-12069	Subin Lin, Yangyun Wang, Zhizhong Chen, Liubing Li, Jianfeng Zeng, Qirong Dong, Zhifang Chai, Yong Wang*
47	Increased Neutrophil Activation and Plasma DNA Levels in Patients with Pre-Eclampsia	Thromb Haemost	2018, 118(12), 2064-2073	Yae Hu*, Hui Li *, Ruhong Yan, Can Wang, Yun Wang, Ce Zhang, Meng Liu, Tiantian Zhou, Weipei Zhu, Hong Zhang, Ningzheng Dong, Qingyu Wu
48	Lentinan inhibits tumor angiogenesis via interferon γ and in a T cell independent manner	J. Exp. Clin. Canc. Res.	2018, 37(1), 260	Shengming Deng, Guoxi Zhang, Jiajie Kuai, Peng Fan, Xuexiang Wang, Pei Zhou, Dan Yang, Xichen Zheng, Xiaomei Liu, Qunli Wu, Yuhui Huang
49	Facile and Efficient Decontamination of Thorium from Rare Earths Based on Selective Selenite Crystallization	Inorganic Chemistry	2018, 57, 1880-1887	Yaxing Wang, Huangjie Lu, Xing Dai, Tao Duan, Xiaojing Bai, Yawen Cai, Xuemiao Yin, Lanhua Chen, Juan Diwu, Shiyu Du, Ruhong Zhou, Zhifang Chai,Thomas E. Albrecht-Schmitt,Ning Liu,and Shuao Wang
50	Monitoring Ultraviolet Radiation Dosage Based on a Luminescent Lanthanide Metal−Organic Framework	Inorganic Chemistry	2018, 57, 8714-8717	Xiaoyan Li, Yaxing Wang, Jian Xie, Xuemiao Yin, Mark A. Silver, Yawen Cai, Hailong Zhang, Lanhua Chen, Guoqing Bian,Juan Diwu, Zhifang Chai and Shuao Wang

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52	Direct Killing or Immunoregulatory Effects of Natural Polysaccharides in Cancer Treatment	Carbohydrate Polymer	2018,195: 243–256	Pan G, Wang F*, Zhang L*
53	Eff ective cancer immunotherapy by Ganoderma lucidum polysaccharide-gold nanocomposites through dendritic cell activation and memory T cell response	Carbohydrate Polymers	2019, 205, 192–202	Shulei Zhang, Guibin Pang, Chao Chen, Jianzhong Qin, Huan Yu, Yongming Liu, Xihui Zhang, Zhentao Song, Jian Zhao, Fujun Wang, Yangyun Wang, Leshuai W. Zhang
54	Ni counterpart-assisted synthesis of nanoarchitectured Co3O4/CoS/Ni(OH)(2)@Co electrode for superior supercapacitor	Electrochimica Acta	2018, 284, 444-453	Zhu, Zhaoqiang; Zhou, Yanan; Wang, Wang, Shengqi; Zhao, Chunhua; Li, Zhen; Chen*, Guorong; Zhao, Chongjun*
55	Radiolabeled ultra-small Fe3O4 nanoprobes for tumor-targeted multimodal imaging	Nanomedicine	2018,14.5-17	Hao Sun, Bin Zhang*, Xinxin Jiang, Honglian Liu, Shengming Deng, Zhen Li, Haibin Shi*
56	Oral administration of highly bright Cr3+ doped ZnGa2O4 nanocrystals for &ITin vivo &ITtargeted imaging of orthotopic breast cancer	Journal of Materials Chemistry B	2018, 6, 1508-1518	Liu, Hanghang; Ren, Feng; Zhang, Hao; Han, Yaobao; Qin, Huizhu; Zeng, Jianfeng; Wang, Y; Sun, Q; Li, Z*; Gao, MY
57	A strategy for high radioprotectiveactivity by the assembly of PprI protein with a ROS-sensitive polymeric carrier	Journal of Materials Chemistry B	2018, 6, 3297-3304	Zhang, H.; Cai, S.;Zhang, Y.; Xu, M.; Kuang, L.; Hua, D.*
58	Polyelectrolyte-based physical adhesive hydrogels with excellent mechanical properties for biomedical applications	J. Mater. Chem. B	2018, 6, 4799-4807	Wenxiang Li,Ruyan Feng,Rensheng Wang,Dan Li,Wenwen Jiang,Hanzhou Liu,Zhengzhong Guo*, Michael J. Serpe, Liang Hu*
59	First Observation of Low-Temperature Magnetic Transition in CuAgSe	Journal of Physical Chemistry C	2018, 122,19139-19145	Han, Chao; Ding, Qingping; Zhang, Lijuan; Li, Weijie; Wang, Jianli; Gu, Qinfen; Sun, Qiao; Furukawa, Yuji; Dou, Shixue; Cheng, ZhenxiangCheng,* and Zhen Li*

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60	Precise nanomedicine for intelligent therapy of cancer	Sci. China Chem.	2018, 61, 1503-1552	Huabing Chen, Zhanjun Gu, Hongwei An, Chunying Chen, Jie Chen, Ran Cui, Siqin Chen, Weihai Chen, Xuesi Chen, Xiaoyuan Chen, Zhuo Chen, Baoquan Ding, Qian Dong, Qin Fan, Ting Fu, Dayong Hou, Qiao Jiang, Hengte Ke, Xiqun Jiang, Gang Liu, Suping Li, Tianyu Li, Zhuang Liu, Guangjun Nie, Muhammad Ovais, Daiwen Pang, Nasha Qiu, Youqing Shen, Huayu Tian, Chao Wang, Hao Wang, Ziqi Wang, Huaping Xu, Jiangfei Xu, Xiangliang Yang, Shuang Zhu, Xianchuang Zheng, Xianzheng Zhang, Yanbing Zhao, Weihong Tan, Xi Zhang, Yuliang Zhao
61	Pregnancy-associated cardiac hypertrophy in corin-deficient mice: observations in a transgenic model of preeclampsia	Can. J. Cardiol.	Published online: November 13, 2018	Rachael C. Baird, Shuo Li, Hao Wang, Sathyamangla V. Naga Prasad, David Majdalany, Uma Perni, Qingyu Wu*
62	Effects of Metformin Combined with Lactoferrin on Lipid Accumulation and Metabolism in Mice Fed with High-Fat Diet	Nutrients.	2018, 2;10(11). pii: E1628	Qingqing Min, Liqiang Qin, Zhenzhen Sun, Wenting Zuo, Lin Zhao and Jiaying Xu*
63	A Strategy for Effective Cesium Adsorption from Aqueous Solutionby Polypentacyanoferrate-Grafted Polypropylene Fabric under γ-ray Irradiation	Journalof the Taiwan Institute of Chemical Engineers	2018, 89, 162-168	Qian, J., Han, X., Kuang,L., Hua, D.*
64	Fabrication of PEGylated Fe@Bi_2S_3 nanocomposites for dual-mode imaging and synergistic thermoradiotherapy	Biomater. Sci.	2018, 6, 1892–1898	Li E, Cheng X , Deng Y , Zhu J , Xu X , Saw PE , Gu H , Ge C , Pan Y.
65	Macroscopic, theoretical simulation and spectroscopic investigation on the immobilization mechanisms of Ni(II) at cryptomelane/water interfaces	Chemosphere	2018, 210, 392-400	Chunfang Wu, Lei Chen, Shitong Yang, Yawen Cai, Lin Xu, Xilin Wu, Haibo Qin, Zhiyong Liu, Lanhua Chen, Shuao Wang
66	Highly selective and sensitive determination of uranyl ion by the probe of CdTe quantum dot with a specific size	Talanta	2018, 190, 278-283	Hua, M., Yang, S., Ma, J., He, W.*, Kuang, L., Hua, D.*

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68	A Theoretical Insight into a Feasible Strategy of Fabrication Borophane	Phys. Chem. Chem. Phys	2018, 20, 16216-16221	Gangqiang Qin, Aijun Du, Qiao Sun
69	Metal-Organic Framework as an Efficient Filter for the Removal of Heavy Metal Cations in Water	Phys. Chem. Chem. Phys.	2018, 20, 30384-30391	Zonglin Gu, Wei Song, Zaixing Yang, and R. H. Zhou
70	Hydroxylated-graphene quantum dots induce DNA damage and disrupt microtubule structure in human esophageal epithelial cells	Toxicological Sciences	2018, 164, 339–352	Ming Li, Mengmeng Gu, Xin Tian, Beibei Xiao, Siyuan Lu，Wei Zhu, Lan Yu, Zengfu Shang
71	One dimensional hierarchical nanostructures composed of CdS nanosheets/nanoparticles and Ag nanowires with promoted photocatalytic performance	Inorganic Chemistry Frontiers	2018, 5, 903-915	Xiong, Jinyan; Du, Xulei; Cheng, Gang; Yang, Huagui; Chen, Jun; Dou, Shixue; Li, Zhen*
72	Extremely rapid engineering of zinc oxide nanoaggregates with structure-dependent catalytic capability towards removal of ciprofloxacin antibiotic?	Inorganic Chemistry Frontiers	2018, 5, 2432-244	Jinyan Xiong, Wei Li*, Yixin Gan, Yi Wei, Gang Cheng*, Shixue Dou and Zhen Li*
73	Semaphorin 7A Promotes VEGFA/VEGFR2-Mediated Angiogenesis and Intraplaque Neovascularization in ApoE-/- Mice	Frontiers in Physiology	2018, 9, 1718	Shuhong Hu, Yifei Liu, Tao You, Li Zhu.
74	An ingenious one-dimensional zirconium phosphonate with efficient strontium exchange capability and moderate proton conductivity	Dalton Transactions	2018, 47, 5161–5165	Jiarong Zhang, Lanhua Chen, Daxiang Gui, Haowen Zhang, Duo Zhang, Wei Liu, Guolin Huang, Juan Diwu, Zhifang Chai and Shuao Wang
75	La/SSB chimeric autoantibody receptor modified NK92MI cells for targeted therapy of autoimmune disease	Clin. Immunol.	2018, 19, 40-49	Meng H, Sun X, Song Y, Zou J, An G, Jin Z*, Yang L*.
76	The p53-inducible gene 3 promotes cell migration and invasion via activating the FAK/Src pathway in lung adenocarcinoma	Cancer Science	2018, 109, 3783-3793	Mengmeng Gu, Dexuan Gao, Pingan Yao, Lan Yu, Xiao-Dong Yang, Chungen Xing, Jundong Zhou, Zengfu Shang and Ming Li
77	Monitoring tyrosine kinase inhibitor therapeutic responses with a panel of metabolic biomarkers in chronic myeloid leukemia patients	Cancer Science	2018, 109(3), 777-784	Bingyu Yang, Chang Wang, Yiyu Xie, Liangjing Xu, Xiaojin Wu*, Depei Wu*

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79	Rosamine with pyronine-pyridinium skeleton: unique mitochondrial targetable structure for fluorescent probes	Analyst	2018,143, 1813-1819	Ling Yang, Jinyun Niu, Ru Sun,Yujie Xu, Jianfeng Ge*
80	The vanillin derivative 6-bromine-5-hydroxy-4-methoxybenzaldehyde induces aberrant mitotic progression and enhances radio-sensitivity accompanying suppression the expression of PLK1 in esophageal squamous cell carcinoma	Toxicology and Applied Pharmacology	2018, 348, 76–84	Mengmeng Gu, Ming Li, Dexuan Gao, Langhuan Liu,Yue Lang,Simin Yang, Hongling Qu, Bo Huang, Pingkun Zhou*, Zengfu Shang*
81	Detection of Nanocarrier Potentiation on Drug Induced Phospholipidosis in Cultured Cells and Primary Hepatocyte Spheroids by High Content Imaging and Analysis	Toxicology and Applied Pharmacology	2018, 348, 54–66	Zhang X, Yang L, Liu Y, Song Z, Zhao J, Chen D, Yu Huan, Li R, Wang Y, Yang K, Chen Y, Xia M, Zhang L*
82	Atorvastatin enhances endothelial adherens junctions through promoting VE-PTP gene transcription and reducing VE-cadherin-Y731 phosphorylation	Vascul Pharmacol	2018 Jun 9.	Zihe Huo, Ying Kong, Mei Meng, Zhifei Cao, Quansheng Zhou*
83	A novel monitoring approach of antibody-peptide binding using "bending" capillary electrophonesis	International Journal of Biological Macromolecules	2018, 113, 900–906	Jianhao Wang, Zhilan Zhu, Xiang Wang, Li Yang, Li Liu, Jianpeng Wang, Eseosaserea Igbinigie, Xiaoqian Liu, Jinping Li*, Lin Qiu*, Yongqiang Li*, Pengju Jiang*
84	Quantitative assessment of HR and NHEJ activities via CRISPR/Cas9- induced oligodeoxynucleotide-mediated DSB repair	DNA Repair	2018, 70, 67-71	Jie Du, Narui Yin, Ting Xie, Yunfeng Zheng, Ning Xia, Jun Shang, Fei Chen, Haowen Zhang, Jiahua Yu, Fenju Liu
85	High Capacity and Reversible Hydrogen Storage on Two Dimensional C2N Monolayer Membrane	International Journal of Hydrogen Energy	2018, 43, 9895-9901	Gangqiang Qin, Qianyi Cui, Baofeng Yun, Lixiang Sun,Aijun Du, Qiao Sun

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87	Speckle noise reduction in optical coherence tomography images based on edge-sensitive cGAN	Biomedical Optics Express	2018, 9(11): 5129-5140	Yuhui Ma, Xinjian Chen,Weifang Zhu, Xuena Cheng, Dehui Xiang, and Fei Shi
88	A Uranyl Phosphonate Framework with Temperature Induced Order-Disorder Transition and Temperature Correlated Photoluminescence	CrystEng Comm	2018, 20, 3153-3157	Yi Wang, Xiangxiang Wang, Dongya Zhang, Fan Zhou, Daxiang Gui,Tao Zheng, Jiansheng Li, Zhifang Chai, Shuao Wang
89	Single-crystal-to-single-crystal desolvation in a Ti32 nanoring cluster	CrystEng Comm	2018, 20, 7062-7065.	Xiangxiang Wang,Daxiang Gui,Fuwan Zhai,Hui Li,Xia Wang,Yanlong Wang,Lanhua Chen,Tao Zheng, Zhifang Chai and Shuao Wang
90	Loss-of-function mutations with circadian rhythm regulator Per1/Per2 lead to premature ovarian insufficiency	Biol Reprod	2018 Nov 18.	Yating Zheng, Chao Liu, Yan Li, Haijuan Jiang, Peixin Yang, Jing Tang, Ying Xu, Han Wang, Yulong He
91	Distribution, source and pollution level of heavy metals in river sediments from South China	Catena	2018, 170, 386–396	Zhuang Qifan，Li Gang，Liu Zhiyong
92	137Cs and 239+240Pu in the Bohai Sea of China: Comparison in distribution and source identification between the inner bay and the tidal flat	Marine Pollution Bulletin	2019, 138, 604-617	Qifan Zhuang , Guosheng Li , Fu Wang, Lizhu Tian, Xingyu Jiang, Kexing Zhang , Geng Liu , Shaoming Pan, Zhiyong Liu
93	First-principles Study of Electrocatalytically Reversible CO2 Capture on Graphene Like C3N	ChemPhys Chem	1439-4235	Gangqiang Qin, Qianyi Cui, Weihua Wang, Ping Li, Aijun Du, Qiao Sun
94	Mechanism by which DHA inhibits the aggregation of KLVFFA peptides: A molecular dynamics study	The Journal of Chemical Physics	2018, 148, 115102	Hong Zhou, Shengtang Liu, Qiwen Shao, Dongfang Ma, Zaixing Yang, R. H. Zhou
95	Overexpression of Peroxiredoxin 6 (PRDX6) Promotes the Aggressive Phenotypes of Esophageal Squamous Cell Carcinoma	Journal of Cancer	2018, 9(21): 3939-3949	He Y, Xu W, Xiao Y, Pan L, Chen G, Tang Y, Zhou J, Wu J, Zhu W, Zhang S*, Cao J*.

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96	Protective effect of polydatin on radiation-induced injury of intestinal epithelial and endothelial cells	Bioscience Reports	2018, 38, BSR20180868	Li Li, Ke Zhang,Ji Zhang, Yanan Zeng, Feng Lai, Gen Li,NaMa, Mingjiang Hu, Fengmei Cui and Qiu Chen
97	Guanidine and Amidoxime Cofunctionalized Polypropylene Nonwoven Fabric for Potential Uranium Seawater Extraction with Antifouling Property	Industrial & Engineering Chemistry Research	2018, 57, 1662-1670	Zhang, H.; Zhang, L.; Han, X.; Kuang, L.; Hua, D.*
98	radiosensitivity enhancement by combined treatment of nimotuzumab and celecoxib on nasopharyngeal carcinoma cells	Drug Design, Development and Therapy	2018, 12, 2223–2231	Jianfeng Huang, Xiaopeng Yuan, Qingfeng Pang, Haowen Zhang, Jiahua Yu, Bo Yang, Leyuan Zhou. Fuzheng Zhang, Fenju Liu
99	Resolving quantum dots and peptide assembly and dis-assembly using bending capillary electrophoresis	Electrophoresis	2018, doi: 10.1002/elps. 201800466	Jianhao Wang, Zhilan Zhu, Lin Qiu, Jianpeng Wang, Li Liu, Xiaoqian Liu,Yongqiang Li,Pengju Jiang
100	Competitive sequestration of Ni(II) and Eu(III) on montmorillonite: role of molar Ni:Eu ratios and coexisting oxalate	Environmental Science And Pollution Research	2018, 25, 32617-32630	Lin Xu,Wei Liu, Yawen Cai,Chunfang Wu,Lei Chen,Shitong Yang,Xiangke Wang,Guoxun Ji,Shuao Wang
101	Effects of CSF1R-targeted chimeric antigen receptor-modified NK92MI & T cells on tumor-associated macrophages	Immunotherapy	2018, 10(11), 935-949	Ping Zhang, Songbo Zhao, Chao Wu, Jialu Li, Zixuan Li, Chunmei Wen, Siyi Hu, Gangli An, Huimin Meng, Xingding Zhang & Lin Yang*
102	A novel in-capillary assay for dynamically monitoring fast binding between antibody and peptides using CE	Journal of Separation Science	2018, 41, 4544-4550	Jianhao Wang, Lin Qiu, Ying You, Luping Ma, Zhilan Zhu, Li Yang, Jianpeng Wang, Xiang Wang, Li Liu, Xiaoqian Liu, Yufeng Chang, Jie Li, Liqian Gao, Yongqiang Li*
103	Addition of histone deacetylase inhibitors does not improve prognosis in patients with myelodysplastic syndrome and acute myeloid leukemia compared with hypomethylating agents alone: A systematic review and meta-analysis of seven prospective cohort studies	Leuk Res.	2018, 71, 13-24	Tingting Pan, Jiaqian Qi,TaoYou, LipingYang，DepeiWu，YueHan*， Li Zhu*
104	The improvement of lysosome targetability with oligoethyleneoxy chains linked benzo[a]phenoxazine	Bioorganic & Medicinal Chemistry Letters	2018, 28, 2953-2956	Weijin Zhu,Jinyun Niu,Ru Sun,Yujie Xu*, Jianfeng Ge*

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105	Multiple Organ Lesions in a case of contamination with multiple radionuclides after 38 years	Dose-Response	2018, October-December: 1-6	Huahui Bian, Youyou Wang, Weibo Chen, Yusong Zhang, Zhixiang, Zhuang, Rui Xia, Hong Dai, Junchao Feng, Wangyang Pu, Lei Chen, Wu Cai, Wentao Hu*, and Yulong Liu*.
106	Effects of Chahuangjing on Decorporation and Radiation Protection Against Tritiated Water	Dose-Response: An International Journal October-December	2018, 16, 1559325818810650	Xueyong Zuo, Qiu Chen, Houwen Li, Ke Zhang, Kongzhao Wang, Yu Tu, Mingjiang Hu, Fengmei Cui*, and Yulong Liu*
107	Functionalization of small black phosphorus nanoparticles for targeted imaging and photothermal therapy of cancer	Science Bulletin	2018, 63, 917-924	Deng, Lijuan; Xu, Yifan; Sun, Caixia; Yun, Baofeng; Sun, Qiao; Zhao, Chongjun*; Li, Zhen*
108	Therapeutic ionizing radiation induced bone loss: A review of in vivo and in vitro findings	Connective Tissue Research	2018, 59, 509-522	Jian Zhang, Xinyu Qiu, Kedi Xi, Wentao Hu, Hailong Pei, Jing Nie, Ziyang Wang, Jiahan Ding, Peng Shang, Bingyan Li, Guangming Zhou*
109	Adsorption-assistant detection of trace uranyl ion with high sensitivity and selectivity in the presence of SBA-15	Journal of Radioanalytical and Nuclear Chemistry	2018, 316, 201-207	He, W.; Ma, J.; Qian, J.; Liu, H.; Hua, D.*
110	Efficient uptake of perrhenate/ pertechnenate from aqueous solutions by the bifunctional anion-exchange resin	Radiochimica Acta	2018, 106(7): 581-592	Jie Li, Lin Zhu, Chengliang Xiao*, Lanhua Chen, Zhifang Chai and Shuao Wang*
111	Toxicity Assessment of Six Titanium Dioxide Nanoparticles in Human Epidermal Keratinocytes	Cutaneous and Ocular Toxicology. Accepted.	2019, 38, 66-80	Leshuai W. Zhang,* and Nancy A. Monteiro-Riviere
112	Combined local immunostimulatory radioisotope therapy and systemic immune checkpoint blockade imparts potent antitumour responses	Nature biomedical engineering	2018, 2, 611–621	Yu Chao, Ligeng Xu, Chao Liang, Liangzhu Feng, Jun Xu, Ziliang Dong, Longlong Tian, Xuan Yi, Kai Yang* and Zhuang Liu*
113	Blood Circulation, Biodistribution, and Pharmacokinetics of Dextran-Modified Black Phosphorus Nanoparticles	ACS Applied Bio Materials	2018, 1, 673-682	Caixia Sun, Yifan Xu, Lijuan Deng, Hao Zhang, Qiao Sun, Chongjun Zhao*,and Zhen Li*
114	The crosstalk between autonomic nervous system and blood vessels	Int J Physiol Pathophysiol Pharmacol	2018, 10(1), 17-28	Sheng Y, Zhu L*

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115	Magnetofluorescent nanohybrid comprising polyglycerol grafted carbon dots and iron oxides: colloidal synthesis and applications in cellular imaging and magnetically enhanced drug delivery	Colloids and Surfaces B: Biointerfaces	2019, 173, 842-850	Yu Wen，Meiyun Xu，XinLiu，Xiaoya Jin，Jiaqi Kang，Di Xu，Houyi Sang Peng Gao，Xiao Chen，Li Zhao
116	Metformin suppresses gastric cancer progression through calmodulin-like protein 3 secreted from tumor-associated fibroblasts	Oncology Reports	2019, 41(1):405-414	Guangxia Chen*, Chenxiao Yu*, Zhicheng Tang, Shiyu Liu, Fangmei An, Junjia Zhu, Qianqian Wu, Jianping Cao, Qiang Zhan And Shuyu Zhang*
117	Exploring the Nanotoxicology of MoS2: A Study on the Interaction of MoS2 Nanoflake and K+ Channels	ACS Nano	2018, 12, 705−717	Zonglin Gu, Leigh D. Plant, Xuan-Yu Meng, Jose Manuel Perez-Aguilar, Zegao Wang, Mingdong Dong, Diomedes E. Logothetis, and R.H. Zhou
118	Enhancing Both Biodegradability and Efficacy of Semiconducting Polymer Nanoparticles for Photoacoustic Imaging and Photothermal Therapy	ACS Nano	DOI: 10.1021/acsnano.7b08616	Yan Lyu, Jianfeng Zeng, Yuyan Jiang, Xu Zhen, Ting Wang, Shanshan Qiu, Xin Lou*, Mingyuan Gao, and Kanyi Pu*
119	Lanosterol Disrupts Aggregation of Human γD-Crystallin by Binding to the Hydrophobic Dimerization Interface	Journal of the American Chemical Society	2018, 140, 8479−8486	Hongsuk Kang, Zaixing Yang, and R.H. Zhou
120	Dual-Ratiometric Target-Triggered Fluorescent Probe for Simultaneous Quantitative Visualization of Tumor Microenvironment Protease Activity and pH in Vivo	Journal of the American Chemical Society	2018, 140, 211−218	Tiancong Ma,Yi Hou, Jianfeng Zeng, Chunyan Liu, Peisen Zhang, Lihong Jing, Dihua Shangguan,and Mingyuan Gao*
121	Prediction of acute GVHD and relapse by metabolic biomarkers after allogeneic hematopoietic stem cell transplantation	Journal of Clinical Investigation	2018, 3(9). e99672	Xiaojin Wu, Yiyu Xie, Chang Wang, Yue Han, Xiebing Bao, Shoubao Ma, Ahmet Yilmaz, Bingyu Yang, Yuhan Ji, Jinge Xu, Hong Liu, Suning Chen, Jianying Zhang, Jianhua Yu, and Depei Wu
122	Differential Pd-nanocrystal facets demonstrate distinct antibacterial activity against Gram-positive and Gram-negative bacteria	Nature Communications	2018, 9:129, DOI: 10.1038/s41467-017-02502-3	Fang G, Li W, Shen X, Perez-Aguilar JM, Chong Y, Gao X, Chai Z, Chen C, Ge C, Zhou R.

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123	Biomimetic Copper Sulfide for Chemo-Radiotherapy: Enhanced Uptake and Reduced Efflux of Nanoparticles for Tumor Cells under Ionizing Radiation	Adv. Funct. Mater	2018, 28, 1705161	Xuan Yi, Lei Chen, Jie Chen, Debabrata Maiti, Zhifang Chai, Zhuang Liu, and Kai Yang*
124	A diuranium carbide cluster stabilized inside a C80 fullerene cage	Nature Communications	2018, 9, 2753, DOI: 10.1038/s41467-018-05210-8	Xingxing Zhang, Wanlu Li, Lai Feng, Xin Chen, Andreas Hansen, Stefan Grimme, Skye Fortier, Dumitru-Claudiu Sergentu, Thomas J. Duignan, Jochen Autschbach , Shuao Wang, Yaofeng Wang, Giorgios Velkos, Alexey A. Popov , Nabi Aghdassi, Steffen Duhm , Xiaohong Li, Jun Li, Luis Echegoyen, W.H. Eugen Schwarz & Ning Chen
125	A supramolecular lanthanide separation approach based on multivalent cooperative enhancement of metal ion selectivity	Nature Communications	2018, 9, 547. DOI: 10.1038/s41467-018-02940-7	Xiaozhen Li, Lipeng Zhou, Liangliang Yan, Yamin Dong, Zhuanling Bai, Xiaoqi Sun, Juan Diwu, Shuao Wang, Jean-Claude Bünzli & Qingfu Sun
126	Efficient Capture of Perrhenate and Pertechnetate by a Mesoporous Zr Metal−Organic Framework and Examination of Anion Binding Motifs	Chemistry of Materials	2018, 30, 1277−1284	Riki J. Drout, Kenichi Otake, Ashlee J. Howarth, Timur Islamoglu, Lin Zhu, Chengliang Xiao, Shuao Wang, and Omar K. Farha
127	C–O−–K+(Na+) groups in non-doped carbon as active sites for the oxygen reduction reaction	Journal of Materials Chemistry A	2018, 6, 8955–8961	Yunjie Zhou, Yue Sun, Cheng Zhu, Yang Liu, Xing Dai, Jun Zhong, Qiongyang Chen, He Tian, R. H. Zhou, Zhenhui Kang
128	Molecular mechanism of $Gd@C_{82}(OH)_{22}$ increasing collagen expression: Implication for encaging tumor	Biomaterials	2018, 152, 24-36	Jing Liu, Seung-gu Kang, Peng Wang, Yue Wang, Xiaonan Lv, Ying Liu, Fei Wang, Zonglin Gu, Zaixing Yang, Jeffrey K Weber, Ning Tao, Zhihai Qin, Qing Miao, Chunying Chen, R. H. Zhou, Yuliang Zhao
129	Degradable carbon dots with broad-spectrum antibacterial activity	ACS Applied Materials Interfaces	2018, 10, 26936-26946	Hao Li, Jian Huang, Yuxiang Song, Mengling Zhang, Huibo Wang, Fang Lu, Hui Huang, Yang Liu, Xing Dai, Zonglin Gu, Zaixing Yang, R. H. Zhou, Zhenhui Kang

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130	Bactericidal Effects of Silver Nanoparticles on Lactobacilli and the Underlying Mechanism	ACS Applied Materials & Interfaces	2018, 10, 8443−8450	Xin Tian, Xiumei Jiang, Cara Welch, Timothy R. Croley, Tit-Yee Wong, Chao Chen, Sanhong Fan, Yu Chong, Ruibin Li, Cuicui Ge, Chunying Chen, and Jun-Jie Yin
131	Fabrication of Multifoliate PtRu Bimetallic Nanocomplexes for Computed Tomography Imaging and Enhanced Synergistic Thermoradiotherapy	ACS Applied Materials & Interfaces	2018, DOI: 10.1021/acsami.8b11507	Yaoyao Deng[#], Xin Tian[#], Shuanglong Lu, Mingxing Xie, Hai Hu, Rui Zhang, Feng Lv, Liang Cheng, Hongwei Gu, Youliang Zhao, and Yue Pan
132	Bacterial species-identifiable magnetic nanosystems for early sepsis diagnosis and extracorporeal photodynamic blood disinfection	Nanoscale	2018, 10, 132–141	Jianhao Wang, Hao Wu, Yanmei Yang, Rong Yan, Yuan Zhao, Yanhao Wang, Aihong Chen, Shilong Shao, Pengju Jiang, Yongqiang Li
133	Inhibition of the proteasome activity by graphene oxide contributes to its cytotoxicity	Nanotoxicology	2018,DOI: 10.1080/17435390.2018.1425503	Xiaochuan Ma, Sangyun Lee, Xingshu Fei, Ge Fang, Tien Huynh, Yu Chong, Zhifang Chai, Cuicui Ge, R. H. Zhou
134	A Dual-Modal Molecular Probe for Near-Infrared Fluorescence and Photoacoustic Imaging of Peroxynitrite	Analytical Chemistry	2018, 90, 9301−9307	Jianjian Zhang, Xu Zhen, Jianfeng Zeng*, and Kanyi Pu*
135	Phase Transition Triggered Aggregation-Induced Emission in a Photoluminescent Uranyl-Organic Framework	Chem. Commun.	2018, 54, 627-630	Xia Wang, Yanlong Wang, Xing Dai, Mark A. Silver, Wei Liu,Yuxiang Li,Zhuanling Bai, Daxiang Gui, Lanhua Chen,Juan Diwu,a Ruhong Zhou,Zhifang Chai, and Shuao Wang
136	Preparation of thermochromic selenidostannates in deep eutectic solvents	Chem. Commun.	2018,54, 4806-4809	Kaiyao Wang, Dong Ding, Shu Zhang,Yanlong Wang,Wei Liu,Shuao Wang, Shuaihua Wang, Dan Liu and Cheng Wang
137	Neptunium(V)-Mediated Interwoven Transuranium-Rotaxane Network Incorporating Mechanically Interlocked [c2]Daisy Chain Unit	Chem. Commun.	2018, 54, 8645-8648	Lei Mei, Chao Xu, Qunyan Wu, Kongqiu Hu, Liyong Yuan, Jing Chen, Chengliang Xiao, Shuao Wang, Zhifang Chai, and Weiqun Shi*
138	Defects Engineering in Metal−Organic Frameworks: A New Strategy to Develop Applicable Actinide Sorbents.	Chem. Commun.	2018, 54, 370-373	Liyong Yuan, Ming Tian, JianhuiLan, Xingzhong Cao, Xiaolin Wang, Zhifang Chai, John K. Gibson, and Weiqun Shi*

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139	Defects Engineering in Metal−Organic Frameworks: A New Strategy to Develop Applicable Actinide Sorbents	Chem. Commun.	2018, 54, 2248-2251	Congzhi Wang, Tao Bo, JianhuiLan, Qunyan Wu, Zhifang Chai, John K. Gibson, and Weiqun Shi*
140	Simultaneous elimination of cationic uranium(VI) and anionic rhenium(VII) by graphene oxide-poly(ethyleneimine) macrostructures: a Batch, XPS, EXAFS, and DFT combined study	Environ. Sci.: Nano	2018, 5, 2077-2087	Zhiwei Huang, Zijie Li, Qunyan Wu, LirongZheng, Limin Zhou, Zhifang Chai, Xiaolin Wang, and Weiqun Shi*.
141	Benzoate-Induced High-NuclearitySilver Thiolate Clusters	Chemistry-A European Journal	2018, 24, 4967-497	Yanmin Su,Wei Liu, Zhi Wang,Shuao Wang,Yanan Li, Fei Yu, Quanqin Zhao, Xingpo Wang,ChenhoTung,and Di Sun*
142	Microarray Profiling of TGF-β1-induced Long Non-coding RNA Expression Patterns in Human Lung Bronchial Epithelial BEAS-2B Cells	Cellular Physiology and Biochemistry	2018, 50(6): 2071-2085	Wentao Hu, Weiwei Pei, Lin Zhu, Jing Nie, Hailong Pei, Jian Zhang, Bingyan Li, Tom K. Hei*, Guangming Zhou*
143	Angular distribution measurement for 12C fragmentation via 12C + 12C scattering at 100 MeV/u	Chinese Physics C	2018, 42: 7 - 074001	Weiwei Qu, Gaolong Zhang, Guoyu Tian, Zhiqiang Chen, Shouping Xu, Royichi Wada
144	Monocyte-mediated chemotherapy drug delivery in glioblastoma	Nanomedicine	2018,10.2217/nnm-2017-0266	Chao Wang, Ke Li, Tongfei Li, Zhuo Chen, Yu Wen, Xin Liu, Xuemei Jia, Yichao Zhang, Yonghong Xu, Min Han, Naoki Komatsu, Li Zhao, Xiao Chen
145	Tunable 4f/5f Bimodal Emission in Europium-Incorporated Uranyl Coordination Polymers	Inorganic Chemistry	2018, 57, 572-582	Jian Xie, Yaxing Wang, Mark A. Silver,Wei Liu,Tao Duan, Xuemiao Yin, Lanhua Chen, Juan Diwu, Zhifang Chai, and Shuao Wang
146	In Situ Reduction from Uranyl Ion into a Tetravalent Uranium Trimer and Hexamer Featuring Ion-Exchange Properties and the Alexandrite Effect	Inorganic Chemistry	2018, 57, 6753−6761	Jian Lin, Zenghui Yue,Mark A. Silver,Meiying Qie,Xiaomei Wang, Wei Liu, Xiao Lin, Hongliang Bao, Linjuan Zhang, Shuao Wang, and Jianqiang Wang

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147	An Ultrastable Heterobimetallic Uranium(IV)/Vanadium(III) Solid Compound Protected by a Redox-Active Phosphite Ligand: Crystal Structure, Oxidative Dissolution, and First-Principles Simulation	Inorganic Chemistry	2018, 57, 903-907	Daxiang Gui, Xing Dai, Tao Zheng,Xiangxiang Wang, Mark A. Silver, Lanhua Chen,Chao Zhang, Juan Diwu,Ruhong Zhou, Zhifang Chai, and Shuao Wang
148	Evaluation of the structure–activity relationship of carbon nanomaterials as antioxidants	Nanomedicine	2018,10.2217/nnm-2017-0314	Cheng X, Ni X, Wu R, Chong Y, Gao X, Ge C, Yin JJ.
149	Releasing Metal-Coordination Capacity of Cucurbit[6]urilMacrocycle in Pseudorotaxane Ligands for the Construction of Interwoven Uranyl-Rotaxane Coordination Polymers	Inorg. Chem.	2018, 57, 13513-13523	Feize Li, Lei Mei, Kongqiu Hu, Jipan Yu, ShuwenAn, Kang Liu, Zhifang Chai, Ning Liu,* and Weiqun Shi*
150	Bimetallic uranyl organic frameworks supported by transition metal ions based metalloligand motifs: synthesis, structure diversity, and luminescence properties	Inorg. Chem.	2018, 57, 6084-6094	Ran Zhao, Lei Mei, Kongqiu Hu, Ming Tian, Zhifang Chai, and Weiqun Shi*.
151	Towards understanding the correlation between UO_2^{2+} extraction and substitute groups in 2,9-diamide-1,10-phenanthroline	Sci. China Chem.	2018, 1-8	Xinrui Zhang, Liyong Yuan*, Zhifang Chai, and Weiqun Shi*.
152	Mechanisms of oxidative stress, apoptosis, and autophagy involved in graphene oxide nanomaterial anti-osteosarcoma effect	International Journal of Nanomedicine	2018, 13: 2907–2919	Zhibing Tang[#], Lin Zhao[#], Zaixing Yang, Zhaohui Liu, Jia Gu, Bing Bai, Jinlian Liu, Jiaying Xu*, Huilin Yang*
153	Crystal Imperfection Modulation Engineering for Functionalization of Wide Band Gap Semiconductor Radiation Detector	Adv. Electron. Mater	2017, 1700307, DOI: 10.1002/aelm.201700307	Xu Ji, Liang Chen, Mengxuan Xu, Mei Dong, Kun Yan, Shuang Cheng, Xueqian Kong, Tongyao Wang, Jiandang Liu, Bingchuan Gu, Huanhua Wang, Zhiyong Liu, Shuao Wang, Feng Huang,* and Xiaoping Ouyang*
154	Insight into the nature of M-C bonding in the lanthanide/actinide-biscarbene complexes: A theoretical perspective	Dalton. Trans.	2018, 47, 12718-12725	Qunyan Wu, Zhongping Cheng, JianhuiLan, Congzhi Wang, Zhifang Chai, John K. Gibson, and Weiqun Shi*

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156	Synthesis and Study of the First Zeolitic Uranium Borate	Crystal Growth & Design	2018, 18, 498-505	Yucheng Hao,Vladislav V. Klepov Philip Kegle,Giuseppe Modolo,Dirk Bosbach,Thomas E. Albrecht-Schmitt,Shuao Wang,and Evgeny V. Alekseev
157	A Theoretical Study on Unsupported Uranium-Metal Bonding in Uranium-Group 8 Complexes	Organometallics	2018, 37, 3678-3686	Xiaowang Chi, Qunyan Wu, QiangHao, JianhuiLan, Congzhi Wang, Qin Zhang, Zhifang Chai, Weiqun Shi*
158	Structural and thermodynamic stability of uranyl– deferiprone complexes and the removal efficacy of U(VI) at the cellular level	Dalton Transactions	2018, 47, 8764-8770	Xiaomei Wang, Guoxun Ji, Cen Shi,Juan Diwu, Lanhua Chen, Daxiang Gui, Jianmei Wan,Mark A.Silver,Jianqiang Wang and Shuao Wang
159	Large-pore Layered Networks, Polycatenated Frameworks and Three-dimensional Frameworks of UranylTri(biphenyl)amine/Tri(phenyl)amine Tricarboxylate: Solvent/Ligand-dependent Dual Regulation	Cryst. Growth Des.	2018, 18, 4347−4356	Shuai Wang, Lei Mei, Jipan Yu, Kongqiu Hu, Zhirong Liu, Zhifang Chai, and Weiqun Shi*
160	Template-Driven Assembly of Rare HexamericUranyl-Organic Rotaxane Networks Threaded on DimericUranyl Chains	Cryst. Growth Des.	2018, 18, 3073-3081	YunchenGe, Lei Mei, Feize Li, Kongqiu Hu, Chuanqin Xia, Zhifang Chai, and Weiqun Shi*
161	Understanding Am^{3+}/Cm^{3+} Separation with H_4TPAEN and its Hydrophilic Derivatives: A Quantum Chemical Study	Phys. Chem. Chem. Phys.	2018, 20, 14031-14039	Pinwen Huang, Congzhi Wang, Qunyan Wu, JianhuiLan, Gang Song, Zhifang Chai, and Weiqun Shi*
162	Uncovering the impact of 'capsule' shaped amine-type ligands on Am(III)/Eu(III) separation	Phys. Chem. Chem. Phys.	2018, 20, 1030-1038	Pinwen Huang, Congzhi Wang, Qunyan Wu, JianhuiLan, Gang Song, Zhifang Chai, and Weiqun Shi*
163	Polyglycerol grafting and RGD peptide conjugation on MnO nanoclusters for enhanced colloidal stability, selective cellular uptake and cytotoxicity	Colloids and Surfaces B: Biointerfaces	2018,163 :167–174	Xiaoxin Yang, Li Zhao, Luyi Zheng, Meiyun Xu, Xiulan Cai
164	Nomograms for predicting survival outcomes in patients with primary tracheal tumors: a large population-based analysis	Cancer Management and Research	2018,10: 6843–6856	Junmiao Wen, Di Liu,*Xinyan Xu Donglai Chen, Yongbing Chen4, Liang Sun, Jiayan Chen, Min Fan
165	Electrochemicaland thermodynamic properties of Pr on the liquid Bi electrode in LiCl-KCleutectic melt	J. Electrochem. Soc.	2018, 165, D1-D9	Taiqi Yin, Kui Liu, Yalan Liu, Yongde Yan*, Guiling Wang, Zhifang Chai and Weiqun Shi*

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166	Raman and Electrochemical Study of Zirconium in LiCl-KCl-LiF-ZrCl4	J. Electrochem. Soc.	2018, 165, D6-D12	Benlin Yao, Kui Liu, Yalan Liu, Liyong Yuan, Hui He, Zhifang Chai, and Weiqun Shi*
167	Uranium dendritic morphology in the electrorefining: Influences of temperature and current density	J. Electrochem. Soc.	2018, 165(3): D98-D106	Kui Liu, Zhifang Chai and Weiqun Shi*.
168	Macroscopic and spectral exploration on the removal performance of pristine and phytic acid-decorated titanate nanotubes towards Eu(III)	Journal of Molecular Liquids	2018, 258: 66–73	Chunfang Wu, Yawen Cai, Lin Xu, Jian Xie, Zhiyong Liu, Shitong Yang, Shuao Wang
169	The fluorescent biomarkers for lipid droplets with quinolone-coumarin unit	Organic & Biomolecular Chemistry	2018,16: 7619-7625	Yuan Chen, Xuerui, Wei, Ru Sun*, Yujie Xu and Jianfeng Ge*
170	The pH-influenced PET processes between pyronine and different heterocycles	Organic & Biomolecular Chemistry	2017, 15:8402–8409	Ling Yang,Jin-Yun Niu, Ru Sun,* Yujie Xu and Jianfeng Ge*
171	Ordered Entanglement in Actinide-Organic Coordination Polymers	Bull. Chem. Soc. Jpn.	2018, 91, 554–562	Lei Mei, Weiqun Shi,* and Zhifang Chai.
172	Near-infrared pH probes based on phenoxazinium connecting with nitrophenyl and pyridinyl groups	Dyes and Pigments	2018,149: 481-490	Weijin Zhu, Jinyun Niu, Dandan He, Ru Sun, Yujie Xu *, Jianfeng Ge*
173	Biofunctional magnetic hybrid nanomaterials for theranostic applications	Nanotechnology	2019, 30 : 032002	Xin Tian, Shaopeng Liu, Jianliang Zhu, Zheyan Qian, Lei Bai, Yue Pan
174	Improvement of the extraction ability of bis(2-propyloxy)calix[4]arenecrown-6 toward cesium cation by introducing an intramolecular triple cooperative effect	Separation And Purification Technology	2018, 199: 97–104	Rong Yi, Chao Xu, Taoxiang Sun, Yaxing Wang, Gang Ye, Shuao Wang, Jing Chen
175	Sorafenib and docosahexaenoic acid act in synergy to suppress cancer cell viability: a role of heme oxygenase 1	BMC Cancer	2018, 26;18(1):1042	Jiao Y, Watts T, Xue J, Hannafon B, Ding WQ
176	Structures and energetics of point defects with charge states in zircon: A first-principles study	Journal of Alloys And Compounds	2018, 759, 60-69	Xiaoyong Yang, Shuao Wang, Yong Lu, Peng Bi, Ping Zhang, Shahid Hussain, Yong Yi, Tao Duan
177	Tris-amidoximate uranyl complexes via η2 binding mode coordinated in aqueous solution shown by X-ray absorption spectroscopy and density functional theory methods	J. Synchrotron Rad.	2018, 25, 514–522	Linjuan Zhang,* Meiying Qie, Jing Su, Shuo Zhang, Jing Zhou, Jiong Li, Yu Wang, Shitong Yang, Shuao Wang, Jingye Li, Guozhong Wu and Jianqiang Wang*

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179	Light‐triggered Covalent Assembly of Gold Nanoparticles for Cancer Cell Photothermal Therapy	ChembioChem	2018, DOI:10.1002/cbic.201800648	Huawei Xia, Yinjia Gao, Ling Yin, Xiaju Cheng, Anna Wang, Meng Zhao, Jianan Ding and Haibin Shi*
180	Insight into the Extraction Mechanism of Am(III) over Eu(III) with Pyridylpyrazole: A Relativistic Quantum Chemistry Study	J. Phys. Chem. A.	2018, 122, 4499-4507	Xianghe Kong, Qunyan Wu, Congzhi Wang, JianhuiLan, Zhifang Chai, ChangmingNie, and Weiqun Shi*.
181	Non-thermal plasma inhibits tumor growth and proliferation	Oncology Reports	2018, 40: 3405-3415	Lin Lin*, Lili Wang*, Yandong Liu, Chao Xu, Yu Tu And Juying Zhou
182	The Role of FABP5 in Radiation-Induced Human Skin Fibrosis	Radiation Research	2018, 189, 177-186	Song J, Zhang H, Wang Z, Xu W, Zhong L, Cao J, Yang J, Tian Y, Yu D, Ji J*, Cao J, Zhang S*
183	Protective Effects of Magnesium Sulfate on Radiation Induced Brain Injury in Rats	Current Drug Delivery	2018, 15: 1159-1166	Na Chen, Runjun Xu, Lili Wang, Meng Zhang, Shicheng Feng, Juying Zhou and Yu Tu*
184	Enhanced anticancer effect of MAP30-S3 by cyclosproin A through endosomal escape.	Anti-cancer Drugs	2018, 29, 736-747	Song ZT, Zhang L, Fan LQ, Kong JW, Mao JH, Zhao J, Wang FJ.
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186	Fabrication and Reduction of pH Dual Bio-Responsive Poly(ether-urethane) Nanocarriers for Targeted Drug Delivery	Nanoscience and Nanotechnology Letters	2018, 10:13-22	Liubing Li[#], Yufeng Lu[#], Moyu Zhang, Yuhao Zhao, Xueqing Li, Qirong Dong, Liqin Shen* and Yangyun Wang*
187	Fluorescence Responses of the Protonation and Deprotonation Processesbetween Phenolate and Phenol within Rosamine	Chinese Journal of Chemistry	2018, 36 (1):42-46	Yang Ling, Niu Jinyun, Zhan，Yanhua, Xu Yujie*, Sun Ru, and Ge Jianfeng*
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192	Effects of static magnetic fields on bone microstructure and mechanical properties in mice	Electromagnetic Biology and Medicine	2018, 37(2): 76-83	Jian Zhang, Xiaofeng Meng, Chong Ding, Peng Shang*.
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194	Application of microdosimetry on biological physics for ionizing radiation	Chinese Physics B	2018, 27(2): 1674-1056	Dandan Chen and Liang Sun
195	Influence of Complexing Species on the Extraction of Trivalent Actinides from Lanthanides with CyMe4-BTBP: A Theoretical Study.	J. Radioanal. Nucl. Chem.	2018, 318, 1453-1463	JianhuiLan, Qunyan Wu, Congzhi Wang, Zhifang Chai and Weiqun Shi*
196	Effect of Pycnogenol Supplementation on Blood Pressure: A Systematic Review and Meta-analysis	Iran J. Public Health	2018, 47, 779-787	Zheng Zhang, Xing Tong, Yulu Wei, Lin Zhao, *Jiaying Xu, *Liqiang Qin
197	Low-dose ionizing radiation increases the mortality risk of solid cancers in nuclear industry workers: A meta-analysis	Molecular and clinical onology	2018, 8:703-711	Shugen Qu*, Jin Gao*, Bo Tang, Bo Yu, Yueping Shen and Yu Tu

八、代表性论文首页

COMMUNICATION

Conjugated Photosensitizers

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Rational Design of Conjugated Photosensitizers with Controllable Photoconversion for Dually Cooperative Phototherapy

Shuyue Ye, Jiaming Rao, Shihong Qiu, Jinglong Zhao, Hui He, Ziling Yan, Tao Yang, Yibin Deng, Hengte Ke, Hong Yang, Yuliang Zhao, Zhengqing Guo,* and Huabing Chen**

High-performance photosensitizers are highly desired for achieving selective tumor photoablation in the field of precise cancer therapy. However, photosensitizers frequently suffer from limited tumor suppression or unavoidable tumor regrowth due to the presence of residual tumor cells surviving in phototherapy. A major challenge still remains in exploring an efficient approach to promote dramatic photoconversions of photosensitizers for maximizing the anticancer efficiency. Here, a rational design of boron dipyrromethene (BDP)-based conjugated photosensitizers (CPs) that can induce dually cooperative phototherapy upon light exposure is demonstrated. The conjugated coupling of BDP monomers into dimeric BDP (*di*-BDP) or trimeric BDP (*tri*-BDP) induces photoconversions from fluorescence to singlet-to-triplet or nonradiative transitions, together with distinctly redshifted absorption into the near-infrared region. In particular, *tri*-BDP within nanoparticles shows preferable conversions into both primary thermal effect and minor singlet oxygen upon near-infrared light exposure, dramatically achieving tumor photoablation without any regrowth through their cooperative anticancer efficiency caused by their dominant late apoptosis and moderate early apoptosis. This rational design of CPs can serve as a valuable paradigm for cooperative cancer phototherapy in precision medicine.

Photosensitizers have extensively explored as emerging versatile compounds in many fields including photodynamic therapy (PDT), photocatalysis, cell signaling, and biosensors.[1] For cancer therapy, excited photosensitizer is able to produce highly cytotoxic reactive oxygen species (ROS) such as singlet oxygen via intersystem crossing (ISC)-mediated singlet-to-triplet transition and subsequent energy transfer, thus causing the apoptosis through the oxidation of biologically relevant molecules in mitochondria and nucleus to cause selective suppression against malignant shallow tumors.[2] PDT possesses several distinct advantages over conventional therapeutics including precise spatiotemporal control, selective treatment with minimized adverse side effect, and negligible drug resistance.[2b,3] To date, several types of organic photosensitizers including boron dipyrromethene (BDP), phthalocyanine, and porphyrin have been extensively developed for achieving effective PDT through versatile strategies such as heavy-atom effect, spin converter, charge recombination, exciton coupling, suppressed photoinduced electron transfer, as well as functional substitution of pH-activatable dimethylaminophenyl group, mitochondria-targeted triphenylphosphonium bromide, or antiangiogenic acetazolamide moiety.[4] Moreover, versatile drug vehicles such as micelles, vesicles, graphene oxide, mesoporous silica nanoparticles, and metal–organic frameworks are frequently utilized to boost their anticancer efficiency through enhanced singlet oxygen generation, self-supplied oxygen, improved resistance to photobleaching, or preferable tumor accumulation.[2b,c,3,4,5] Unfortunately, these photosensitizers frequently suffer from limited tumor suppression or unavoidable tumor regrowth due to the residual tumor cells surviving from light irradiation, usually owing to their several drawbacks including shallow light penetration depth in visible region (frequently less than 650 nm), absolute oxygen dependence, insufficient cytoplasmic drug translocation, and inadequate cell damage from singlet oxygen-mediated apoptosis. Hence, highly potent photosensitizer with distinctly redshifted absorption is highly desired for achieving tumor photoablation.[2b,4b]

S. Y. Ye, Dr. S. H. Qiu, J. L. Zhao, Dr. H. He, Z. L. Yan, T. Yang, Dr. Y. B. Deng, Dr. H. T. Ke, Prof. H. Yang, Prof. H. B. Chen
State Key Laboratory of Radiation Medicine and Protection
Jiangsu Key Laboratory of Neuropsychiatric Diseases, and College of Pharmaceutical Sciences
Soochow University
Suzhou 215123, China
E-mail: hhe@suda.edu.cn; chenhb@suda.edu.cn

J. M. Rao, Dr. Z. Q. Guo, Prof. H. B. Chen
State Key Laboratory of Radiation Medicine and Protection
Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, and School of Radiation Medicine and Protection
Soochow University
Suzhou 215123, China
E-mail: zqguo@suda.edu.cn

Prof. Y. L. Zhao
CAS Key Laboratory for Biomedical Effects of Nanomaterials and Nanosafety
Center of Excellence for Nanosciences
National Center for Nanoscience and Technology of China
Beijing 100190, China

The ORCID identification number(s) for the author(s) of this article can be found under https://doi.org/10.1002/adma.201801216.

DOI: 10.1002/adma.201801216

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Highly In-Plane Anisotropic 2D $GeAs_2$ for Polarization-Sensitive Photodetection

Liang Li, Penglai Gong, Daopeng Sheng, Shuao Wang, Weike Wang, Xiangde Zhu, Xingqiang Shi, Fakun Wang, Wei Han, Sanjun Yang, Kailang Liu, Huiqiao Li,* and Tianyou Zhai**

Due to the intriguing anisotropic optical and electrical properties, low-symmetry 2D materials are attracting a lot of interest both for fundamental studies and fabricating novel electronic and optoelectronic devices. Identifying new promising low-symmetry 2D materials will be rewarding toward the evolution of nanoelectronics and nano-optoelectronics. In this work, germanium diarsenide ($GeAs_2$), a group IV–V semiconductor with novel low-symmetry puckered structure, is introduced as a favorable highly anisotropic 2D material into the rapidly growing 2D family. The structural, vibrational, electrical, and optical in-plane anisotropy of $GeAs_2$ is systematically investigated both theoretically and experimentally, combined with thickness-dependent studies. Polarization-sensitive photodetectors based on few-layer $GeAs_2$ exhibit highly anisotropic photodetection behavior with lineally dichroic ratio up to ≈2. This work on $GeAs_2$ will excite interests in the less exploited regime of group IV–V compounds.

Ever since the discovery of graphene,[1] the family of 2D materials have attracted tremendous attention due to the unique physical properties,[2] and potentials in nano-electronics and nano-optoelectronics.[3] Recently, black phosphorus (BP) was reintroduced as a new star in the 2D materials family with largely tunable bandgap,[4] relatively high mobility,[5] and in-plane anisotropy.[6] Among these, the most exotic characteristic distinguishing BP from the foregoing 2D materials like graphene and MoS_2 is the in-plane anisotropy. Such anisotropy rooted in its puckered low-symmetry structure, which will bring even richer physics (e.g., linear dichroism,[7] anisotropic plasmons,[8] anisotropic excitation,[9] etc.) and provides another new degree of freedom for fabricating unique devices (e.g., polarization sensitive photodetector,[7] synaptic devices for neuromorphic applications,[10] etc.). Nevertheless, question still remains regarding the nature of degeneration of BP.[11] Thus, increasing effort has been directly paid to the exploration of new 2D materials with in-plane anisotropic structure.[12]

Very recently, group IV–V compounds GeP, SiP, and GeAs with widely tunable bandgap, moderate carrier mobility, and highly in-plane anisotropy have been introduced to the in-plane anisotropic 2D materials family.[13] $GeAs_2$, another group IV–V compound, was first synthesized by Bryden in 1962.[14] Early research (in 1971) only reported the basic optical and electrical properties of bulk $GeAs_2$.[15] After that, the experimental research on $GeAs_2$ remained stagnant. Unlike the monoclinic structure of GeP and GeAs, $GeAs_2$ holds a BP-like puckered orthorhombic structure, combining with the difference in electronegativity between Ge and As, thus the

Dr. L. Li, F. K. Wang, Dr. W. Han, Dr. S. J. Yang, Dr. K. L. Liu, Prof. H. Q. Li, Prof. T. Y. Zhai
State Key Laboratory of Material Processing and Die and Mould Technology
School of Materials Science and Engineering
Huazhong University of Science and Technology (HUST)
Wuhan 430074, P. R. China
E-mail: hqli@hust.edu.cn; zhaity@hust.edu.cn

Dr. L. Li
Institute of Physical Science and Information Technology
Anhui University
Hefei 230601, P. R. China

Dr. P. L. Gong, Prof. X. Q. Shi
Department of Physics
Southern University of Science and Technology
Shenzhen 518055, P. R. China

The ORCID identification number(s) for the author(s) of this article can be found under https://doi.org/10.1002/adma.201804541.

Dr. D. P. Sheng, Prof. S. A. Wang
State Key Laboratory of Radiation Medicine and Protection
School for Radiological and interdisciplinary Sciences (RAD-X)
Soochow University, Suzhou
215123, P. R. China

Dr. W. K. Wang
Synergetic Innovation Center for Quantum Effects and Application
Key Laboratory of Low-dimensional Quantum Structures and Quantum Control of Ministry of Education
College of Physics and Information Science
Hunan Normal University
Changsha 410081, P. R. China

Dr. X. D. Zhu
Anhui Province Key Laboratory of Condensed Matter Physics at Extreme Conditions
High Magnetic Field Laboratory of the Chinese Academy of Science
Hefei 230031, P. R. China
E-mail: xdzhu@hmfl.ac.cn

DOI: 10.1002/adma.201804541

Immunoregulatory mechanisms of mesenchymal stem and stromal cells in inflammatory diseases

Yufang Shi[1,2], Yu Wang[2], Qing Li[2], Keli Liu[2], Jianquan Hou[1], Changshun Shao[1] and Ying Wang[2]**

Abstract | Mesenchymal stem cells (MSCs; also referred to as mesenchymal stromal cells) have attracted much attention for their ability to regulate inflammatory processes. Their therapeutic potential is currently being investigated in various degenerative and inflammatory disorders such as Crohn's disease, graft-versus-host disease, diabetic nephropathy and organ fibrosis. The mechanisms by which MSCs exert their therapeutic effects are multifaceted, but in general, these cells are thought to enable damaged tissues to form a balanced inflammatory and regenerative microenvironment in the presence of vigorous inflammation. Studies over the past few years have demonstrated that when exposed to an inflammatory environment, MSCs can orchestrate local and systemic innate and adaptive immune responses through the release of various mediators, including immunosuppressive molecules, growth factors, exosomes, chemokines, complement components and various metabolites. Interestingly, even nonviable MSCs can exert beneficial effects, with apoptotic MSCs showing immunosuppressive functions in vivo. Because the immunomodulatory capabilities of MSCs are not constitutive but rather are licensed by inflammatory cytokines, the net outcomes of MSC activation might vary depending on the levels and the types of inflammation within the residing tissues. Here, we review current understanding of the immunomodulatory mechanisms of MSCs and the issues related to their therapeutic applications.

[1]*The First Affiliated Hospital of Soochow University, State Key Laboratory of Radiation Medicine and Protection, Institutes for Translational Medicine, Soochow University, Suzhou, China.*

[2]*CAS Key Laboratory of Tissue Microenvironment and Tumor, Shanghai Institute of Nutrition and Health, Shanghai Institutes for Biological Sciences/Shanghai Jiao Tong University School of Medicine, University of Chinese Academy of Sciences, Chinese Academy of Sciences, Shanghai, China.*

**e-mail: yfshi@suda.edu.cn; yingwang@sibs.ac.cn*

https://doi.org/10.1038/s41581-018-0023-5

Stem cells are undifferentiated cells of metazoans that are characterized by their ability to both self-renew through symmetrical division and differentiate into specialized cell types through asymmetrical division. Stem cells can be classified according to their differentiation potential: pluripotent stem cells, such as embryonic stem cells, can presumably give rise to any cell type, whereas multipotent stem cells have limited differentiation potential and unipotent stem cells can differentiate only along one lineage. In tissues, stem cells function to maintain homeostasis. They are often quiescent and retain their progenitor properties by self-renewing. Activation (for example, by extrinsic cellular factors or damaged resident cells) induces stem cells to proliferate and differentiate to regenerate the damaged tissue. In addition to regenerating tissue in response to normal wear and tear, trauma or disease, resident stem cells are now also understood to actively communicate with the tissue microenvironment, especially with inflammatory components.

Mesenchymal stem cells (MSCs) are among the most widely studied multipotent stem cells. Unlike many other stem cells that are tissue-specific, MSCs have been identified in various tissues. Their 'stemness' is exemplified by their ability to differentiate into osteoblasts, chondrocytes and adipocytes[1]. However, MSCs are also often referred to as 'mesenchymal stromal cells' owing to their ability to sustain the homeostasis of the tissue microenvironment by supporting the functions of parenchymal cells, such as haematopoietic stem cells (HSCs)[2,3]. Due to variations in experimental protocols and cell sources between studies, no consensus exists regarding the nomenclature of these cells. In this Review, we use 'MSCs' to refer to the stem and stromal functions of these cells.

Owing to the lack of specific markers to study endogenous MSCs, most of our knowledge of the biological properties of MSCs has been obtained from the study of in vitro expanded and exogenously administered MSCs. Exogenously administered MSCs have been found to accumulate at damaged tissues[4], where they promote tissue regeneration through cell replacement or by empowering the regenerative

ACS NANO
Cite This: ACS Nano 2018, 12, 1390−1402
www.acsnano.org

ARTICLE

Surface Oxidation of Graphene Oxide Determines Membrane Damage, Lipid Peroxidation, and Cytotoxicity in Macrophages in a Pulmonary Toxicity Model

Ruibin Li,[#] Linda M. Guiney,[¶] Chong Hyun Chang,[§] Nikhita D. Mansukhani,[¶] Zhaoxia Ji,[§] Xiang Wang,[§] Yu-Pei Liao,[†] Wen Jiang,[‡] Bingbing Sun,[†] Mark C. Hersam,[¶] Andre E. Nel,*[,†,‡,§] and Tian Xia*[,†,‡,§]

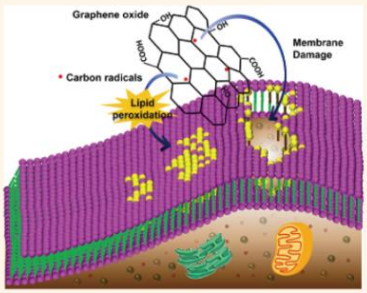
[†]Division of NanoMedicine, Department of Medicine, [‡]Center for Environmental Implications of Nanotechnology, and [§]California NanoSystems Institute, University of California, Los Angeles, California 90095, United States

[¶]Departments of Materials Science and Engineering, Chemistry, and Medicine, Northwestern University, Evanston, Illinois 60208, United States

[#]School for Radiological and Interdisciplinary Sciences (RAD-X), Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, Jiangsu Provincial Key Laboratory of Radiation Medicine and Protection, State Key Laboratory of Radiation Medicine and Protection, Soochow University, Suzhou 215123, China

Supporting Information

ABSTRACT: **While two-dimensional graphene oxide (GO) is used increasingly in biomedical applications, there is uncertainty on how specific physicochemical properties relate to biocompatibility in mammalian systems. Although properties such as lateral size and the colloidal properties of the nanosheets are important, the specific material properties that we address here is the oxidation state and reactive surface groups on the planar surface. In this study, we used a GO library, comprising pristine, reduced (rGO), and hydrated GO (hGO), in which quantitative assessment of the hydroxyl, carboxyl, epoxy, and carbon radical contents was used to study the impact on epithelial cells and macrophages, as well as in the murine lung. Strikingly, we observed that hGO, which exhibits the highest carbon radical density, was responsible for the generation of cell death in THP-1 and BEAS-2B cells as a consequence of lipid peroxidation of the surface membrane, membrane lysis, and cell death. In contrast, pristine GO had lesser effects, while rGO showed extensive cellular uptake with minimal effects on viability. In order to see how these *in vitro* effects relate to adverse outcomes in the lung, mice were exposed to GOs by oropharyngeal aspiration. Animal sacrifice after 40 h demonstrated that hGO was more prone than other materials to generate acute lung inflammation, accompanied by the highest lipid peroxidation in alveolar macrophages, cytokine production (LIX, MCP-1), and LDH release in bronchoalveolar lavage fluid. Pristine GO showed less toxicity, whereas rGO had minimal effects. We demonstrate that the surface oxidation state and carbon radical content play major roles in the induction of toxicity by GO in mammalian cells and the lung.**



KEYWORDS: *graphene oxide, surface functional groups, structure−activity relationships, carbon radicals, lipid peroxidation, lung inflammation*

Graphene is increasingly being used for a broad range of applications in electronics, energy, sensors, and catalysis due to its high electronic and thermal conductivity, high surface area, and extraordinary mechanical properties.[1,2] Moreover, the graphene derivative, graphene oxide (GO), exhibits excellent dispersibility, colloidal properties, and the potential to use surface functionalization to render the material attractive for use in biomedicine, including tissue engineering,[3] antimicrobial agents,[4] bioimaging,[5] and drug delivery.[6] In order to be successfully translated to products that can be used in the marketplace, it is important to understand the safety and biocompatibility of GO.[7,8] Although there has

Received: October 31, 2017
Accepted: January 12, 2018
Published: January 12, 2018

DOI: 10.1021/acsnano.7b07737
ACS Nano 2018, 12, 1390−1402

ACS NANO

Cite This: ACS Nano XXXX, XXX, XXX−XXX

www.acsnano.org

ARTICLE

Highly Effective Radioisotope Cancer Therapy with a Non-Therapeutic Isotope Delivered and Sensitized by Nanoscale Coordination Polymers

Yu Chao,[†] Chao Liang,[†] Yu Yang,[†] Guanglin Wang,[‡] Debabrata Maiti,[†] Longlong Tian,[†] Fei Wang,[§] Wei Pan,[∥] Song Wu,[*,§] Kai Yang,[*,‡] and Zhuang Liu[*,†]

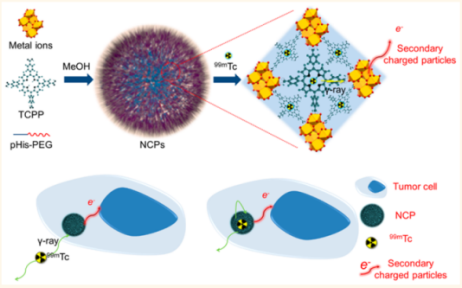
[†]Institute of Functional Nano & Soft Materials (FUNSOM), Jiangsu Key Laboratory for Carbon-Based Functional Materials & Devices and [‡]State Key Laboratory of Radiation Medicine and Protection, School of Radiation Medicine and Protection & School for Radiological and Interdisciplinary Sciences (RAD-X), Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, Soochow University, Suzhou, Jiangsu 215123, China

[§]Institute of Urology of Shenzhen University, The Third Affiliated Hospital of Shenzhen University, Shenzhen Luohu Hospital Group, Shenzhen 518000, China

[∥]College of Chemistry, Chemical Engineering and Materials Science, Shandong Normal University, Jinan 250014, China

Supporting Information

ABSTRACT: **Nuclear medicine with radioisotopes is extremely useful for clinical cancer diagnosis, prognosis, and treatment. Herein, polyethylene glycol (PEG)-modified nanoscale coordination polymers (NCPs) composed of hafnium (Hf^{4+}) and tetrakis (4-carboxyphenyl) porphyrin (TCPP) are prepared via a one-pot reaction. By chelation with the porphyrin structure of TCPP, such Hf-TCPP-PEG NCPs could be easily labeled with $^{99m}Tc^{4+}$, an imaging radioisotope widely used for single-photon emission computed tomography (SPECT) in a clinical environment. Interestingly, Hf, as a high-*Z* element in such ^{99m}Tc-Hf-TCPP-PEG NCPs, could endow nontherapeutic ^{99m}Tc with the therapeutic function of killing cancer cells, likely owing to the interaction of Hf with *γ* rays emitted from ^{99m}Tc to produce charged particles for radiosensitization. With efficient tumor retention, as revealed by SPECT imaging, our ^{99m}Tc-Hf-TCPP-PEG NCPs offer exceptional therapeutic results in eliminating tumors with moderate doses of ^{99m}Tc after either local or systemic administration. Importantly, those biodegradable NCPs could be rapidly excreted without much long-term body retention. Our work, showing the success of applying NCPs for radioisotope therapy (RIT), presents a potential concept for the realization of highly effective cancer treatment with ^{99m}Tc, a short-half-life (6.0 h) diagnostic radioisotope, which is promising for cancer RIT with enhanced efficacy and reduced side effects.**



KEYWORDS: *nanoscale coordination polymers, technetium-99, radiosensitization, SPECT imaging, radioisotope therapy*

Radioisotope therapy (RIT) *via* the use of therapeutic radioisotopes (*e.g.*, ^{131}I, ^{125}I, ^{188}Re, ^{177}Lu, etc.),[1−5] most of which are *β* emitters, implanted or administrated into the tumor or placed nearby the tumor to destruct solid tumors is an widely applied cancer treatment strategy in the clinic.[6,7] However, while local implantation of radioisotopes has no systemic effect on the treatment of metastatic tumors,[8,9] those *β*-emitting radioisotopes with half-lives of several days, if applied by systemic administration, could result in severe long-lasting damage to normal tissues.[10,11] ^{99m}Tc, as a metastable nuclear isomer of ^{99}Tc, is one of the most widely used radioisotopes in diagnostic imaging, particularly for single-photon emission computed tomography (SPECT).[12−14] With a short half-life of 6.0 h, ^{99m}Tc as a *γ* emitter is known to be a rather safe radioisotope.[15−17] While it is extensively used as an imaging radioisotope, the use of ^{99m}Tc for RIT has not yet been possible due to the fact that it only emits *γ* rays that have

Received: March 30, 2018
Accepted: July 13, 2018

ACS NANO
Cite This: ACS Nano 2018, 12, 11541−11551
www.acsnano.org

ARTICLE

Calcium Bisphosphonate Nanoparticles with Chelator-Free Radiolabeling to Deplete Tumor-Associated Macrophages for Enhanced Cancer Radioisotope Therapy

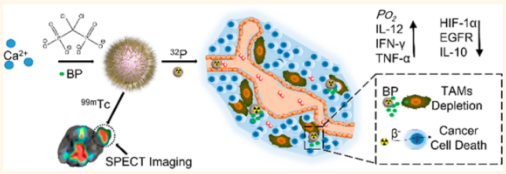
Longlong Tian,[†] Xuan Yi,[‡] Ziliang Dong,[†] Jun Xu,[†] Chao Liang,[†] Yu Chao,[†] Yaxing Wang,[‡] Kai Yang,*[,‡] and Zhuang Liu*[,†]

[†]Institute of Functional Nano & Soft Materials (FUNSOM), Collaborative Innovation Center of Suzhou Nano Science and Technology, Soochow University, Suzhou, Jiangsu 215123, China

[‡]State Key Laboratory of Radiation Medicine and Protection, School of Radiation Medicine and Protection & School for Radiological and Interdisciplinary Sciences (RAD-X), Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, Soochow University, Suzhou, Jiangsu 215123, China

Supporting Information

ABSTRACT: **Tumor-associated macrophages (TAMs) are often related with poor prognosis after radiotherapy. Depleting TAMs may thus be a promising method to improve the radio-therapeutic efficacy. Herein, we report a biocompatible and biodegradable nanoplatform based on calcium bisphosphonate (CaBP-PEG) nanoparticles for chelator-free radiolabeling chemistry, effective *in vivo* depletion of TAMs, and imaging-guided enhanced cancer radioisotope therapy (RIT). It is found that CaBP-PEG nanoparticles prepared *via* a mineralization method with poly(ethylene glycol) (PEG) coating could be labeled with various radioisotopes upon simple mixing, including gamma-emitting ^{99m}Tc for single-photon-emission computed tomography (SPECT) imaging, as well as beta-emitting ^{32}P as a therapeutic radioisotope for RIT. Upon intravenous injection, CaBP(^{99m}Tc)-PEG nanoparticles exhibit efficient tumor homing, as evidenced by SPECT imaging. Owning to the function of bisphosphonates as clinical drugs to deplete TAMs, suppressed angiogenesis, normalized tumor vasculatures, enhanced intratumoral perfusion, and relieved tumor hypoxia are observed after TAM depletion induced by CaBP-PEG. Such modulated tumor microenvironment appears to be highly favorable for cancer RIT using CaBP(^{32}P)-PEG as the radio-therapeutic agent, which offers excellent synergistic therapeutic effect in inhibiting the tumor growth. With great biocompatibility and multifunctionalities, such CaBP-PEG nanoparticles constituted by Ca^{2+} and a clinical drug would be rather attractive for clinical translation.**



KEYWORDS: *bisphosphonates, biomineralized nanoparticles, chelating-free radiolabeling chemistry, tumor-associated macrophages, radioisotope therapy*

Radiotherapy, including external beam radiation therapy and radioisotope therapy (RIT), is a major method widely applied in current clinical cancer treatment.[1,2] The improvement of RIT depends on accurately delivering radioisotopes to tumor tissues to optimize radiation doses of tumors *versus* normal organs.[3,4] Over the recent decade, versatile nanomaterials has been developed to deliver radionuclides to tumors through the enhanced permeability and retention (EPR) effect due to the leaky tumor blood vasculature.[5−8] To minimize side effects, those nanomaterials are often designed to be biodegradable and responsive to various features within the tumor microenvironment (*e.g.*, pH-sensitive, enzyme-sensitive).[9−15] Regarding the types of radio-therapeutic isotopes, as beta particles would often cause more damage to cancer cells compared to γ rays because of higher linear energy transfer (LET), various types of radioisotopes, such as ^{131}I, ^{177}Lu, ^{186}Re, and ^{188}Re, with both beta and gamma decays, have been extensively applied in the clinic for RIT.[16−18] Among various therapeutic isotopes, 32-phosphorus (^{32}P) appears to be quite suitable, as it is a purely beta-emitting radioisotope and could be innately bound to the DNA of cancer cells and then get trapped in tumors to effectively induce cell death.[19−22] Thus, developing biocompatible and

Received: September 2, 2018
Accepted: October 25, 2018
Published: October 25, 2018

DOI: 10.1021/acsnano.8b06699
ACS Nano 2018, 12, 11541−11551

ACS NANO
Cite This: ACS Nano 2018, 12, 9142−9151
www.acsnano.org

ARTICLE

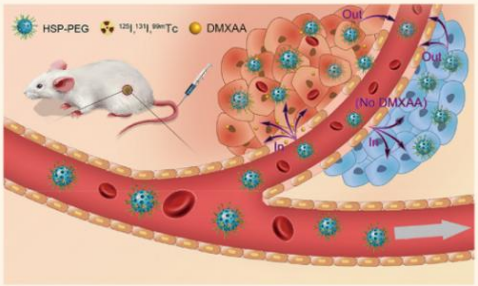
Ultrasmall Hyperbranched Semiconducting Polymer Nanoparticles with Different Radioisotopes Labeling for Cancer Theranostics

Xuan Yi,[†] Meiyun Xu,[†] Hailin Zhou, Saisai Xiong, Rui Qian, Zhifang Chai, Li Zhao,* and Kai Yang*

State Key Laboratory of Radiation Medicine and Protection, School of Radiation Medicine and Protection & School for Radiological and Interdisciplinary Sciences (RAD-X), Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, Soochow University, Suzhou, Jiangsu 215123, China

Supporting Information

ABSTRACT: **Exploiting ultrasmall nanoparticles as multifunctional nanocarriers labeled with different radionuclides for tumor theranostics has attracted great attention in past few years. Herein, we develop multifunctional nanocarriers based on ultrasmall hyperbranched semiconducting polymer (HSP) nanoparticles for different radionuclides including technetium-99m (^{99m}Tc), iodine-131 (^{131}I), and iodine-125 (^{125}I) labeling. SPECT imaging of ^{99m}Tc labeled PEGylated HSP nanoparticles (HSP-PEG) exhibit a prominent accumulation in two-independent tumor models including subcutaneously xenograft and patient derived xenograft model. Impressively, 5,6-dimethylxanthenone-4-acetic acid (DMXAA), as tumor-vascular disrupting agent (VDA), significantly improves the tumor accumulation of ^{131}I labeled HSP-PEG nanoparticles, further leading to the excellent inhibition of tumor growth after intravenous injection. More importantly, SPECT imaging of ^{125}I labeled HSP-PEG indicates that ultrasmall HSP-PEG nanoparticles could be slowly excreted from the body of a mouse through urine and feces in 1 week and cause no obvious toxicity to treated mice from blood analysis and histology examinations. Our finding from the different independent tumor models SPECT imaging shows that HSP-PEG nanoparticles may act as multifunctional nanocarriers to deliver different radionuclides for monitoring the *in vivo* behaviors of nanoparticles and cancer theranostics, which will provide a strategy for cancer treatment.**



KEYWORDS: *hyperbranched semiconducting polymer, SPECT imaging, DMXAA, radioisotope therapy, metabolizable property*

Nowadays, cancer is one of the leading threats to human health.[1] Various imaging approaches including computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET)/single photon emission computed tomography (SPECT) have been widely applied in clinical diagnosis of diseases.[2] Under the guidance of imaging, a clinician will provide the right treatment for precision medicine of patients.[3−6] At present, main methods such as surgery, chemotherapy, and radiotherapy (external beam radiotherapy (RT) and internal radioisotope therapy (RIT)) have been widely used in the clinic for cancer treatments.[7−10] Although radioisotopes have been shown to have a significant advantage in both SPECT/PET imaging and RIT of tumor, how to realize the targeting delivery of radioisotopes to the tumor sites and decrease the unnecessary side effects is still a challenge.[11,12] To date, the rapid development of nanotechnology brings a nanoplatform for radionuclides targeting delivery.[13,14] Various inorganic or organic nanomaterials have been used as nanocarriers for radionuclides delivery due to the intrinsic properties of nanomaterials.[15−18] Various treatments such as photothermal therapy, photodynamic therapy, and immunotherapy have been combined with RT/RIT for improving cancer therapeutic efficiency.[19−22] Given the potential toxicity and the problem of degradation, nanomaterials based on biomolecules (e.g., protein, DNA) or ultrasmall nanoparticles have been widely acted as nanocarriers for drug and radionuclides delivery and attracted considerable attention in recent years.[23−25] Such

Received: May 9, 2018
Accepted: September 4, 2018
Published: September 5, 2018

DOI: 10.1021/acsnano.8b03514
ACS Nano 2018, 12, 9142−9151

ACS NANO
Cite This: ACS Nano 2018, 12, 11070−11079
www.acsnano.org

ARTICLE

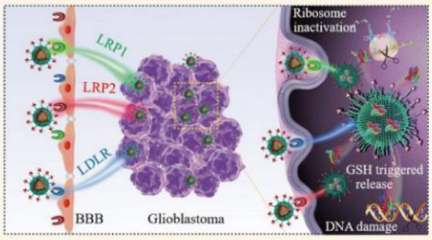
Apolipoprotein E Peptide-Directed Chimeric Polymersomes Mediate an Ultrahigh-Efficiency Targeted Protein Therapy for Glioblastoma

Yu Jiang, Jian Zhang,* Fenghua Meng, and Zhiyuan Zhong*

Biomedical Polymers Laboratory, and Jiangsu Key Laboratory of Advanced Functional Polymer Design and Application, College of Chemistry, Chemical Engineering and Materials Science, and State Key Laboratory of Radiation Medicine and Protection, Soochow University, Suzhou 215123, PR China

Supporting Information

ABSTRACT: **The inability to cross the blood−brain barrier (BBB) prevents nearly all chemotherapeutics and biotherapeutics from the effective treatment of brain tumors, rendering few improvements in patient survival rates to date. Here, we report that apolipoprotein E peptide [ApoE, $(LRKLRKRLL)_2C$] specifically binds to low-density lipoprotein receptor members (LDLRs) and mediates superb BBB crossing and highly efficient glioblastoma (GBM)-targeted protein therapy *in vivo*. The *in vitro* BBB model studies reveal that ApoE induces 2.2-fold better penetration of the immortalized mouse brain endothelial cell line (bEnd.3) monolayer for chimeric polymersomes (CP) compared to Angiopep-2, the best-known BBB-crossing peptide used in clinical trials for GBM therapy. ApoE-installed CP (ApoE−CP) carrying saporin (SAP) displays a highly specific and potent antitumor effect toward U-87 MG cells with a low half-maximum inhibitory concentration of 14.2 nM SAP. Notably, ApoE−CP shows efficient BBB crossing as well as accumulation and penetration in orthotopic U-87 MG glioblastoma. The systemic administration of SAP-loaded ApoE−CP causes complete growth inhibition of orthotopic U-87 MG GBM without eliciting any observable adverse effects, affording markedly improved survival benefits. ApoE peptide provides an ultrahigh-efficiency targeting strategy for GBM therapy.**



KEYWORDS: *brain tumor, blood−brain barrier, protein delivery, nanomedicines, targeted therapy*

Glioblastoma (GBM) is the most-invasive intracranial primary tumor that remains incurable to date.[1−3] An inability to cross the blood−brain barrier (BBB) limits nearly all chemotherapeutics and biotherapeutics from effectively treating of GBM patients.[4] It is found that a plethora of receptors, such as the low-density lipoprotein (LDL) receptor family (LDLRs), transferrin receptors, and insulin receptors are highly expressed on BBB,[5] which enable receptor-mediated transcytosis (RMT) of cargos through BBB.[6−8] In particular, three LDLRs, *i.e.*, LDL receptor (LDLR) and LDLR-related proteins 1 and 2 (LRP1 and LRP2), demonstrate significant up-regulation along with the development of glioblastoma.[9] Notably, these three receptors are also over-expressed on GBM cells,[10,11] which renders LDLRs an ideal target for GBM therapy. In the past years, peptides targeting LDLRs, including Angiopep-2 (ANG),[12] ApoB (3371-3409),[13] and peptide-22,[14,15] which target LRP1, LRP2, and LDLR, respectively, have been explored for delivering anticancer drugs to GBM. ANG, as a most-advanced GBM targeting peptide, is currently under clinical development.[16−18] The functionalization of nanoparticles with ANG showed clearly enhanced BBB transcytosis.[19,20] Notably, apolipoprotein E3 has shown efficient GBM-targeting delivery of siRNA.[21] Several apolipoprotein E derived peptides have recently been developed for crossing the BBB,[22−25] among which a tandem dimer sequence of the receptor-binding domain of apolipoprotein E, ApoE peptide, was reported to significantly improve brain delivery of therapeutics without interfering with endogenous apolipoprotein E.[26] The high brain-delivery efficiency of ApoE peptide may be ascribed to its high affinity to multiple LDLRs, including LDLR, LRP1, and LRP2.[27]

Here, we report that ApoE directed superb BBB crossing and highly efficient GBM-targeted protein therapy *in vivo*

Received: July 12, 2018
Accepted: November 5, 2018
Published: November 5, 2018

DOI: 10.1021/acsnano.8b05265
ACS Nano 2018, 12, 11070−11079

JACS
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY
Cite This: J. Am. Chem. Soc. 2018, 140, 6146−6155
Article
pubs.acs.org/JACS

Unique Proton Transportation Pathway in a Robust Inorganic Coordination Polymer Leading to Intrinsically High and Sustainable Anhydrous Proton Conductivity

Daxiang Gui,[†,#] Xing Dai,[†,#] Zetian Tao,[‡,#] Tao Zheng,[†] Xiangxiang Wang,[†] Mark A. Silver,[†] Jie Shu,[§] Lanhua Chen,[†] Yanlong Wang,[†] Tiantian Zhang,[§] Jian Xie,[†] Lin Zou,[∥] Yuanhua Xia,[∥] Jujia Zhang,[⊥] Jin Zhang,[⊥] Ling Zhao,*[,□] Juan Diwu,[†] Ruhong Zhou,*[,†,¶] Zhifang Chai,[†] and Shuao Wang*[,†]

[†]State Key Laboratory of Radiation Medicine and Protection, School for Radiological and interdisciplinary Sciences (RAD-X) and Collaborative Innovation Centre of Radiation Medicine of Jiangsu Higher Education Institutions, Soochow University, Suzhou 215123, China

[‡]Key Laboratory for Advanced Technology in Environmental Protection of Jiangsu Province, Yancheng Institute of Technology, Yancheng 224001, Jiangsu, China

[§]Analysis and Testing Center, Soochow University, 199 Renai Road, Suzhou 215123, China

[∥]Key Laboratory of Neutron Physics and Institute of Nuclear Physics and Chemistry, China Academy of Engineering Physics (CAEP), Mianyang 621999, China

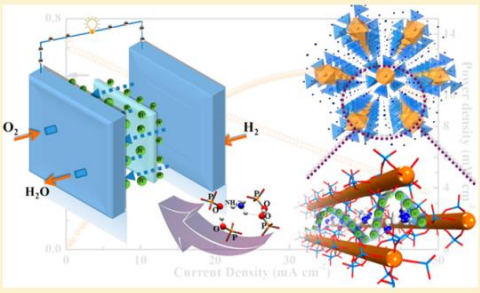
[⊥]Beijing Key Lab of Bio-inspired Energy Materials and Devices & School of Space and Environment, Beihang University, Beijing 100191, China

[□]Department of Material Science and Chemistry, China University of Geosciences, Wuhan 430074, China

[¶]Computational Biology Center, IBM Thomas J Watson Research Center, Yorktown Heights, New York 10598, United States

Supporting Information

ABSTRACT: Although comprehensive progress has been made in the area of coordination polymer (CP)/metal−organic framework (MOF)-based proton-conducting materials over the past decade, searching for a CP/MOF with stable, intrinsic, high anhydrous proton conductivity that can be directly used as a practical electrolyte in an intermediate-temperature proton-exchange membrane fuel cell assembly for durable power generation remains a substantial challenge. Here, we introduce a new proton-conducting CP, $(NH_4)_3[Zr(H_{2/3}PO_4)_3]$ (**ZrP**), which consists of one-dimensional zirconium phosphate anionic chains and fully ordered charge-balancing NH_4^+ cations. X-ray crystallography, neutron powder diffraction, and variable-temperature solid-state NMR spectroscopy suggest that protons are disordered within an inherent hydrogen-bonded infinite chain of acid−base pairs (N−H···O−P), leading to a stable anhydrous proton conductivity of 1.45×10^{-3} S·cm^{-1} at 180 °C, one of the highest values among reported intermediate-temperature proton-conducting materials. First-principles and quantum molecular dynamics simulations were used to directly visualize the unique proton transport pathway involving very efficient proton exchange between NH_4^+ and phosphate pairs, which is distinct from the common guest encapsulation/dehydration/superprotonic transition mechanisms. **ZrP** as the electrolyte was further assembled into a H_2/O_2 fuel cell, which showed a record-high electrical power density of 12 mW·cm^{-2} at 180 °C among reported cells assembled from crystalline solid electrolytes, as well as a direct methanol fuel cell for the first time to demonstrate real applications. These cells were tested for over 15 h without notable power loss.



INTRODUCTION

Proton-exchange membrane fuel cells (PEMFCs) are promising candidates for the partial substitution of fossil fuel energy owing to their high power density, green features, and mild operating conditions.[1,2] Intermediate-temperature (100−300 °C) PEMFCs exhibit several clear advantages over those assembled with commercialized Nafion, which can be operated only at low temperature (below 100 °C) and high hydration levels.[3,4] These advantages include faster electrode kinetics, no requirement of humidified inlet streams or large radiators to dissipate waste heat, and minimized CO poisoning of the platinum

Received: March 7, 2018
Published: April 25, 2018

DOI: 10.1021/jacs.8b02598
J. Am. Chem. Soc. 2018, 140, 6146−6155

blood® Brief Report

The transmembrane protein disulfide isomerase TMX1 negatively regulates platelet responses

Zhenzhen Zhao,[1,*] Yi Wu,[1,2,*] Junsong Zhou,[1,2] Fengwu Chen,[1] Aizhen Yang,[1] and David W. Essex[2]

[1]The Cyrus Tang Hematology Center, Collaborative Innovation Center of Hematology, State Key Laboratory of Radiation Medicine and Protection, Soochow University, Suzhow, China and [2]Sol Sherry Thrombosis Research Center, Division of Hematology, Department of Medicine, Temple University School of Medicine, Philadelphia, PA

KEY POINTS

- **Extracellular TMX1 negatively regulates activation of the αIIbβ3 integrin and platelet aggregation.**

Secreted platelet protein disulfide isomerases, PDI, ERp57, ERp5, and ERp72, have important roles as positive regulators of platelet function and thrombosis. Thioredoxin-related transmembrane protein 1 (TMX1) was the first described transmembrane member of the protein disulfide isomerase family of enzymes. Using a specific antibody, the recombinant extracellular domain of TMX1 (rTMX1) protein, a knockout mouse model, and a thiol-labeling approach, we examined the role of TMX1 in platelet function and thrombosis. Expression of TMX1 on the platelet surface increased with thrombin stimulation. The anti-TMX1 antibody increased platelet aggregation induced by convulxin and thrombin, as well as potentiated platelet ATP release. In contrast, rTMX1 inhibited platelet aggregation and ATP release. TMX1-deficient platelets had increased aggregation, ATP release, αIIbβ3 activation, and P-selectin expression, which were reversed by addition of rTMX1. TMX1-knockout mice had increased incorporation of platelets into a growing thrombus in an $FeCl_3$-induced mesenteric arterial injury, as well as shortened tail-bleeding times. rTMX1 oxidized thiols in the αIIbβ3 integrin and TMX1-deficient platelets had increased thiols in the β3 subunit of αIIbβ3, consistent with oxidase activity of rTMX1 against αIIbβ3. Thus, TMX1 is the first identified extracellular inhibitor of platelet function and the first disulfide isomerase that negatively regulates platelet function. (*Blood*. 2018;00(00):1-6)

Introduction

Platelets become rapidly activated at the site of vascular injury and have a central role in thrombosis. Of equal importance to pathways that cause platelet activation are those systems that negatively regulate platelets to prevent excessive activation and unwanted thrombosis.[1] Platelets have a number of endogenous inhibitors that act at the levels of agonist receptor stimulation, intracellular Ca^{2+} elevation, and RAP1 activation.[1] These cytosolic inhibitors serve to control platelet activation upstream of activation of the αIIbβ3 receptor for fibrinogen and other adhesive proteins.[2] Extracellular negative regulators of αIIbβ3 activation have not been well studied.

We and other investigators have shown that several members of the protein disulfide isomerase (PDI) family of enzymes support platelet function and thrombosis via their CGHC active-site motif. These include the prototypical PDI, ERp57, ERp5, and ERp72.[3-14] Each of these enzymes is individually required for activation of the αIIbβ3 integrin and platelet aggregation.[13] There are no known PDIs that negatively regulate platelet function.

Thioredoxin-related transmembrane protein 1 (TMX1) is a transmembrane member of the PDI family that forms disulfide bonds in newly formed proteins in the endoplasmic reticulum.[15,16] These reactions are mediated through a single unique CPAC-active site.[15,16] TMX1 preferentially acts on transmembrane polypeptides, including the β1 integrin, while ignoring the same Cys-containing ectodomains if not anchored at the endoplasmic reticulum membrane.[16] In the current study, we found that extracellular platelet TMX1 has an unexpected negative regulatory function in platelet activation and thrombosis.

Study design

Generation and characterization of TMX1-deficient mice and the recombinant extracellular domain of TMX1 (rTMX1) protein are described in the supplemental Materials and methods (available on the *Blood* Web site). RNA extraction, reverse-transcription polymerase chain reaction (RT-PCR), polymerase chain reaction, western blotting, coagulation assays, bleeding times, flow cytometry, platelet aggregation/secretion, $FeCl_3$-induced thrombosis, PDI assays, labeling of platelet αIIbβ3 with 3-(*N*-maleimidylpropionyl)-biocytin, and statistical analysis were described previously[13] and are included in the supplemental Materials and methods.

Labeling of thiols in αIIbβ3 with iodoTMT

αIIbβ3 (1.5 μg; R&D Systems) was treated with TCEP Disulfide Reducing Resin for 60 minutes at room temperature and then

Increased vessel perfusion predicts the efficacy of immune checkpoint blockade

Xichen Zheng,[1] Zhaoxu Fang,[1] Xiaomei Liu,[1] Shengming Deng,[1] Pei Zhou,[1] Xuexiang Wang,[1] Chenglin Zhang,[2] Rongping Yin,[2] Haitian Hu,[1] Xiaolan Chen,[3] Yijie Han,[4] Yun Zhao,[1] Steven H. Lin,[5] Songbing Qin,[6] Xiaohua Wang,[7] Betty Y.S. Kim,[8] Penghui Zhou,[9] Wen Jiang,[5] Qingyu Wu,[1] and Yuhui Huang[1]

[1]Cyrus Tang Hematology Center, Collaborative Innovation Center of Hematology, State Key Laboratory of Radiation Medicine and Prevention, and [2]School of Nursing, Soochow University, Suzhou, Jiangsu, China. [3]Institute of Pediatric Research, Affiliated Children's Hospital of Soochow University, Suzhou, Jiangsu, China. [4]Key Laboratory of Protein and Peptide Pharmaceuticals, Institute of Biophysics, Chinese Academy of Sciences, Beijing, China. [5]Department of Radiation Oncology, University of Texas MD Anderson Cancer Center, Houston, Texas, USA. [6]Department of Radiotherapy, and [7]First Affiliated Hospital of Soochow University, Suzhou, Jiangsu, China. [8]Department of Neurosurgery, Mayo Clinic, Jacksonville, Florida, USA. [9]State Key Laboratory of Oncology in Southern China, Sun Yat-Sen University Cancer Center, Guangzhou, Guangdong, China.

Immune checkpoint blockade (ICB) has demonstrated curative potential in several types of cancer, but only for a small number of patients. Thus, the identification of reliable and noninvasive biomarkers for predicting ICB responsiveness is an urgent unmet need. Here, we show that ICB increased tumor vessel perfusion in treatment-sensitive EO771 and MMTV-PyVT breast tumor as well as CT26 and MCA38 colon tumor models, but not in treatment-resistant MCaP0008 and 4T1 breast tumor models. In the sensitive tumor models, the ability of anti–cytotoxic T lymphocyte–associated protein 4 or anti–programmed cell death 1 therapy to increase vessel perfusion strongly correlated with its antitumor efficacy. Moreover, globally enhanced tumor vessel perfusion could be detected by Doppler ultrasonography before changes in tumor size, which predicted final therapeutic efficacy with more than 90% sensitivity and specificity. Mechanistically, $CD8^+$ T cell depletion, IFN-γ neutralization, or implantation of tumors in IFN-γ receptor knockout mice abrogated the vessel perfusion enhancement and antitumor effects of ICB. These results demonstrated that ICB increased vessel perfusion by promoting $CD8^+$ T cell accumulation and IFN-γ production, indicating that increased vessel perfusion reflects the successful activation of antitumor T cell immunity by ICB. Our findings suggest that vessel perfusion can be used as a novel noninvasive indicator for predicting ICB responsiveness.

Introduction

Recent advances in cancer immunotherapy have revolutionized cancer treatment. Immune checkpoint blockade (ICB), designed to target immune suppressive signals such as cytotoxic T lymphocyte–associated protein 4 (CTLA4) or programmed cell death 1 (PD1), has produced durable responses in some patients with advanced-stage and treatment-refractory cancers, including melanoma, non–small cell lung cancer, renal cell carcinoma, and Merkel cell carcinoma (1–5). However, despite these exciting results, only about one-quarter of patients experience a benefit from ICB monotherapy (2–4, 6). Therefore, novel strategies are needed to identify likely ICB responders to improve therapeutic efficacy.

Various tissue-based biomarkers have been explored to identify which patients are likely to respond to ICB. For instance, an increase in the ratio of tumor-infiltrating $CD8^+$ cytotoxic T cells over regulatory T cells (Tregs) was linked to response to anti-CTLA4 therapy (4, 7). Greater infiltration of $CD8^+$ T cells that express PD1 or programmed cell death protein ligand 1 (PD-L1) was associated with a better response to PD1 signaling blockade (3, 6). Likewise, PD-L1 expression was proposed as a promising biomarker to predict the effectiveness of anti–PD1 therapy (6, 8–10). Finally, mutational load is known to prompt the production of neoantigens for immune cells to recognize cancer cells, and has been linked to positive responses to ICB in the clinic (11, 12). Although a correlation between genetic mutations and ICB responsiveness could be used to estimate overall response rates in different cancer types, this may not be useful for individual patients (3, 11, 12). Moreover, these tissue-based methods can provide a baseline assessment of tumor immunogenicity, but are not suitable for longitudinal monitoring of changes in the tumor microenvironment (TME) over time during the course of treatment.

The task of identifying a noninvasive and reliable biomarker of responsiveness to ICB is further complicated by the fact that the response of tumors to immunotherapy differs from their response to chemotherapy and radiotherapy (2, 3). Pseudoprogression of lesions during ICB limits the classification of lesion size as a direct correlation of treatment responses (13, 14). In this case, the ability to discern real-time physiological changes within the TME is more critical than lesion size in assessing actual antitumor immunity. Therefore, we proposed to identify TME-based

Authorship note: XZ and ZF contributed equally to this work.
Conflict of interest: The authors have declared that no conflict of interest exists.
Submitted: July 28, 2017; **Accepted:** March 1, 2018.
Reference information: *J Clin Invest*. 2018;128(5):2104–2115.
https://doi.org/10.1172/JCI96582.

NANO LETTERS
Cite This: Nano Lett. 2018, 18, 4985−4992
Letter
pubs.acs.org/NanoLett

Monitoring the Opening and Recovery of the Blood−Brain Barrier with Noninvasive Molecular Imaging by Biodegradable Ultrasmall $Cu_{2-x}Se$ Nanoparticles

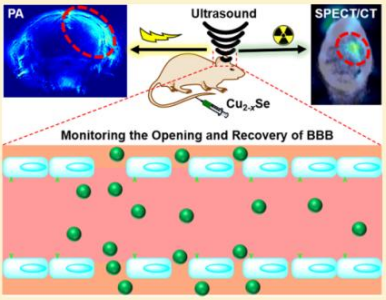
Hao Zhang,[†] Tingting Wang,[†] Weibao Qiu,[‡] Yaobao Han,[†] Qiao Sun,[†] Jianfeng Zeng,[†] Fei Yan,[‡] Hairong Zheng,[‡] Zhen Li,*[,‡] and Mingyuan Gao[†]

[†]Center for Molecular Imaging and Nuclear Medicine, State Key Laboratory of Radiation Medicine and Protection, School for Radiological and Interdisciplinary Sciences (RAD-X), Soochow University, Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, Suzhou 215123, PR China

[‡]Paul C. Lauterbur Research Center for Biomedical Imaging, Institute of Biomedical and Health Engineering, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen 518055, PR China

Supporting Information

ABSTRACT: The reversible and controllable opening and recovery of the blood−brain barrier (BBB) is crucial for the treatment of brain diseases, and it is a big challenge to noninvasively monitor these processes. In this article, dual-modal photoacoustic imaging and single-photon-emission computed tomography imaging based on ultrasmall $Cu_{2-x}Se$ nanoparticles (3.0 nm) were used to noninvasively monitor the opening and recovery of the BBB induced by focused ultrasound in living mice. The ultrasmall $Cu_{2-x}Se$ nanoparticles were modified with poly(ethylene glycol) to exhibit a long blood circulation time. Both small size and long blood circulation time enable them to efficiently penetrate into the brain with the assistance of ultrasound, which resulted in a strong signal at the sonicated site and allowed for photoacoustic and single-photon emission computed tomography imaging monitoring the recovery of the opened BBB. The results of biodistribution, blood routine examination, and histological staining indicate that the accumulated $Cu_{2-x}Se$ nanoparticles could be excreted from the brain and other major organs after 15 days without causing side effects. By the combination of the advantages of noninvasive molecular imaging and focused ultrasound, the ultrasmall biocompatible $Cu_{2-x}Se$ nanoparticles holds great potential for the diagnosis and therapeutic treatment of brain diseases.



KEYWORDS: *Ultrasmall $Cu_{2-x}Se$ nanoparticles, focused ultrasound, blood−brain barrier, noninvasive molecular imaging*

During the treatment of brain diseases, one big challenge is the efficient delivery of therapeutic agents across the blood−brain barrier (BBB), which is a specialized cerebral vascular system formed by brain endothelial cells and prevents more than 98% of drug molecules larger than ~400 Da in size from entering the brain.[1,2] To improve the delivery efficiency, great efforts have been devoted to developing different methods to overcome the BBB issue, including: (1) injection of hyperosmotic drug solutions,[3,4] (2) modification of drug structures for active efflux transporters,[5,6] (3) improvement of drug solubility to facilitate its penetration,[7,8] and (4) conjugation with targeting ligands (e.g., transferrin and angiopep-2) to enable active carrier-mediated transport across the BBB.[9−11] Although these methods resulted in promising outcomes, they have high risks of side effects or low delivery efficiency.

Recently, focused ultrasound (US) as a noninvasive technique has been used to deliver theranostic agents for the detection and treatment of various brain diseases, such as Alzheimer's disease,[12,13] Parkinson's disease,[14,15] and glioma.[16,17] Ultrasound with a frequency below 1 MHz can induce noninvasive, reversible, and temporary opening of the BBB with the assistance of microbubbles (MB).[18,19] However, it is very challenging to noninvasively monitor and evaluate the permeability of the BBB after sonication. A number of imaging methods have been adopted for this purpose, such as contrast-enhanced magnetic resonance imaging (MRI),[20−22] fluorescence imaging,[23] and immunoelectron microscopy.[24]

The above methods have their own merits and disadvantages. For example, MRI has high resolution but with low sensitivity, and it usually takes a long time to obtain high-quality images. Fluorescence imaging has high sensitivity, but it is limited with respect to penetration and resolution due to the presence of the cranium and strong scattering in brain tissue. Immunoelectron microscopy cannot record real-time images of living tissue. The shortcomings of these imaging approaches

Received: May 4, 2018
Revised: July 1, 2018
Published: July 11, 2018

DOI: 10.1021/acs.nanolett.8b01818
Nano Lett. 2018, 18, 4985−4992

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Synthesis of Pt Hollow Nanodendrites with Enhanced Peroxidase-Like Activity against Bacterial Infections: Implication for Wound Healing

*Renfei Wu, Yu Chong, Ge Fang, Xiumei Jiang, Yue Pan, Chunying Chen, Jun-Jie Yin, and Cuicui Ge**

Improving the antibacterial activity of H_2O_2 and reducing its usage are requirements for wound disinfection. Nanomaterials with intrinsic peroxidase-like properties are developed to enhance the antibacterial performance of H_2O_2 and avoid the toxicity seen with high H_2O_2 levels. Here, Pd–Pt core–frame nanodendrites consist of a dense array of platinum (Pt) branches on a Pd core are synthesized, and subsequently converted to Pt hollow nanodendrites by selective removal of the Pd cores by wet etching. The fabricated Pt hollow nanodendrites exert striking peroxidase-like activity due to the maximized utilization efficiency of the Pt atoms and the presence of high-index facets on their surfaces. By catalyzing the decomposition of H_2O_2 into more toxic hydroxyl radicals (•OH), Pt hollow nanodendrites exhibit excellent bactericidal activity against both Gram-negative and Gram-positive bacteria with the assistance of low concentrations of H_2O_2. Furthermore, Pt hollow nanodendrites accelerate wound healing in the presence of low doses of H_2O_2. In addition, no obvious adverse effects are observed at the given dose of nanodendrites. These findings can be used to guide the design of noble metal-based nanomaterials as potential enzyme-mimetic systems and advance the development of nanoenzymes to potentiate the antibacterial activity of H_2O_2.

1. Introduction

Bacterial infections pose a large public health concern due to the rapid emergence of antibiotic resistance.[1,2] Therefore, the development of novel antibacterial agents is highly desirable. In recent years, developments in nanoscience and nanotechnology have led to the construction of a series of antibacterial nanomaterials, including nanosilver, metal oxides, and carbon-based nanostructures, that have been utilized to overcome the disadvantages of traditional antibiotics.[3–12] Based on their intrinsic enzyme-like activity, several nanoparticles have been used in synergistic antibacterial applications with H_2O_2, which can significantly reduce the amount of both nanoparticles and H_2O_2 used.[13–15] H_2O_2 is widely used in the practical treatment of bacterial infections as an antibacterial agent.[16,17] Interestingly, functional nanoparticles with peroxidase-like properties can convert H_2O_2 into hydroxyl radicals, which are more toxic to bacteria.[18] Thus, in order to develop better antibacterials, it is required to maximize the enzyme like activity of nanomaterials through tuning their morphology and composition.

Platinum (Pt)-based nanocrystals have been widely applied in electronics, photonics, sensing, energy conversion, biomedicine, and particularly in catalysis, due to their well-controlled shape, size, morphology and structure.[19–27] In recent years, a

Dr. C. C. Ge, R. F. Wu, Dr. Y. Chong, G. Fang
State Key Laboratory of Radiation Medicine and Protection
School for Radiological and Interdisciplinary Sciences (RAD-X)
Collaborative Innovation Center of Radiation Medicine of Jiangsu
Higher Education Institutions
Soochow University
Suzhou 215123, China
E-mail: ccge@suda.edu.cn

Dr. X. M. Jiang, Dr. J. J. Yin
Division of Bioanalytical Chemistry and Division of Analytical Chemistry
Office of Regulatory Science
Center for Food Safety and Applied Nutrition
U. S. Food and Drug Administration
College Park, MD 20740, USA

The ORCID identification number(s) for the author(s) of this article can be found under https://doi.org/10.1002/adfm.201801484.

Dr. Y. Pan
State and Local Joint Engineering Laboratory for Novel Functional Polymeric Materials
College of Chemistry
Chemical Engineering and Materials Science
Soochow University
Suzhou 215123, China

Prof. C. Y. Chen
Key Laboratory for Biomedical Effects of Nanomaterials and Nanosafety
National Center for Nanoscience and Technology of China
and Institute of High Energy Physics
Chinese Academy of Sciences
Beijing 100190, China

DOI: 10.1002/adfm.201801484

nature COMMUNICATIONS

ARTICLE

DOI: 10.1038/s41467-018-05380-5 OPEN

$^{99}TcO_4^-$ remediation by a cationic polymeric network

Jie Li[1], Xing Dai[1], Lin Zhu[1], Chao Xu[2], Duo Zhang[1], Mark A. Silver[1], Peng Li[3], Lanhua Chen[1], Yongzhong Li[4], Douwen Zuo[5], Hui Zhang[6], Chengliang Xiao[1], Jing Chen[2], Juan Diwu[1], Omar K. Farha[3,7], Thomas E. Albrecht-Schmitt[8], Zhifang Chai[1] & Shuao Wang[1]

Direct removal of $^{99}TcO_4^-$ from the highly acidic solution of used nuclear fuel is highly beneficial for the recovery of uranium and plutonium and more importantly aids in the elimination of ^{99}Tc discharge into the environment. However, this task represents a huge challenge given the combined extreme conditions of super acidity, high ionic strength, and strong radiation field. Here we overcome this challenge using a cationic polymeric network with significant TcO_4^- uptake capabilities in four aspects: the fastest sorption kinetics, the highest sorption capacity, the most promising uptake performance from highly acidic solutions, and excellent radiation-resistance and hydrolytic stability among all anion sorbent materials reported. In addition, this material is fully recyclable for multiple sorption/desorption trials, making it extremely attractive for waste partitioning and emergency remediation. The excellent TcO_4^- uptake capability is elucidated by X-ray absorption spectroscopy, solid-state NMR measurement, and density functional theory analysis on anion coordination and bonding.

[1] State Key Laboratory of Radiation Medicine and Protection, School for Radiological and Interdisciplinary Sciences (RAD-X) and Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, Soochow University, 215123 Suzhou, China. [2] Collaborative Innovation Center of Advanced Nuclear Energy Technology, Institute of Nuclear and New Energy Technology, Tsinghua University, 100084 Beijing, China. [3] Department of Chemistry, Northwestern University, 2145 Sheridan Road, Evanston, IL 60208, USA. [4] Suzhou CNNC Huadong Radiation Co., Ltd, 215222 Suzhou, China. [5] CGN Dasheng Electron Accelerator Technology Co., Ltd, 215212 Suzhou, China. [6] State Key Laboratory of Functional Materials for Informatics, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, 200050 Shanghai, China. [7] Department of Chemistry, Faculty of Science, King Abdulaziz University, Jeddah 21589, Saudi Arabia. [8] Department of Chemistry and Biochemistry, Florida State University, 95 Chieftain Way, Tallahassee, FL 32306, USA. Correspondence and requests for materials should be addressed to C.X. (email: xiaoc@suda.edu.cn) or to S.W. (email: shuaowang@suda.edu.cn)

nature COMMUNICATIONS

ARTICLE

DOI: 10.1038/s41467-018-07257-z OPEN

Palladium concave nanocrystals with high-index facets accelerate ascorbate oxidation in cancer treatment

Yu Chong[1], Xing Dai[1], Ge Fang[1], Renfei Wu[1], Lin Zhao[1], Xiaochuan Ma[1], Xin Tian[1], Sangyun Lee[2], Chao Zhang[3], Chunying Chen[4], Zhifang Chai[1], Cuicui Ge[1] & Ruhong Zhou[1,2,5]

Intravenous pharmacological dose of ascorbate has been proposed as a potential antitumor therapy; however, its therapeutic efficacy is limited due to the slow autoxidation. Here, we report that palladium (Pd) nanocrystals, which possess intrinsic oxidase-like activity, accelerate the autoxidation of ascorbate, leading to the enhancement of its antitumor efficacy. The oxidase-like activity of Pd nanocrystals was facet-dependent, with the concave nanostructure enclosed by high-index facets catalyzing ascorbate autoxidation more efficiently than the planar nanostructure enclosed by low-index facets. Our first-principles calculations provide the underlying molecular mechanisms for the facet-dependent activation of O_2 molecule and subsequent ascorbate oxidation. Further in vitro and in vivo assays demonstrate the enhancement of the antitumor efficacy of ascorbate with these Pd concave nanocubes. Our animal experiments also indicate the combined approach with both ascorbate and Pd concave nanocubes displays an even better efficacy than currently available clinical medicines, with no obvious cytotoxicity to normal cells.

[1] State Key Laboratory of Radiation Medicine and Protection, School for Radiological and Interdisciplinary Sciences (RAD-X), Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, Soochow University, Suzhou 215123, China. [2] Computational Biology Center, IBM Thomas J. Watson Research Center, Yorktown Heights, 10598 NY, USA. [3] School of Materials Science and Engineering, Anhui University of Science and Technology, Huainan 232001, China. [4] CAS Key Laboratory for Biomedical Effects of Nanomaterials and Nanosafety, & CAS Center for Excellence in Nanoscience, National Center for Nanoscience and Technology of China, and University of Chinese Academy of Sciences, Beijing 100190, China. [5] Department of Chemistry, Columbia University, New York, 10027 NY, USA. These authors contributed equally: Yu Chong, Xing Dai. Correspondence and requests for materials should be addressed to C.G. (email: ccge@suda.edu.cn) or to R.Z. (email: ruhongz@us.ibm.com)

nature COMMUNICATIONS

ARTICLE

DOI: 10.1038/s41467-018-06869-9 OPEN

Multi-hierarchical profiling the structure-activity relationships of engineered nanomaterials at nano-bio interfaces

Xiaoming Cai[1], Jun Dong[2], Jing Liu[3], Huizhen Zheng[1], Chitrada Kaweeteerawat[4], Fangjun Wang[3], Zhaoxia Ji[5,6] & Ruibin Li[1]

Increasing concerns over the possible risks of nanotechnology necessitates breakthroughs in structure-activity relationship (SAR) analyses of engineered nanomaterials (ENMs) at nano-bio interfaces. However, current nano-SARs are often based on univariate assessments and fail to provide tiered views on ENM-induced bio-effects. Here we report a multi-hierarchical nano-SAR assessment for a representative ENM, Fe_2O_3, by metabolomics and proteomics analyses. The established nano-SAR profile allows the visualizing of the contributions of seven basic properties of Fe_2O_3 to its diverse bio-effects. For instance, although surface reactivity is responsible for Fe_2O_3-induced cell migration, the inflammatory effects of Fe_2O_3 are determined by aspect ratio (nanorods) or surface reactivity (nanoplates). These nano-SARs are examined in THP-1 cells and animal lungs, which allow us to decipher the detailed mechanisms including NLRP3 inflammasome pathway and monocyte chemoattractant protein-1-dependent signaling. This study provides more insights for nano-SARs, and may facilitate the tailored design of ENMs to render them desired bio-effects.

[1] State Key Laboratory of Radiation Medicine and Protection, Collaborative Innovation Center of Radiological Medicine of Jiangsu Higher Education Institutions, School of Public Health, School of Radiation Medicine and Protection, Soochow University, Suzhou, Jiangsu 215123, China. [2] Wuhan Academy of Agricultural Science, Wuhan, Hubei 430000, China. [3] CAS Key Laboratory of Separation Sciences for Analytical Chemistry, National Chromatographic R&A Center, Dalian Institute of Chemical Physics, Chinese Academy of Sciences (CAS), Dalian 116023, China. [4] National Nanotechnology Center (NANOTEC), National Science and Technology Development Agency (NSTDA), Klong Nueng 12120, Thailand. [5] California NanoSystems Institute, University of California, Los Angeles, CA 90095, USA. [6] Living Proof, Inc., Cambridge, MA 02142, United States. Correspondence and requests for materials should be addressed to Z.J. (email: zji@cnsi.ucla.edu) or to R.L. (email: liruibin@suda.edu.cn)

Metal–Organic Frameworks

International Edition: DOI: 10.1002/anie.201802173
German Edition: DOI: 10.1002/ange.201802173

Employing an Unsaturated Th^{4+} Site in a Porous Thorium–Organic Framework for Kr/Xe Uptake and Separation

*Yanlong Wang, Wei Liu, Zhuanling Bai, Tao Zheng, Mark A. Silver, Yuxiang Li, Yaxing Wang, Xia Wang, Juan Diwu, Zhifang Chai, and Shuao Wang**

Abstract: *Actinide based metal–organic frameworks (MOFs) are unique not only because compared to the transition-metal and lanthanide systems they are substantially less explored, but also owing to the uniqueness of actinide ions in bonding and coordination. Now a 3D thorium–organic framework (**SCU-11**) contains a series of cages with an effective size of ca. 21 × 24 Å. Th^{4+} in **SCU-11** is 10-coordinate with a bicapped square prism coordination geometry, which has never been documented for any metal cation complexes. The bicapped position is occupied by two coordinated water molecules that can be removed to afford a very unique open Th^{4+} site, confirmed by X-ray diffraction, color change, thermogravimetry, and spectroscopy. The degassed phase (**SCU-11-A**) exhibits a Brunauer–Emmett–Teller surface area of 1272 $m^2 g^{-1}$, one of the highest values among reported actinide materials, enabling it to sufficiently retain water vapor, Kr, and Xe with uptake capacities of 234 $cm^3 g^{-1}$, 0.77 $mmol g^{-1}$, 3.17 $mmol g^{-1}$, respectively, and a Xe/Kr selectivity of 5.7.*

Thorium is a unique element in the actinide series, and not just because it is the most common radioactive 5f-element found in natural reserves. The naturally occurring isotope of thorium, ^{232}Th ($t_{1/2} = 1.405 \times 10^{10}$ *y*), is less radioactive than that of uranium (^{238}U, $t_{1/2} = 4.468 \times 10^{9}$ *y*), yet the need for experiments aimed at defining the structural properties and chemical characteristics of thorium has been overlooked.[1] Indeed, the need for more intensive research interest towards thorium takes root in two aspects in nuclear chemistry. On the one hand, a complete understanding of thorium chemistry is paramount in nuclear energy science, given that ^{232}Th is a core part of molten salt reactors.[2] Furthermore, thorium prefers the tetravalent oxidation state and therefore serves as a useful surrogate for Pu^{IV}, yielding valuable knowledge that increases the efficiency of properly disposing nuclear waste. Beyond this, the hydrolytic nature of Th^{IV} has been thoroughly investigated and it is an understanding of the coordination chemistry of thorium that is truly overdue. In comparison to uranium, which can crystallize in four different oxidation states (III, IV, V, and VI) and yet is still in dire need of further solid-state analyses;[3] there are nearly eight times as many crystal structures for uranium as there are for thorium when considering the recent Inorganic Crystallographic Structure Database and Cambridge Crystallographic Database. Thorium has been observed in a variety of coordination numbers (4 to 15) due to having the largest ionic radius (1.09 Å) of the tetravalent metal cations in general.[4] This orchestrates a myriad of unique coordination geometries with varying stabilities that will result in the design and preparation of new materials that may not be achieved in other metal-based systems.

A strong majority of known thorium materials are purely inorganic compounds or simple organic complexes, in contrast to a mere handful of thorium metal–organic frameworks (MOFs) that have been explored throughout the past two decades.[3d,5,6,7b,c] The original motivation is to prepare MOF materials with elevated water resistance and thermal stability based on high charge density metal cations, similar with those of Zr^{IV} based MOFs. O'Hare and co-workers synthesized the first thorium–organic framework $[(Th_2F_5)(NC_7H_5O_4)_2(H_2O)][NO_3]$ through self-assembly of pyridinedicarboxylate and $Th(NO_3)_4$, which produced a thorium cationic metal organic framework.[6a] Years later, they reported $Th[C_6H_3(CO_2)_3F]\cdot 0.3\,H_2O$ (denoted as **TOF-2**)[6b] that featured nanotubular 1D channels with pore diameters of about 1.7–2.7 nm and a specific surface area of 293 $m^2 g^{-1}$ (CO_2, 196 K). Volkringer and co-workers built a thorium-organic framework as an analogue of **UiO-66** that displays elevated stability and a large Brunauer–Emmett–Teller (BET) surface of 730 $m^2 g^{-1}$.[5a] To summarize, porous materials with a variety of specific properties can be expected from the assembly of thorium with tailored ligands. The exploration of thorium MOFs is of great importance to thoroughly comprehending the chemical properties and expanding the applications of thorium.

We have long been interested in building new types of MOFs based on the unique coordination chemistry of actinides.[7] In our recent work, a 2D thorium(IV) framework was found to display a (6,3) graphene-like sheet topology analogous to a uranium(IV) structure. Being anisotropic in character, this structure provides insight into how low-valent actinide ions exhibit a similar coordination mode frequently observed in high-valent actinyl ions for the first time.[7b] Furthermore, we constructed the first hydrolytically stable mesoporous MOF based on the 10-coordinate Th^{4+} with superior anion-exchange properties.[7d] Notably, all these compounds do not have Zr^{IV} analogues.

[*] Dr. Y. Wang, W. Liu, Z. Bai, T. Zheng, Prof. M. A. Silver, Y. Li, Y. Wang, X. Wang, Prof. J. Diwu, Prof. Z. F. Chai, Prof. S. Wang
State Key Laboratory of Radiation Medicine and Protection
School for Radiological and interdisciplinary Sciences (RAD-X) and Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions
Soochow University, Suzhou 215123 (China)
E-mail: shuaowang@suda.edu.cn
Supporting information and the ORCID identification number(s) for the author(s) of this article can be found under: https://doi.org/10.1002/anie.201802173.

Uranium

International Edition: DOI: 10.1002/anie.201802865
German Edition: DOI: 10.1002/ange.201802865

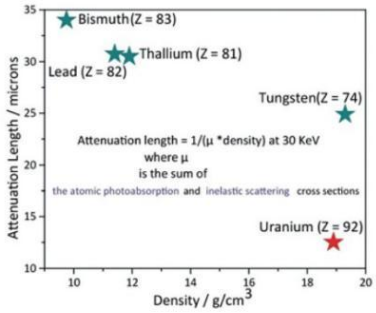
Emergence of Uranium as a Distinct Metal Center for Building Intrinsic X-ray Scintillators

*Yaxing Wang[+], Xuemiao Yin[+], Wei Liu, Jian Xie, Junfeng Chen, Mark A. Silver, Daopeng Sheng, Lanhua Chen, Juan Diwu, Ning Liu, Zhifang Chai, Thomas E. Albrecht-Schmitt, and Shuao Wang**

Abstract: *The combination of high atomic number and high oxidation state in U^{VI} materials gives rise to both high X-ray attenuation efficiency and intense green luminescence originating from ligand-to-metal charge transfer. These two features suggest that U^{VI} materials might act as superior X-ray scintillators, but this postulate has remained substantially untested. Now the first observation of intense X-ray scintillation in a uranyl–organic framework (**SCU-9**) that is observable by the naked eye is reported. Combining the advantage in minimizing the non-radiative relaxation during the X-ray excitation process over those of inorganic salts of uranium, **SCU-9** exhibits a very efficient X-ray to green light luminescence conversion. The luminescence intensity shows an essentially linear correlation with the received X-ray intensity, and is comparable with that of commercially available CsI:Tl. **SCU-9** possesses an improved X-ray attenuation efficiency ($E > 20$ keV) as well as enhanced radiation resistance and decreased hygroscopy compared to CsI:Tl.*

X-ray scintillation is the ability of a material to absorb X-rays and convert the energy into luminescence. This luminescence is typically in the visible region of the EM spectrum and is ubiquitous in mammography,[1] computed tomography,[2] non-invasive security checks,[3] and other industrial applications.[4] Depending on the luminescence mechanism, scintillators are categorized into multiple subsets.[5] The majority of them are crystalline solids doped with guest ions that provide the luminescence. These materials include NaI:Tl, CsI:Tl, and $Lu_3Al_5O_{12}$:Ce, where the guest ions introduce activators into the forbidden gap of crystal to achieve X-ray to visible light conversion. There also exists the class of materials that possess luminescent host lattices, such as $Bi_4Ge_3O_{12}$, $PbWO_4$, displaying so called self-activated emission.[5] However, the development of this material type is slow because most luminescent ions are faced with self-quenching when the concentrations are high.[6] Nevertheless, an ideal scintillator should be featured with high light output, fast response time, high radiation stopping power, decent radiation and hygroscopy hardness, and good energy resolution.[5] Numerous materials have been screened for scintillation applications, but to date no single material has proven to be applicable to a broader spectrum of measurement conditions.[3,5,7,8]

Uranium is the heaviest naturally occurring and abundant element in the periodic table, endowing it with an X-ray attenuation efficiency superior to many other common heavy elements such as lead, thallium, and tungsten (Scheme 1). Another unique property of uranium is the intrinsically intense green emission originating from the HOMO–LUMO transition in hexavalent uranyl ions (UO_2^{2+}).[9] In the past, this has allowed uranium to serve as toners for glazed ceramic dinnerware, dentistry, and vaseline glass.[10] In principle, these two properties support uranium as being one of the best candidates for X-ray scintillation; however, rejection of uranium in any application besides nuclear fuel assigns it as being a research "dark horse" in this utility. This dismissal to



Scheme 1. Comparison of the X-ray attenuation efficiency between several typical heavy elements in their elementary states, highlighting the advantage of uranium. The shorter attenuation length indicates the higher attenuation efficiency.

[*] Y. Wang,[+] X. Yin,[+] W. Liu, J. Xie, Prof. M. A. Silver, D. Sheng, L. Chen, Prof. J. Diwu, Prof. Z. Chai, Prof. S. Wang
State Key Laboratory of Radiation Medicine and Protection, School for Radiological and interdisciplinary Sciences (RAD-X) and Collaborative Innovation Center of Radiation Medicine of Jiangsu Higher Education Institutions, Soochow University
Suzhou 215123 (China)
E-mail: shuaowang@suda.edu.cn
Y. Wang,[+] Prof. N. Liu
Key Laboratory of Radiation Physics and Technology, Ministry of Education, Institute of Nuclear Science and Technology
Sichuan University, Chengdu 610064 (China)
Prof. J. Chen
Key Laboratory of Transparent Opto-functional Inorganic Materials, Chinese Academy of Sciences, Shanghai Institute of Ceramics
Chinese Academy of Sciences, Shanghai 201899 (China)
Prof. T. E. Albrecht-Schmitt
Department of Chemistry and Biochemistry, Florida State University
95 Chieftain Way, Tallahassee, FL 32306 (USA)
[+] These authors contributed equally to this work.
Supporting information and the ORCID identification number(s) for the author(s) of this article can be found under: https://doi.org/10.1002/anie.201802865.

Akt-mediated platelet apoptosis and its therapeutic implications in immune thrombocytopenia

Mengxing Chen[a,1], Rong Yan[a,1,2], Kangxi Zhou[a,1], Xiaodong Li[a], Yang Zhang[a], Chunliang Liu[a], Mengxiao Jiang[a], Honglei Ye[a], Xingjun Meng[a], Ningbo Pang[a], Lili Zhao[a], Jun Liu[a], Weiling Xiao[a], Renping Hu[a], Qingya Cui[a], Wei Zhong[a], Yunxiao Zhao[a], Mingqing Zhu[a], Anning Lin[b], Changgeng Ruan[a], and Kesheng Dai[a,2]

[a]Jiangsu Institute of Hematology, The First Affiliated Hospital and Collaborative Innovation Center of Hematology, State Key Laboraotry of Radiation Medicine and Protection, Soochow University, Key Laboratory of Thrombosis and Hemostasis, Ministry of Health, Suzhou, Jiangsu 215006, China; and [b]Ben May Department for Cancer Research, The University of Chicago, Chicago, IL 60637

Edited by Barry S. Coller, The Rockefeller University, New York, NY, and approved September 25, 2018 (received for review May 14, 2018)

Immune thrombocytopenia (ITP) is an autoimmune disorder characterized by low platelet count which can cause fatal hemorrhage. ITP patients with antiplatelet glycoprotein (GP) Ib-IX autoantibodies appear refractory to conventional treatments, and the mechanism remains elusive. Here we show that the platelets undergo apoptosis in ITP patients with anti-GPIbα autoantibodies. Consistent with these findings, the anti-GPIbα monoclonal antibodies AN51 and SZ2 induce platelet apoptosis in vitro. We demonstrate that anti-GPIbα antibody binding activates Akt, which elicits platelet apoptosis through activation of phosphodiesterase (PDE3A) and PDE3A-mediated PKA inhibition. Genetic ablation or chemical inhibition of Akt or blocking of Akt signaling abolishes anti-GPIbα antibody-induced platelet apoptosis. We further demonstrate that the antibody-bound platelets are removed in vivo through an apoptosis-dependent manner. Phosphatidylserine (PS) exposure on apoptotic platelets results in phagocytosis of platelets by macrophages in the liver. Notably, inhibition or genetic ablation of Akt or Akt-regulated apoptotic signaling or blockage of PS exposure protects the platelets from clearance. Therefore, our findings reveal pathogenic mechanisms of ITP with anti-GPIbα autoantibodies and, more importantly, suggest therapeutic strategies for thrombocytopenia caused by autoantibodies or other pathogenic factors.

immune thrombocytopenia | platelet | apoptosis | Akt | phosphatidylserine exposure

Immune thrombocytopenia (ITP) is an autoimmune disorder characterized by low platelet count (1, 2) which is caused primarily by autoantibodies against two major receptors of platelets, the fibrinogen receptor glycoprotein (GP) IIb/IIIa and the von Willebrand factor (VWF) receptor GPIb-IX complex (3–5). The autoantibody-bound platelets are thought to be removed by Fc-dependent phagocytosis in the spleen (1, 2, 6). Therefore, the main therapeutic strategies for ITP are immune suppression, immune modulation, and splenectomy (1, 2, 7). However, ITP patients with anti–GPIb-IX autoantibodies present more severe decreases in platelet count (4) and are less responsive to conventional therapies such as steroid treatments (8), i.v. IgG (IVIG) (5, 9), and even splenectomy (10, 11), suggesting that a different pathogenic mechanism may be involved in anti–GPIb-IX autoantibody-induced platelet clearance.

Anti-GPIbα monoclonal antibodies were found to activate platelets in vitro (12–16) and induce platelet clearance in vivo (12, 17–20). More recent studies demonstrated that anti-GPIbα antibodies induced phagocytosis of platelets in the liver through an Fc-independent mechanism (12, 17, 20). Anti-GPIbα antibodies targeting the N terminus of the receptor cause it to cluster, resulting in phagocytosis of platelets by microphages in the liver (12). On the other hand, GPIbα desialylation was demonstrated to contribute to platelet clearance in an hepatocyte Ashwell–Morell receptor-dependent manner (20). Moreover, shear-induced unfolding of the GPIbα mechanosensory domain by anti-GPIbα monoclonal antibodies was found to trigger signaling, leading to platelet clearance (21). Therefore, while increasing evidence suggests that anti-GPIbα autoantibodies may induce platelet clearance via an Fc-independent manner, the mechanism for anti-GPIbα antibody-induced thrombocytopenia remains elusive.

GPIbα, the main subunit of the GPIb-IX complex, contains binding sites for several important ligands including VWF and thrombin at the N-terminal extracellular domain (16, 22, 23). The interaction of the VWF multimer with GPIbα induces translocation and cross-linking of GPIb-IX complexes in lipid rafts (24–27), triggering signaling cascades (28, 29) and leading to platelet activation and thrombus formation (30, 31). Interestingly, we found that the GPIbα–VWF interaction could also induce platelet apoptosis, but the mechanism remains unknown (32). We recently reported that protein kinase A (PKA)-mediated platelet apoptosis occurs extensively in pathophysiological conditions (33). Moreover, accumulating evidence suggests that various pathological stimuli lead to thrombocytopenia in many common diseases, such as infection, cancer, diabetes, and heart and circulation diseases (34–37). However, little is known about the pathogenesis leading to thrombocytopenia.

In this study, we find that anti-GPIbα monoclonal antibodies induce Akt activation and Akt-mediated platelet apoptosis. We demonstrate that platelets undergo apoptosis in ITP patients

Significance

Immune thrombocytopenia (ITP) patients with antiplatelet glycoprotein (GP) Ib-IX autoantibodies appear refractory to conventional treatments; however, the mechanism remains elusive. Here we show that the platelets undergo apoptosis in ITP patients with anti-GPIbα autoantibodies. We demonstrate that anti-GPIbα antibody binding activates Akt, which elicits platelet apoptosis through activation of phosphodiesterase (PDE3A) and PDE3A-mediated PKA inhibition. Phosphatidylserine (PS) exposure results in phagocytosis of anti-GPIbα antibody-bound platelets by macrophages in the liver. Notably, inhibition or genetic ablation of Akt or Akt-regulated apoptotic signaling or blockage of PS exposure rescues the platelets from clearance. Therefore, our findings reveal pathogenic mechanisms of ITP with anti-GPIbα autoantibodies and, more importantly, suggest therapeutic strategies for thrombocytopenia caused by autoantibodies or other pathogenic factors.

Author contributions: M.C., R.Y., K.Z., and K.D. designed research; M.C., R.Y., K.Z., X.L., Y. Zhang, C.L., M.J., H.Y., X.M., N.P., L.Z., J.L., W.X., R.H., Q.C., W.Z., Y. Zhao, and M.Z. performed research; M.C., R.Y., C.R., and K.D. analyzed data; R.Y. and K.D. wrote the paper; A.L. provided Bad$^{-/-}$ mice; and K.D. initiated and supervised the project.

The authors declare no conflict of interest.

This article is a PNAS Direct Submission.

[1]M.C., R.Y., and K.Z. contributed equally to this work.

[2]To whom correspondence may be addressed. Email: yanrongbaobao@163.com or kdai@suda.edu.cn.

This article contains supporting information online at www.pnas.org/lookup/suppl/doi:10.1073/pnas.1808217115/-/DCSupplemental.

Published OnlineFirst June 22, 2018; DOI: 10.1158/0008-5472.CAN-18-0988

Molecular Cell Biology

Cancer Research

Long Noncoding RNA CRYBG3 Blocks Cytokinesis by Directly Binding G-Actin

Hailong Pei[1,2], Wentao Hu[1,2], Ziyang Guo[1,2], Huaiyuan Chen[1,2], Ji Ma[1,2], Weidong Mao[1,3], Bingyan Li[4], Aiqing Wang[4], Jianmei Wan[4], Jian Zhang[1,2], Jing Nie[1,2], Guangming Zhou[1,2], and Tom K. Hei[1,5]

Abstract

The dynamic interchange between monomeric globular actin (G-actin) and polymeric filamentous actin filaments (F-actin) is fundamental and essential to many cellular processes, including cytokinesis and maintenance of genomic stability. Here, we report that the long noncoding RNA LNC CRYBG3 directly binds G-actin to inhibit its polymerization and formation of contractile rings, resulting in M-phase cell arrest. Knockdown of LNC CRYBG3 in tumor cells enhanced their malignant phenotypes. Nucleotide sequence 228-237 of the full-length LNC CRYBG3 and the ser[14] domain of β-actin is essential for their interaction, and mutation of either of these sites abrogated binding of LNC CRYBG3 to G-actin. Binding of LNC CRYBG3 to G-actin blocked nuclear localization of MAL, which consequently kept serum response factor (SRF) away from the promoter region of several immediate early genes, including JUNB and Arp3, which are necessary for cellular proliferation, tumor growth, adhesion, movement, and metastasis. These findings reveal a novel lncRNA-actin-MAL-SRF pathway and highlight LNC CRYBG3 as a means to block cytokinesis and to treat cancer by targeting the actin cytoskeleton.

Significance: Identification of the long noncoding RNA LNC CRYBG3 as a mediator of microfilament disorganization marks it as a novel therapeutic antitumor strategy. *Cancer Res; 78(16); 4563–72. ©2018 AACR.*

Introduction

The dynamic actin cytoskeleton in eukaryotic cells plays multiple roles in regulating cellular morphology, motility, and vesicle trafficking by exerting mechanical forces, which alter the shape of the plasma membrane (1, 2). In vertebrates, three main groups of actin isoforms, α-, β-, and γ-actin, have been identified. The α-actin, mostly found in muscle, is a major constituent of the contractile apparatus. The β- and γ-actins coexist in most cell types as components of cytoskeleton and mediators of internal cell motility. It is widely recognized that the diverse range of structures formed by actin enable it to fulfill a number of specialized cellular functions including cell division, cell mobility, vesicle and organelle movement, embryogenesis, wound healing, and tumor invasiveness, among others (3). Cell division is normally accomplished by separating a parent cell into two daughter cells through cytokinesis that involves a contractile ring composed of actin, myosin, and α-actin (4). Actin is actively formed in the contractile ring with the participation of Arp3, formin Cdc12, profilin, and WASp, along with preformed microfilaments. Once the ring has been constructed, the structure is maintained by continual assembly and disassembly by the Arp2/3 complex and formins, which is key to one of the crucial steps of cytokinesis (5). In multicellular organisms where tissue specialization is critical for maintenance complex cellular function, for example cellular adhesion and motility in normal epithelial cells and cellular invasion and metastasis in cancer cells. These cellular processes require actin cytoskeleton and cadherins that act as extracellular elements in both normal and cancer cells (6, 7). As such, it is essential to clarify the regulatory process and molecular mechanisms underlying the remodeling of actin cytoskeleton.

The dynamic process of actin polymerization and depolymerization is regulated by a group of actin-binding proteins (ABP; ref. 8) including profilins (9), β-thymosins (10), Wiskott–Aldrich syndrome protein homology domain 2 (WH2)-containing proteins (10, 11), actin depolymerizing factor (ADF)/cofilins (collectively referred to cofilins; ref. 12), twinfilins (13), cyclase-associated proteins (CAP; ref. 14), and Rho GTPases (15). Actin dynamics induce MAL nuclear accumulation and affect the activity of serum response factor (SRF), which activates numerous downstream genes (16). Furthermore, many mRNAs or noncoding RNAs (ncRNA) can bind to actin (17, 18), but none of them is known to affect the structure of actin.

In recent years, long noncoding RNAs (lncRNA), defined as ncRNA molecules greater than 200 nucleotides in length, have

[1]State Key Laboratory of Radiation Medicine and Protection, School of Radiation Medicine and Protection, Medical College of Soochow University, Suzhou, China. [2]Collaborative Innovation Center of Radiological Medicine of Jiangsu Higher Education Institutions, Suzhou, China. [3]The Second Affiliated Hospital of Soochow University, Suzhou, China. [4]Medical College of Soochow University, Suzhou, China. [5]Center for Radiological Research, College of Physician and Surgeons, Columbia University, New York, New York.

Note: Supplementary data for this article are available at Cancer Research Online (http://cancerres.aacrjournals.org/).

H. Pei, W. Hu, and Z. Guo contributed equally to this article.

Corresponding Authors: Tom K. Hei, Columbia University, VC11-218, New York, NY 10032. Phone: 212-305-8462; 212-305-3229; E-mail: tkh1@cumc.columbia.edu; and Guangming Zhou, gmzhou@suda.edu.cn

doi: 10.1158/0008-5472.CAN-18-0988

九、获奖情况

序号	奖项名称	获奖人	获奖等级	授权单位	获奖时间）
1	第一届中国环境科学学会青年科学家奖	王殳凹	金奖	中国环境科学学会	2018.8.1
2	肿瘤辐射增敏机制研究及关键技术的临床应用	王忠敏、刘芬菊 陈克敏、丁晓毅 吴志远、陆　健 贡　桔、黄　蔚 张丽云、陈志瑾	中华医学科技奖二等奖	中华医学会	2018.1
3	干细胞治疗心血管疾病临床转化的关键技术研究	沈振亚、胡士军 李杨欣、陈一欢 余云生、黄浩岳 胡雁秋、杨君杰 滕小梅、刘　盛 雷　伟	中华医学科技奖一等奖	中华医学会	2018.1
4	基于放射损伤临床救治的相关关键技术研究	刘玉龙、左雅慧 邢春根、周晓中 余道江、汪传高 张玉松、柴栋良 王盼君、王优优	国防科学技术进步奖二等奖	国防科工局	2018.1
5	核能放射性污染防治应用基础研究	王殳凹、柴之芳 第五娟、肖成梁 王亚星、王艳龙 陈兰花	江苏省教育教学与研究成果奖（研究类）二等奖	江苏省教育厅	2018
6	基于新型纳米复合体的细菌感染成像和治疗研究	王建浩、李永强 邱　琳、蒋鹏举 杨宝珠	江苏省教育教学与研究成果奖（研究类）二等奖	江苏省教育厅	2018

十、内部协作课题

序号	项目编号	负责人	负责人所在中心	课题参与人	经费 （万，3 年）
1	GZN1201801	陈新建	多模态辐射技术研究中心	刘芬菊、胡　亮、聂宝清 石　菲、王仁生、屈卫卫	150
2	GZN1201802	武　艺	唐仲英医学研究院	高明远、周俊松、阳艾珍 史海斌、曾剑峰、王广林	150
3	GZN1201803	杨　林	唐仲英医学研究院	杨红英、安刚力、孟会敏 季　诚、韩志超	150
4	GZN1201804	邵常顺	转化医学研究院	时玉舫、柳春晓、李小雷 楚云鹏、贾善芬	150
5	GZN1201805	戴克胜	江苏血液研究所	李冰燕、胡文涛、闫　荣 赵丽丽、胡仁萍、庞宁波 周　康、熙成斌、张素斌	150

十一、开放课题

序号	项目编号	所在单位	申请人	项目名称	经费(万元)	起止时间
1	GZK1201801	北京市肿瘤防治研究所	李一林	基于纳米免疫探针的胃癌肿瘤巨噬细胞调控及可视化成像研究	5	2018.07.01-2019.12
2	GZK1201802	中国科学院高能物理研究所	王聪芝	新型杯芳烃衍生物对锕系离子的萃取分离研究	5	2018.07.01-2019.12
3	GZK1201803	鞍山市肿瘤医院	张　镇	受照神经胶质母细胞瘤对神经发生的影响研究	5	2018.07.01-2019.12
4	GZK1201804	南京理工大学	郑　涛	膦酸锆框架材料的构筑及在放射性污染治理中的应用	5	2018.07.01-2019.12
5	GZK1201805	复旦大学放射医学研究所	潘　燕	TIGAR 调控黑色素瘤脑转移及放射敏感性的机制研究	5	2018.07.01-2019.12
6	GZK1201806	南京市第一医院	王　峰	GIPR 纳米探针合成及对前肠NET双模态显像研究	5	2018.07.01-2019.12
7	GZK1201807	山东省疾病预防控制中心	唐　波	粒籽源近距离植入治疗中的剂量验证及相关人员防护研究	5	2018.07.01-2019.12
8	GZK1201808	上海市质子重离子临床技术研发中心	陈　剑	碳离子射线通过调控免疫微环境调节肺癌细胞侵袭和迁移能力的初步研究	5	2018.07.01-2019.12
9	GZK1201809	苏州大学附属第一医院	薛　姣	FTO/m6A 通路调控 DHFR 表达在放射性皮肤损伤中的总用及机制研究	5	2018.07.01-2019.12
10	GZK1201810	苏州大学功能纳米与软物质研究院	程　亮	基于金属硫化物的仿生复合纳米材料用于肿瘤靶向放疗增敏研究	5	2018.07.01-2019.12

序号	项目编号	所在单位	申请人	项目名称	经费(万元)	起止时间
11	GZK1201811	同济大学附属第十人民医院	邱裕友	脂肪酸结合蛋白 FABP4 调控脂质沉积影响放射性骨损伤的机制研究及影像动态评估	3	2018.07.01-2019.12
12	GZK1201812	苏州大学附属第一医院	秦颂兵	非小细胞肺癌 SBRT 中边界外扩关键算法及应用研究	3	2018.07.01-2019.12
13	GZK1201813	上海应用物理研究所	孙艳红	基于 DNA 四面体纳米结构的脑靶向分子成像探针研究	3	2018.07.01-2019.12
14	GZK1201814	苏州科技大学	秦粉菊	微重力与电离辐射联合作用对睾酮分泌的时间毒性及 miRNA-103/ CaMKI 信号通路在其中的作用	3	2018.07.01-2019.12
15	GZK1201815	苏州市疾病预防控制中心	许　哲	放射诊疗频度与健康影响关系研究及风险评估	3	2018.07.01-2019.12
16	GZK1201816	鞍山市肿瘤医院	李旭刚	四氢生物蝶呤及其代谢产物在放射性肺损伤进展及早期监测中的作用与机制研究	3	2018.07.01-2019.12
17	GZK1201817	内蒙古赤峰市医院	齐丹丹	宫颈癌病人瘤体微生物与肿瘤放射治疗敏感性/粪便微生物与肠道损伤相关性研究	3	2018.07.01-2019.12
18	GZK1201818	福建医科大学附属协和医院	宋建元	抗氧化蛋白 PRDX6 对食管癌放射敏感性的影响及机制研究	3	2018.07.01-2019.12
19	GZK1201819	苏州大学附属第一医院	张海涛	miR-378a-3p 的纳米靶向输送及调控 PLAGL2 抑制肝癌生长的分子机制研究	3	2018.07.01-2019.12
20	GZK1201820	苏州大学附属第二医院	张玉松	二甲双胍对放射性肺损伤的防治作用及机制研究	3	2018.07.01-2019.12

十二、2018 大事记

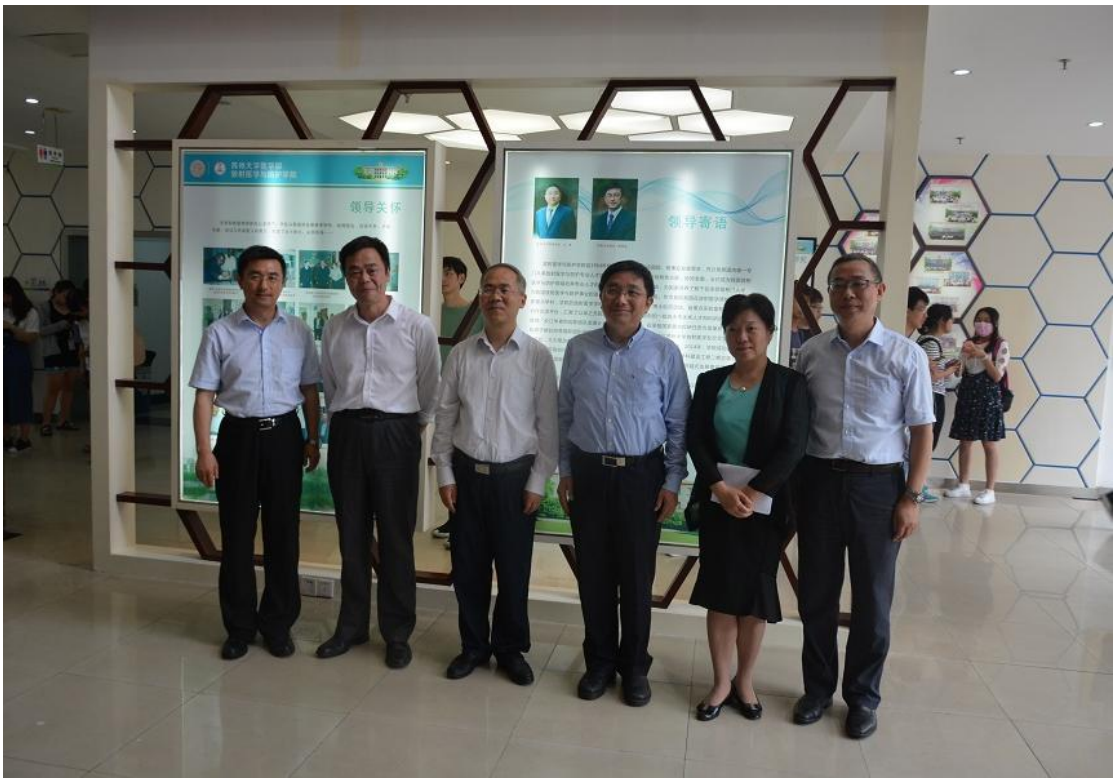
1 月 17 日，放射医学与辐射防护国家重点实验室建设工作会议成功召开。

4 月 27 日，省部共建放射医学与辐射防护国家重点实验室专题协商会在京顺利召开。

4月22-25日,实验室组团访问日本广岛大学原爆放射线医科学研究所并签订合作协议。

5月6日，全国人大常委会副委员长陈竺一行来我校调研。

5 月 11-3 日，实验室组团参加第三届全球华人辐射研究大会。



5 月 28 日，省委组织部副部长周为号一行来院考察调研。

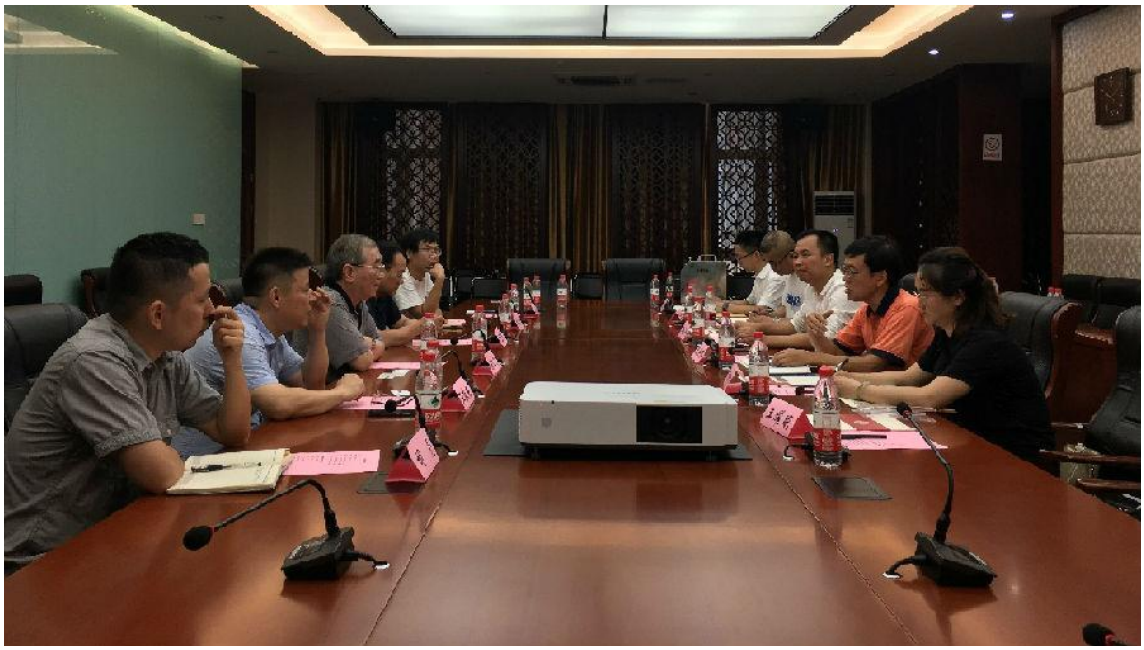
6 月 2 日，苏州大学放射医学及交叉学科第六届战略发展研讨会成功召开。

6 月 7 日，第一届空间辐射生物高峰论坛在宁波召开。

6 月 13 日，省部共建放射医学与辐射防护国家重点实验室建设运行实施方案通过论证。

7 月 6 日，国家重点实验室与鞍山市肿瘤医院合作交流成功举行。

7 月 7 日下午，第二届苏大放医科技成果转化会成功举行。



8 月 14 日，平湖市科协副主席张洪琪率企业代表一行来访我院。

9 月 7 日，与陕西健康医疗集团签订战略合作框架暨院士工作站协议。

9 月 27 日，教育部副部长田学军一行莅临苏州大学调研。

10 月 8 日，与中广核核技术发展股份有限公司签订战略合作框架协议。

10 月 12 日，空间生命与医学工程学术研讨会顺利召开。

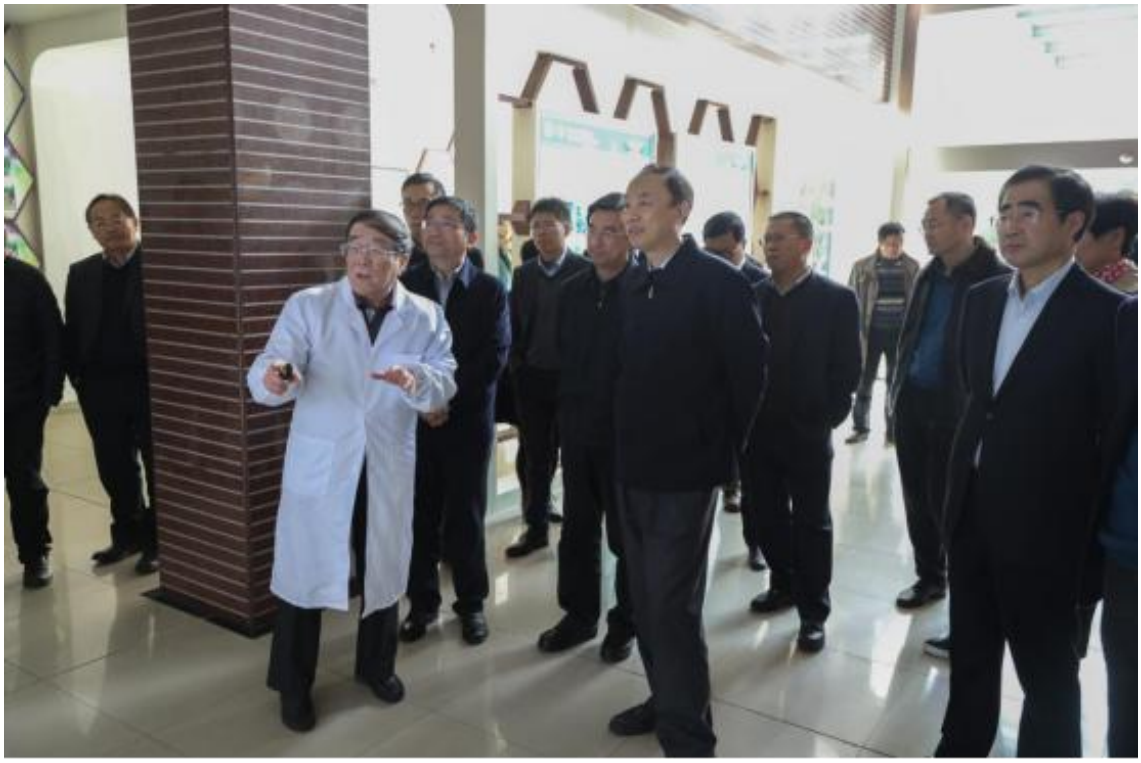
10 月 13 日，中测校准与苏州大学医学部放射医学与防护学院签署战略合作框架协议

10 月 18 日，放射医学协同创新中心 2018 年推进会议顺利召开。

10 月 26 日，江苏省政协副主席阎立来放射医学与辐射防护国家重点实验室调研。

10 月 30 日，省部共建放射医学与辐射防护国家重点实验室启动会暨揭牌仪式举行。

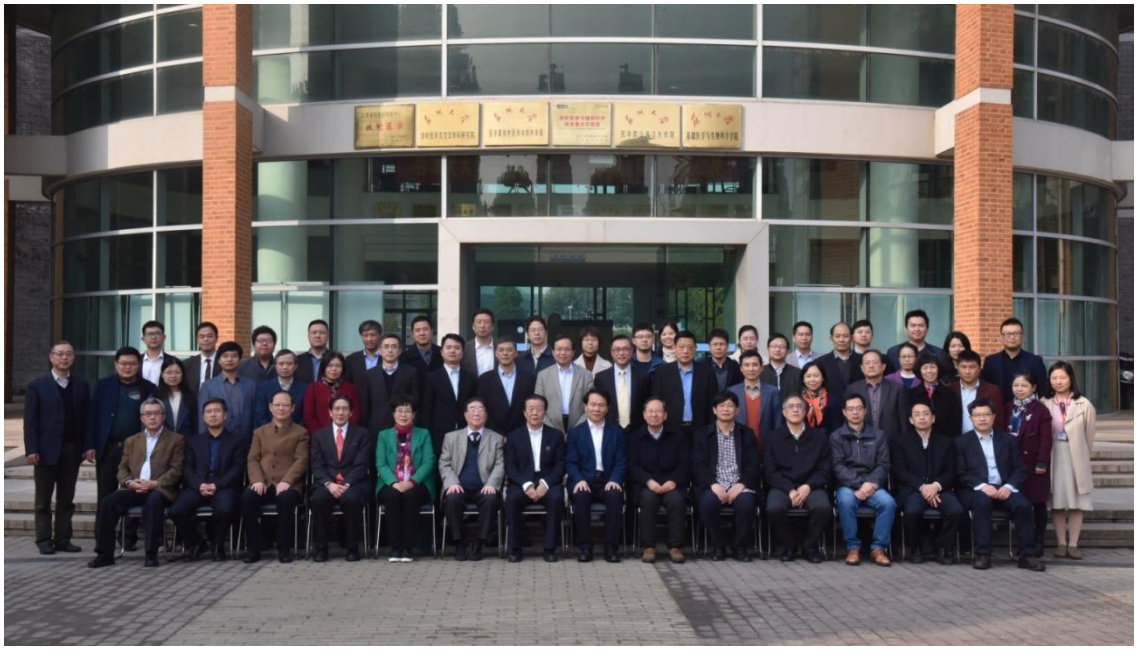
11 月 4-8 日，第四届分子影像与纳米医学国际学术研讨会在苏州召开。



11 月 20 日，江苏省副省长马秋林一行莅临我校调研。

11 月 29 日，成功召开特种医学优势学科三期建设启动会。

11 月 30 日，放射医学与辐射防护国家重点实验室徽标设计颁奖典礼成功举行。



12 月 1 日，放射医学与辐射防护国家重点实验室第一届学术委员会第一次会议成功举行。

12 月 2 日，放射医学与辐射防护行业联盟筹备工作会议成功召开。

12 月 8-9 日，第四届医学物理研讨会成功举办。

12 月 10 日，中国辐射防护学会建筑物室内氡测量与控制专业委员会第六次会议成功召开。

12 月 12-14 日，实验室师生组团参加第十一次全国放射医学与防护学术交流会。

十三、存在问题

1）根据实验室建设规划，实验场所应集中整体布局。经过 5 年建设，重点实验室用房将达 20,000 平方米。然而，目前实验室用房面积只有 16000 平方米左右，用房依然紧张，严重影响实验室调整和改造进度。从长远发展来看，建议学校考虑给重点实验室单独建楼，不仅有利于实验室发展，更是加强放射性管理的必需。目前开放式的放射性实验楼蕴藏着极大风险。

2）重点实验室科研成果原创性有待加强，缺乏重大变革性的科研成果，基础研究与国家需求的有待进一步结合。期望在新的一年里，各类项目的申请能够更上一层楼，发表一批高水平论文，取得重要有显示度的成果。

3）高水平人才引进需要进一步加强。高水平人才对国重实验室的发展至关重要，人才引进永远在路上，要充分利用好国重实验室相对独立的人事权。

4）研究生素质有待提高。建议增加苏州大学本科生推免攻读硕士研究生的比例，增加硕博连读的人数。要求学生做到“五有”：有思想，有品味，有爱心，有担当，有奉献。

5）实验室重器建设欠缺。目前质子重离子肿瘤治疗装置处于关键时刻，这不仅关系到未来的战略发展规划、更关系到苏大总医院未来的地位。质子肿瘤治疗装置既是当前国际放射医学的前沿，也是重点实验室的重器，同时可使苏大总医院立于全国之巅。