

## 《整合医学战略研究（2035）》参考

2019年第23期（总第63期）

中国工程科技知识中心医药卫生专业分中心  
中国医学科学院医学信息研究所 2019年12月05日

---

### [动态信息]

#### 1. **Pharma Alliance Launches mHealth Study Targeting Seniors and AFib**

**【ThinkStock】** More than 50,000 seniors are being recruited for a connected health study that will use an mHealth wearable to determine whether early detection of atrial fibrillation can help reduce the chances of a stroke.

链接:

<https://mhealthintelligence.com/news/pharma-alliance-launches-mhealth-study-targeting-seniors-and-afib>

#### 2. **Vanderbilt Researchers Test mHealth Platform to Improve ED Hand-Offs**

**【ThinkStock】** Researchers at Vanderbilt University Medical Center are piloting an mHealth wearable platform that aims to improve emergency care – by tracking how EMS providers move.

链接:

<https://mhealthintelligence.com/news/vanderbilt-researchers-test-mhealth-platform-to-improve-ed-hand-offs>

#### 3. **Thermally induced mixing technique could improve treatment of AMD**

**【news-medical】** Age-related macular degeneration is the primary cause of central vision loss and results in the center of the visual field being blurred or fully

blacked out. Though treatable, some methods can be ineffective or cause unwanted side effects.

链接:

<https://www.news-medical.net/news/20191123/Thermally-induced-mixing-technique-could-improve-treatment-of-AMD.aspx>

#### 4. **Researchers create new coating to prevent clotting, infection in synthetic vascular grafts**

**【news-medical】** Researchers at McMaster University have created a new coating to prevent clotting and infection in synthetic vascular grafts, while also accelerating the body's own process for integrating the grafted vessels.

链接:

<https://www.news-medical.net/news/20191127/Researchers-create-new-coating-to-prevent-clotting-infection-in-synthetic-vascular-grafts.aspx>

#### 5. **New model quickly generates brain scan templates used in medical-image analysis**

**【news-medical】** MIT researchers have devised a method that accelerates the process for creating and customizing templates used in medical-image analysis, to guide disease diagnosis.

链接:

<https://www.news-medical.net/news/20191127/New-model-quickly-generates-brain-scan-templates-used-in-medical-image-analysis.aspx>

#### 6. **中国工程院院士樊代明来乐山探讨“整合医学实践”**

**【四川在线】**“作为医护人员，我们病人个体的差异性和人体的整体性，‘千人千方’，整合用药……”昨(22)日下午，中国工程院院士樊代明来到乐山市人民医院，为该院医护人员带来了一场主题为《整合医学实践探索》的专题讲座。

链接: <https://leshan.scol.com.cn/rdxw/201911/57387837.html>

## 7. 九江学院附属医院耳鼻喉科护理团队受邀参加江西省整合医学会耳鼻喉头颈外科分会

【中国江西网】11月21日-22日，江西省整合医学会耳鼻喉头颈外科分会暨耳鼻喉头颈外科专科护理能力提升学习班在南昌召开。

链接：<http://jj.jxnews.com.cn/system/2019/11/29/018674299.shtml>

## 8. 湖南 MRI 菁英聚集娄底探讨核磁共振技术新进展

【娄底新闻网】11月22日，与会人员来到娄底市中心医院核磁共振室，进行上机操作交流。11月23日开始学术会议。会上，中南大学湘雅医院李文政教授、中南大学湘雅三医院刘晟教授、中南大学湘雅医院龙学颖副教授、湖南省人民医院毛志群副教授、中南大学湘雅医院刘慧副教授、周高峰副教授分别以《LIRADS V2018 HCC 相关征象解析》《子宫结合带腺肌症的 MRI 表现》《直肠癌术前 MRI 评估》《肩关节影像基础》《女性盆底功能障碍的 MRI 检查与诊断》《GE HDx3.0T 磁共振腹部成像质量提高技巧》为题进行了深入讲解，为与会人员带来了精彩的“学术盛宴”。

链接：<http://baijiahao.baidu.com/s?id=1651002617435099112&wfr=spider&for=pc>

## 9. 行走在医疗健康领域的可穿戴设备，将会迎来怎样的命运？

【都赛行业相对论】你为什么选择智能可穿戴设备？不同的人有不同的理由。运动监测、定位导航、移动支付、社交互动、健康管理……总有一款功能会打动你，激发你的购买欲望，并让你成为它的忠实用户。在这些功能中，健康管理正成为可穿戴设备未来发展的“关键词”，可穿戴医疗设备也正成为改变医疗体系和人类健康的“新技术”。根据透明市场研究公司（TMR）的报告显示，到2026年，全球可穿戴医疗设备市场份额预计将超过290亿美元，未来七年的复合年增长率将有望超过17%，由此可见，可穿戴设备在医疗健康领域的道路上已经走了很远，而且还将走得更远。

链接：<http://baijiahao.baidu.com/s?id=1651502570372956075&wfr=spider&for=pc>

## 10. 美国加州理工学院研制可穿戴的汗液成分传感器

【传感器专家网】美国加州理工学院医学工程助理教授高伟领导团队，开发

了一种可大规模生产的可穿戴传感器，通过分析人体的汗液，可以监测人体血液中的代谢物和营养素。研究人员说，与之前开发的针对高浓度化合物的汗液传感器不同，这次的汗液传感器除了更容易制造外，还可以检测出低浓度的汗液化合物。

链接：[http://news.rfidworld.com.cn/2019\\_11/599376cd0bac19e4.html](http://news.rfidworld.com.cn/2019_11/599376cd0bac19e4.html)

## [文献速递]

### 1. **Design and implementation of a low-cost, tabletop MRI scanner for education and research prototyping**

作者：Cooley, C. Z.

文献来源：*J MAGN RESON*

摘要：While access to a laboratory MRI system is ideal for teaching MR physics as well as many aspects of signal processing, providing multiple MRI scanners can be prohibitively expensive for educational settings. To address this need, we developed a small, low-cost, open-interface tabletop MRI scanner for academic use. We constructed and tested 20 of these scanners for parallel use by teams of 2-3 students in a teaching laboratory. With simplification and down-scaling to a 1cm FOV, fully-functional scanners were achieved within a budget of \$10,000 USD each. The design was successful for teaching MR principles and basic signal processing skills and serves as an accessible testbed for more advanced MR research projects. Customizable GUIs, pulse sequences, and reconstruction code accessible to the students facilitated tailoring the scanner to the needs of laboratory exercise. The scanners have been used by >800 students in 6 different courses and all designs, schematics, sequences, GUIs, and reconstruction code is open-source.

链接：[http://pan.ckcest.cn/rcservice//doc?doc\\_id=49278](http://pan.ckcest.cn/rcservice//doc?doc_id=49278)

### 2. **Augmented Reality with Diffusion Tensor Imaging (DTI) and Tractography during laparoscopic myomectomies**

作者：Chauvet, P.

文献来源: *J Minim Invasive Gynecol*

摘要: Augmented reality (AR) is a technology that allows a surgeon to see key hidden subsurface structures in an endoscopic video in real time. This works by overlaying information obtained from pre-operative imaging, and fusing it in real time with the endoscopic image. MR-DTI and fiber tractography are known to provide additional information to standard structural MRI. Here we report the first two cases of real-time augmented reality during laparoscopic myomectomies with visualization of uterine muscle fibers after DTI tractography-MRI, to help the surgeon to decide the starting point incision. First case: A 31 years-old patient underwent a laparoscopic surgery for a 6cm FIGO 5 myoma. Second case: a 38 years-old patient also underwent a laparoscopic myomectomy, for a unique 6cm myoma FIGO 6. Signed consents were obtained for all the patients, which included clauses of no modification of the surgery. Before surgery, MRI were realized. The external surface of the uterus, the uterine cavity, and the surface of the myomas were delimited according to the preoperative MRI. A fiber tracking algorithm was used to extrapolate the uterine muscle fibers architecture. The aligned models were blended with each video frame to give the feeling that the uterus is almost transparent, and so the surgeon can localize exactly the myomas, and the uterine cavity. We displayed also the uterine muscle fibers, and the visualization of them helped us to decide the starting incision point for the myomectomies. Then, the myomectomies were performed using a classic laparoscopic technique. Those case-reports shows that AR and DTI fiber tracking in fibroid uterus is possible, providing fiber direction, helping the surgeon to visualize and decide the starting incision point, for laparoscopic myomectomy. Respecting the fibers orientation could improve the quality of the scar, and decrease the architectural disorganization of the uterus.

链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49277](http://pan.ckcest.cn/rcservice//doc?doc_id=49277)

**3. Accelerated (129) Xe MRI morphometry of terminal airspace enlargement: Feasibility in volunteers and those with alpha-1 antitrypsin deficiency**

作者: Ouriadov, A

文献来源: *MAGN RESON MED*

摘要: PURPOSE: Multi-b diffusion-weighted hyperpolarized inhaled-gas MRI provides imaging biomarkers of terminal airspace enlargement including ADC and mean linear intercept ( $L_m$ ), but clinical translation has been limited because image acquisition requires relatively long or multiple breath-holds that are not well-tolerated by patients. Therefore, we aimed to accelerate single breath-hold 3D multi-b diffusion-weighted ( $^{129}\text{Xe}$ ) MRI, using k-space undersampling in imaging direction using a different undersampling pattern for different b-values combined with the stretched exponential model to generate maps of ventilation, apparent transverse relaxation time constant ( $T_2^*$ ), ADC, and  $L_m$  values in a single, short breath-hold; accelerated and non-accelerated measurements were directly compared. METHODS: We evaluated multi-b (0, 12, 20, 30, and 45.5  $\text{s/cm}^2$ ) diffusion-weighted ( $^{129}\text{Xe}$ )  $T_2^*$ /ADC/morphometry estimates using acceleration factor ( $AF = 1$  and  $7$ ) and multi-breath sampling in 3 volunteers (HV), and 6 participants with alpha-1 antitrypsin deficiency (AATD). RESULTS: For the HV subgroup, mean differences of 5%, 2%, and 8% were observed between fully sampled and undersampled k-space for ADC,  $L_m$ , and  $T_2^*$  values, respectively. For the AATD subgroup, mean differences were 9%, 6%, and 12% between fully sampled and undersampled k-space for ADC,  $L_m$  and  $T_2^*$  values, respectively. Although mean differences of 1% and 4.5% were observed between accelerated and multi-breath sampled ADC and  $L_m$  values, respectively, mean ADC/ $L_m$  estimates were not significantly different from corresponding mean ADC(M) / $L_m$  (M) or mean ADC(A) / $L_m$  (A) estimates (all  $P > 0.60$ , (A) = undersampled and (M) = multi-breath sampled). CONCLUSIONS: Accelerated multi-b diffusion-weighted ( $^{129}\text{Xe}$ ) MRI is feasible at  $AF = 7$  for generating pulmonary ADC and  $L_m$  in AATD and normal lung.

链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49279](http://pan.ckcest.cn/rcservice//doc?doc_id=49279)

#### 4. **Stumbling through the Research Wilderness, Standard Methods to Shine**

## **Light on Electrically Conductive Nanocomposites for Future Health-Care Monitoring**

作者: Boland, C. S.

文献来源: *ACS NANO*

摘要: Electrically conductive nanocomposites are an exciting ever-expanding area of research that has yielded many versatile technologies for wearable health devices. Acting as strain sensing materials, real-time medical diagnostic tools based on these materials may very well lead to a golden age of healthcare. Currently, the goal in research is to create a material that simultaneously has both a large gauge factor ( $G$ ) and sensing range. However, a weakness in the area of electromechanical research is the lack of standardisation in the reporting of the figure of merit (i.e.  $G$ ) and the need for other intrinsic metrics to give researchers a more complete view of the research landscape of resistive-type sensors. A paradigm shift in the way in which data is reported is required, to push research in the right direction and to facilitate achieving research goals. Here, we report a standardised method for reporting strain-sensing performance and the introduction of the working factor ( $W$ ) and the Young's modulus ( $Y$ ) of a material as figures of merit for sensing materials. Using this standard method, we can define the benchmarks for an optimum sensing material ( $G > 7$ ,  $W > 1$ ,  $Y < 300$  kPa) using limits set by standard commercial materials and the human body. Using extrapolated data from 200 publications normalised to this standard method, we can review what composite-types meet these benchmark limits, what governs composite performances, the literary trends in composites and individual nanomaterial performance and the future prospects of research.

链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49280](http://pan.ckcest.cn/rcservice//doc?doc_id=49280)

## **5. Signal feedback applications in low-field NMR and MRI**

作者: Kuzmin, V. V.

文献来源: *J MAGN RESON*

摘要: Tuned pick-up coils with high quality factors  $Q$  are used in NMR and MRI for high-sensitivity and low-noise detection. However, large  $Q$ -factors introduce bandwidth issues at low frequency and the associated enhanced currents may cause significant radiation damping effects, especially with hyperpolarised samples. Signal feedback can be used to actively control these currents and adjust the detection bandwidth without resistive losses. Capacitive and inductive coupling methods are compared using detailed models and the operating conditions for efficient feedback with negligible noise penalty are discussed. Several high-impedance commercial preamplifiers have been found to affect the resonance characteristics of tuned coils in a gain-dependent way, or could not be used in low-frequency NMR because of oscillations at large positive gain. This is attributed to an undocumented internal feedback, and could be neutralised using external feedback. The implementation of an inductive coupling scheme to feed a suitably amplified phase-adjusted signal back into the PU coils of low-field NMR systems is described, and three experimental applications are reported. One system is used for NMR studies of distant dipolar field effects in highly polarised liquid  $(^3\text{He})$  without or with radiation damping. The moderate intrinsic  $Q$ -factor (approximately 7) could be reduced (down to 1) or increased (up to 100) to control transient maser oscillations. Another system was used for MRI of water samples around 2 mT with  $Q$  approximately 190 litz-wire detection coils. The detection bandwidth was increased by actively reducing the  $Q$ -factor to obtain uniform sensitivities in images and avoid artifacts introduced by intensity corrections. Finally, parallel acquisition in MRI was performed using two separately tuned detection coils placed above and below the sample. They were actively decoupled using two feedback systems. For an imaging field of view smaller than the sample, artifact-free unfolded images demonstrate the efficiency of this active coil decoupling scheme.

链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49282](http://pan.ckcest.cn/rcservice//doc?doc_id=49282)



## 6. 核磁共振扫描对子宫颈癌的诊断的应用研究进展

作者：周昌谷

文献来源：《医学美学美容》

摘要：在已知的女性疾病中,发达国家中子宫颈癌对女性身体健康的危害已经成为仅次于乳腺癌、结肠癌、直肠癌的第三大恶性肿瘤,而在发展中国家,其超越结、直肠癌成为危害女性健康的第二大疾病,并且随着生活节奏的加快和理念的变化,初次发现子宫颈癌患者的年龄越来越小.很多人在检查出子宫颈癌时,由于对其的认知不够全面,经常会引起过度紧张的情绪,导致"谈癌色变",并且由于患病位置的隐私性,很多人会羞于检查,严重影响着该疾病的发现与治疗.相较于传统的宫颈刮片细胞学检查、活组织检查等医学检查,核磁共振扫描具有无创伤、对子宫颈癌位置及病灶大小能够做出及时、准确判断的优点.因其较高的软组织分辨率及不断成熟的成像技术,可对子宫内部及各个组织,尤其是肿瘤的形态、对周围组织的侵犯状况及范围做出判断,对子宫颈癌的临床诊断与治疗都有着极大的意义和应用价值.

链接：[http://pan.ckcest.cn/rcservice//doc?doc\\_id=49272](http://pan.ckcest.cn/rcservice//doc?doc_id=49272)

## 7. 胶原/硫酸肝素支架联合神经干细胞促进脊髓损伤后运动功能的恢复

作者：曹宗锐

文献来源：《中国组织工程研究》

摘要：背景:近些年来,胶原/硫酸肝素支架作为神经组织工程支架已被用于周围神经、脊髓和脑损伤的修复中.目的:观察胶原/硫酸肝素支架联合神经干细胞移植对脊髓损伤后运动功能恢复的影响.方法:将 SD 乳鼠神经干细胞接种于胶原/硫酸肝素支架上培养 7d,构建细胞-支架复合物.将 60 只成年雌性 SD 大鼠(购自成都达硕生物科技有限公司)随机分为 4 组,每组 15 只:假手术组仅切除 T10 椎板,模型组切除 T10 处 1.5 mm 脊髓建立脊髓损伤模型,支架组建立脊髓损伤模型后植入胶原/硫酸肝素支架,细胞-支架组建立脊髓损伤模型后植入细胞-支架复合物.术后 1,2,3,4,6,8 周进行 BBB 评分与斜板实验,观察大鼠肢体功能恢复;术后 8 周检测大鼠双后肢运动诱发电位,观察运动功能恢复情况;术后 8 周对脊髓损伤处进行核磁扫描,获得弥散张量成像图像,观察神经纤

维再生情况.实验获得成都医学院第一附属医院伦理委员会批准.结果 与结论: ①后 2,3,4,6,8 周,细胞-支架组的 BBB 评分、斜板实验角度均高于模型组、支架组( $P < 0.05, P < 0.01$ ); ②胞-支架组大鼠双侧后肢的运动诱发电位振幅高于模型组、支架组( $P < 0.05, P < 0.01$ ),潜伏期短于模型组、支架组( $P < 0.05, P < 0.01$ ); ③散张量成像显示,假手术组神经纤维完整,模型组病变部位周围神经纤维缺乏不同方向的连续性,支架组、细胞-支架组可见较多数量的神经纤维穿过损伤区域,并且细胞-支架组穿过损伤区域的神经纤维数量更多; ④果表明,胶原/硫酸肝素支架联合神经干细胞可促进大鼠脊髓损伤处神经纤维的再生,改善大鼠双侧后肢运动功能.

链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49274](http://pan.ckcest.cn/rcservice//doc?doc_id=49274)

## 8. 3D 打印三维多孔海洋贝壳/鹿瓜多肽支架材料的生物相容性

作者: 楼毅

文献来源: *中国组织工程研究*

摘要: 背景:人工骨的研制已成为骨组织工程的热点,临床实践证明单一性质的骨材料不能很好地满足临床需要,这使得复合支架材料的研制及应用受到了关注.目的:3D 打印制备三维多孔海洋贝壳/鹿瓜多肽生物支架材料,表征其生物相容性.方法:利用 3D 打印技术制备多孔海洋贝壳/鹿瓜多肽复合支架材料,表征材料的组成成分、微观结构、力学强度.利用倒置显微镜与 CCK-8 实验检测多孔海洋贝壳/鹿瓜多肽生物支架材料对成骨细胞的毒性;利用扫描电镜观察成骨细胞在多孔海洋贝壳/鹿瓜多肽生物支架材料上的生长及黏附情况;利用急性毒性实验、肌肉植入实验与骨缺损植入实验检验多孔海洋贝壳/鹿瓜多肽生物支架材料的生物相容性.实验方案经解放军第二军医大学伦理委员会批准.结果 与结论: ①孔海洋贝壳/鹿瓜多肽生物支架材料主要由碳酸钙、生物多肽组成,抗压强度达到 10 MP 以上,孔隙率达 85%以上,孔径为 50-100  $\mu\text{m}$ ; ②骨细胞在多孔海洋贝壳/鹿瓜多肽生物支架材料浸提液中生长良好,细胞活性强,多孔海洋贝壳/鹿瓜多肽生物支架材料浸提液的细胞毒性为 1 级; ③骨细胞可在多孔海洋贝壳/鹿瓜多肽生物支架材料表面黏附、增殖; ④孔海洋贝壳/鹿瓜多肽生物支架材料可在体内降解,未引发动动物全身毒

性反应,无肌肉刺激反应,可促进骨缺损的修复: 结果表明,多孔海洋贝壳/鹿瓜多肽生物支架材料具有良好的力学性能、三维空间结构、细胞相容性与组织相容性.

链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49273](http://pan.ckcest.cn/rcservice//doc?doc_id=49273)

## 9. 组织工程与再生医学领域的专利竞争态势

作者: 张婷

文献来源: *中国组织工程研究*

摘要: 背景:组织工程可以实现组织器官再生,是再生医学的关键研究领域,体现了再生医学的主要发展方向.专利是技术信息最有效的载体,通过对组织工程与再生医学领域的专利分析,从情报学角度为组织工程与再生医学领域提供新的研究视角,为技术开发提供一定的借鉴和参考.目的:通过对组织工程与再生医学领域的专利分析,揭示全球技术竞争态势.方法:对组织工程与再生医学领域近 20 年的全球专利申请、发明专利申请与授权、三方专利申请进行分析,从专利数量与质量、专利申请人区域分布、专利受理国家/地区、专利申请人、发明人、技术领域等角度展示该领域的技术开发现状与趋势,揭示中国在该领域的技术实力水平.结果 与结论:全球组织工程与再生医学领域技术开发活跃,发展速度快,近 3 年尤为迅猛,创新性强,且已经产出一批具有较高市场价值的技术成果.中国组织工程与再生医学领域技术开发规模和增速均远超美国,是全球主要技术来源地之一.中国和美国是全球组织工程与再生医学领域最受关注的两大目标市场,且中国市场受关注程度持续快速升温.中国多家高校在组织工程与再生医学领域的技术开发规模跻身全球前列.中国发明人在组织工程与再生医学领域取得卓越研究成果.

链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49275](http://pan.ckcest.cn/rcservice//doc?doc_id=49275)

## 10. 利用可穿戴腓总神经电刺激器改善帕金森病冻结步态

作者: 李娟

文献来源: *中华神经科杂志*

摘要: 目的 利用腓总神经电刺激增加患者本体感觉传入线索,观察其对帕金

森病患者冻结步态有无改善作用.方法 纳入2018年1—12月在安徽医科大学第一附属医院就诊的帕金森病伴冻结步态患者30例,采用便携式可穿戴电刺激器通过行走触发电刺激,交替刺激双侧腓总神经.通过改良12 m计时步行试验、改良帕金森病活动量表中的6项评分(PAS-6)、冻结步态评分评估患者的步态功能,观察刺激器处于“开”“关”两种条件下的步态情况.结果 刺激器开启时与关闭时比较,患者的顺、逆时针旋转360°时间(T360)、起步时间(T1)、转身时间(T2)在一般行走[分别为17.49(13.55,23.48)s与14.73(10.31,21.71)s、2.16(1.78,2.68)s与1.70(1.38,2.29)s、6.37(4.10,7.45)s与4.77(3.40,6.85)s、Z=-3.219、-4.206、-2.910]、认知负荷下行走[分别为21.35(16.30,30.72)s与18.36(13.83,27.98)s、2.80(2.05,3.75)s与2.04(1.64,3.00)s、6.58(5.23,8.96)s与5.75(4.59,7.76)s、Z=-3.486、-4.206、-3.363]、运动负荷下行走[分别为25.34(17.79,30.30)s与22.24(14.11,29.33)s、2.46(2.19,3.18)s与2.35(1.66,2.59)s、7.77(4.75,9.93)s与6.45(3.81,7.66)s、Z=-3.468、-3.983、-3.570]均显著缩短(均P<0.05).刺激器开启时与关闭时相比,除显著减少运动负荷下总体行走时间[Tt;29.26(20.11,33.21)s与27.66(17.70,32.73)s、Z=-2.644,P=0.008]外,对一般行走的Tt和认知负荷下Tt及3种模式下的步态维持时间(T3)无显著影响.刺激器打开时,患者的PAS-6评分比关闭时显著增高[(16.82±2.92)分与(18.99±2.55)分,t=-6.617,P=0.000],冻结步态评分比关闭时显著减少[(14.10±5.02)分与(10.61±5.05)分,t=6.151,P=0.000].结论 腓总神经电刺激可改善帕金森病患者的冻结步态,减少其原地转身、起步、转弯所用时间,有望作为一种新的康复治疗方式应用于帕金森病冻结步态.

链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49276](http://pan.ckcest.cn/rcservice//doc?doc_id=49276)

## [研究报告]

### 1. 中国组织工程领域2013至2018年国家自然科学基金资助项目分析

发布源: 中国组织工程研究

发布时间: 2019年

摘要: 组织工程是再生医学分支下的一个重要方向,具有交叉学科特性,起到修复、维持或改善受损器官与组织功能的作用,受到生物学领域重视.国家

自然科学基金长期对组织工程领域的基础研究进行资助,其资助项目情况可以在一定程度上反映学科发展态势.目的:分析并展示国家自然科学基金对组织工程基础研究的资助情况和学科发展态势.方法:以国家自然科学基金网络信息系统为来源检索 2013 至 2018 年间获得资助的组织工程相关项目,利用 Excel 和 Bibexcel 对批准年度、项目名称、批准金额、依托单位、资助类别、关键词等内容进行统计分析.结果与结论:近 6 年来国家自然科学基金对组织工程基础研究资助力度有所减弱,资助项目主要来自生命科学部和医学科学部,项目类型以面上项目和青年科学基金项目为主;获资助项目的依托单位以高校为主,研究实力较强机构研究范围较广,可获得多个分支领域的项目资助;骨和软骨、血管与心脏、口腔、神经和皮肤方向的研究项目较多,血管化、微环境、间充质干细胞、水凝胶、3D 打印、定向分化等是研究的热点主题.  
链接: [http://pan.ckcest.cn/rcservice//doc?doc\\_id=49281](http://pan.ckcest.cn/rcservice//doc?doc_id=49281)

---

主编: 李姣

本期编辑: 刘燕

地址: 北京市朝阳区雅宝路 3 号 邮编: 100020

电话: 010-52328740/8754 邮件地址: med@ckcest.cn