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综述

分子影像：转化医学的重要工具和主要路径

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摘要：

随着基础医学与临床医学脱节现象的日益凸显，作为二者之间连接纽带和桥梁的转化医学越来越受到重视。近年来，转化医学在美、欧等西方国家迅速发展，在我国也正成为“十二五”期间医学领域的重要发展方向之一。分子影像作为现代分子生物学与先进医学影像技术相结合的产物，可以利用影像方法对活体内分子的生物化学过程进行定性和定量研究，是将基础医学研究成果迅速向临床应用转化的重要工具和主要路径，可在疾病的发生、发展和转归研究中，在药物的研制、开发和评价中，以及在诊断和治疗新技术的转化应用中，发挥重要的作用。

关键词： 分子影像 转化医学 基础医学研究 临床应用

Molecular Imaging: An Important Tool and a Main Route for Translational Medicine

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Abstract:

The gap between basic medical research and clinical application becomes more and more prominent, and translational medicine emerges as a bridge between them. Recently, translational medicine is undergoing an incredible growth in the developed countries, especially in Europe and United States of America. In China, translational medicine is considered as one of the main topics in the national "12th Five-Year Plan". Meanwhile, being the hybrid of modern molecular biology and advanced medical imaging technology, molecular imaging holds the ability of both qualitative and quantitative investigation of biochemistry changes *in vivo*, and it's an important tool that can directly translate preclinical research outcomes into clinical use. Molecular imaging is playing an increasing significant role not only in the research of disease etiopathology, progression, and turnover, but also in new drug research, development, and evaluation, as well as in the translation of new technologies for molecular diagnosis and treatment. Therefore, molecular imaging is acting as an important route of translational medicine.

Keywords: Molecular imaging Translational medicine Basic medical research Clinical application

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参考文献：

1. Weissleder R. Molecular imaging: Exploring the next frontier. Radiology, 1999, 212(3): 609~614
2. Thakur ML, Lentle BC, SNM, RSNA. Joint SNM/RSNA molecular imaging summit statement. J Nucl Med, 2005, 46(9): 11N-13N, 42N

3. Mankoff DA. A definition of molecular imaging. J Nucl Med, 2007, 48(6): 18N, 21N
4. Rudin M, Weissleder R. Molecular imaging in drug discovery and development. Nat Rev Drug Discov, 2003, 2(2): 123~131
5. Weissleder R. Molecular imaging in cancer. Science, 2006, 312(5777): 1168~1171
6. Jaffer FA, Libby P, Weissleder R. Molecular imaging of cardiovascular disease. Circulation, 2007, 116 (9): 1052~1061
7. Jacobs AH, Li H, Winkeler A. PET-based molecular imaging in neuroscience. Eur J Nucl Med Mol Imaging, 2003, 30(7): 1051~1065
8. 徐高连, 赵冰海, 吕学诜. NIH医学研究路线图(NIH roadmap). 黑龙江医药科学, 2005, 28(4): 60~61 Xu GL, Zhao HB, Lv XX. NIH roadmap for medical research. Med Pharm Sci Heilongjiang, 2005, 28(4): 60~61
9. 马凌飞, 张宏梁, 田玲. 部分国家医学科技发展战略比较初探. 生命科学, 2010, 22(4): 382~386 Ma LF, Zhang HL, Tian L. Comparison of health S&T development strategies of several countries. Chin Bull life sci, 2010, 22(4): 382-386.
10. Marincola FM. Translational medicine: A two way road. J Transl Med, 2003, 1(1): 1~2
11. Weissleder R. Molecular imaging: Exploring the next frontier. Radiology, 1999, 212(3): 609~614
12. Wehling M. Translational medicine: Can it really facilitate the transition of research “from bench to bedside”? Eur J Clin Pharmacol, 2006, 62(2): 91~95
13. Butler D. Translational research：Crossing the valley of death. Nature, 2008, 453(7197): 840~842
14. Bayele HK, Chiti A, Colina R, Fernandes O, Khan B, Krishnamoorthy R, Ozdag H, Padua RA. Isotopic biomarker discovery and application in translational medicine. Drug Discov Today, 2010, 15 (3/4): 127~137
15. 朱朝晖. 分子影像技术活体追踪移植干细胞的研究进展. 现代仪器, 2007, 13(4): 5~8 Zhu ZH. New developments in tracking stem cells in vivo with molecular imaging. Mod Instr, 2007, 13(4): 5~8
16. Zhang SJ, Wu JC. Comparison of imaging techniques for tracking cardiac stem cell therapy. J Nucl Med, 2007, 48(12): 1916~1919
17. Frangioni JV, Hajjar RJ. In vivo tracking of stem cells for clinical trials in cardiovascular disease. Circulation, 2004, 110(21): 3378~3383
18. Modo M, Cash D, Mellodew K, Williams SC, Fraser SE, Meade TJ, Price J, Hodges H. Tracking transplanted stem cell migration using bifunctional, contrast agent-enhanced, magnetic resonance imaging. Neuroimage, 2002, 17(2): 803~811
19. Shah K, Weissledera R. Molecular optical imaging: Applications leading to the development of present day therapeutics. NeuroRx, 2005, 2(2): 215~225
20. Zhang Y, Ruel M, Beanlands RS, deKemp RA, Suuronen EJ, DaSilva JN. Tracking stem cell therapy in the myocardium: Applications of positron emission tomography. Curr Pharm Des, 2008, 14(36): 3835~3853
21. Pomper MG. Translational molecular imaging for cancer. Cancer Imaging, 2005, 23(5): S16~S26
22. 王晓强, 孙立军. 肿瘤血管生成的分子影像学临床应用及研究进展. 实用放射学杂志, 2008, 24(11): 1554~1558 Wang XQ, Sun LJ. Clinical application and research advancement of molecular imaging in tumor angiogenesis. J Pract Radiol, 2008, 24(11): 1554~1558
23. Li X, Link JM, Stekhova S. Site-specific labeling of Annexin V with F-18 for apoptosis imaging. Bioconjugate Chem, 2008, 19(8): 1684~1688
24. Shah K, Jacobs A, Breakefield XO, Weissleder R. Molecular imaging of gene therapy for cancer. Gene Ther, 2004, 11(15): 1175~1187
25. 谢鹏, 胡漫, 于金明. 肿瘤放射治疗中乏氧显像的研究进展. 中华肿瘤杂志, 2009, 31(3): 161~163 Xie P, Hu M, Yu JM. Advances in research on hypoxic imaging in cancer radiotherapy. Chin J Oncol, 2009, 31(3): 161~163
26. 朱朝晖. 用^{99m}Tc-甲氧基异丁基异腈预测体内肿瘤多药耐药的研究进展. 国外医学药学分册, 1998, 25(1): 5~9 Zhu Z. Advances of using ^{99m}Tc-MIBI to predict MDR in vivo. Foreign Med Sci (Section Pharm), 1998, 25(1): 5~9
27. 吴晨希，朱朝晖. 分子影像技术在转化医学中的应用. 现代仪器, 2009, 16(4): 1~3 Wu CX, Zhu ZH. Application of molecular imaging in translational medicine. Mod Instr, 2009, 16(4): 1~3
28. 张洁, 石洪成. 分化型甲状腺癌131I治疗的现状. 国际放射医学核医学杂志, 2009, 33(3): 163~167 Zhang J, Shi HC. The status of postoperative therapy using iodine-131 in differentiated thyroid carcinoma. Int J Rad Med Nucl Med, 2009, 33(3): 163~167
29. 张迎强, 陈黎波, 李方, 龙明清, 王凤英. ^{131}I-MIBG显像诊断嗜铬细胞瘤. 中国医学影像技术, 2009, 25(7): 1283~1285 Zhang YQ, Chen LB, Li F. Application of 131I-MIBG scintigraphy in diagnosis of pheochromotomography. Chin J Med Imag Tech, 2009, 25(7): 1283~1285
30. Stoeltzing O, Loss M, Huber E, Gross V, Eilles C, Mueller-Brand J, Schlitt HJ. Staged surgery with neoadjuvant ^{90}Y-DOTATOC therapy for down-sizing synchronous bilobular hepatic metastases from a neuroendocrine pancreatic tumor. Langenbecks Arch Surg, 2009, 395(2): 185~192
31. 刘韬. B细胞非霍奇金淋巴瘤的放射免疫治疗. 现代肿瘤医学, 2003, 11(3): 228~230 Liu T. Radioimmunotherpy of B-cell non-Hodgkin's lymphoma. J Mod Oncol, 2003, 11(3): 228~230
32. 张丽, 张春丽, 王荣福. RGD肽类肿瘤靶向受体显像的研究现状及前景. 中国医学影像技术, 2010, 26(6): 1176~1178 Zhang L, Zhang CL, Wang RF. Present and future prospect of studies of the RGD peptide tumor targeting receptor imaging. Chin J Med Imag Tech, 2010, 26(6): 1176~1178

33. Tweedle MF. Peptide-targeted diagnostics and radio- therapeutics. Acc Chem Res, 2009, 42(7): 958~968

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