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双靶向超声微泡造影剂评价小鼠缺血再灌注心肌

Dual targeted microbubbles in assessment of mice myocardium ischemia-reperfusion injury

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中文摘要：

目的 制备同时携载P选择素和ICAM-1抗体的靶向超声微泡造影剂,以评估小鼠缺血再灌注损伤心肌声学造影显像效果。方法 采用生物素-亲和素方法制备靶向微泡,于激光共聚焦显微镜下观察微泡形态,流式细胞仪检测连接效率。将24只健康昆明小鼠随机分成3组:结合双抗体选择素微泡组(MBd组)10只、结合P选择素单抗组(MBp组)10只,空白微泡组(MBc组)4只。结扎冠状动脉左前降支近左主干分支,制作心肌缺血再灌注模型,60 min后经尾静脉分别注射MBd、MBp及MBc,采集心肌对比造影图像。所有图像均采用Sonomath超声影像分析仪处理。结果 MBd组和MBp组对缺氧内皮细胞的黏附力以及对缺血再灌注区心肌显像增强程度显著高于MBc组(P均<0.05),MBd组对缺血再灌注区心肌显像延迟时间高于MBp组(P<0.05)。结论 双靶向微泡联合超声造影是检测和评估小鼠缺血再灌注心肌的无创性手段。

英文摘要：

Objective To assess the imaging effect of mice myocardium with ischemia-reperfusion injury by CEUS with microbubbles dually targeted to P-selectin and ICAM-1 (MBd). **Methods** The targeted microbubbles were prepared by using avidin-biotin method, then were observed and evaluated by confocal laser scanning microscope and flow cytometry, respectively. Twenty-four mice were randomly divided into MBd (microbubbles targeted to dual ligands, n=10) group, MBp (microbubbles targeted to P-selection, n=10) group and MBc (non-targeted microbubbles, n=4) group. Ischemia-reperfusion injury of myocardium was induced to make experiment models by ligating the left anterior descending branch of coronary arteries. Sixty minutes after reperfusion, MBd, MBp and MBc were injected to mice through tail vein in each group, respectively. The contrast images were collected and quantitatively analyzed with Sonomath image system. **Results** The endothelial cells attachment and contrast enhancement of ultrasound imaging in MBd group and MBp group were significantly stronger than in MBc group (both P<0.05). Compared to MBp group, the delay time of ultrasound imaging was longer in MBd group (P<0.05). **Conclusion** CEUS with dual targeted microbubbles is a noninvasive method to detect and evaluate mice injured myocardium after ischemia-reperfusion injury.

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