[1]杨华,龚明福,张松,等.PEG-GoldMag-pod纳米粒标记乳腺癌淋巴管内皮细胞及体外磁共振成像研究[J].第三军医大学学报,2013,35(20):2172-2176.

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PEG-GoldMag-pod纳米粒标记乳腺癌淋巴管内皮细胞及体外磁共振成像研究(PDF)

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Title: PEG-GoldMag-pod nanoparticles labeling breast cancer lymphatic endothelial cells and magnetic resonance imaging *in vitro*

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摘要: 目的 运用聚乙二醇（polyethylene glycol, PEG）、金磁微粒（GoldMag-Coreshell, GoldMag）和抗podoplanin抗体构建靶向淋巴管内皮细胞的磁性纳米粒。 方法 在十六烷基三甲基溴化铵（cetyltrimethyl ammonium bromide, CTAB）的介导下采用PEG修饰GoldMag制备水溶性的PEG-GoldMag复合微粒，将抗podoplanin抗体结合到PEG-GoldMag纳米粒上制备PEG-GoldMag-pod分子探针并检测其相关参数。采用小室法体外诱导人真皮淋巴管内皮细胞（Human dermal lymphatic endothelial cells, HDLECs）向乳腺癌淋巴管内皮细胞（lymphatic endothelial cells, LECs）分化。用铁浓度分别为5、10、15、30、45 μg/mL的PEG-GoldMag-pod纳米粒体外标记经诱导的HDLECs，计算细胞标记率；对不同浓度铁标记的细胞进行MR成像，了解标记细胞的信号改变特点,以未诱导的HDLECs为对照。 结果

成功合成了水溶性的PEG-GoldMag-pod纳米分子探针。在铁浓度分别为5、10、15、30、45 μg/mL时,诱导后的HDLECs和未诱导的HDLECs的标记效率分别为：(39.65±3.48)%、(71.37±3.07)%、(91.36±4.87)%、100%、100%和(22.61±3.68)%、(36.40±4.06)%、(70.13±3.61)%、(91.40±5.45)%和100%。经乳腺癌细胞诱导后的HDLECs较未诱导的HDLECs具有更高的标记阳性率（P<0.05）。标记细胞在常规MR上能够产生明显的信号改变，以T^*_2WI信号改变最明显。　　结论　　采用PEG修饰可以有效的构建水溶性的PEG-GoldMag纳米粒，进一步连接PodAb后能有效的标记LECs，通过对标记的LECs进行MR成像可以反映细胞podoplanin的表达情况。

Abstract: Objective To build lymphatic endothelial cells (LECs)-targeted PEG-GoldMag-pod nanoparticles with gold magnetic particles (GoldMag) modified by polyethylene glycol (PEG) and anti-podoplanin antibody (PodAb). Methods PEG was covalently bound to GoldMag to obtain PEG-GoldMag nanoparticles mediated by cetyltrimethyl ammonium bromide (CTAB). PodAb was covalently bound to PEG-GoldMag to construct PEG-GoldMag-pod nanoparticles. The characteristics of the PEG-GoldMag-pod nanoparticles were tested. Human dermal lymphatic endothelial cells (HDLECs) were incubated with breast cancer cells in Millicell cell culture inserts to acquire breast cancer LECs. The breast cancer LECs were co-cultured with PEG-GoldMag-pod nanoparticles at iron concentrations of 5, 10, 15, 30, and 45 μg/mL separately for 24 h. The labeling ratio was evaluated by Prussian blue staining. Magnetic resonance (MR) imaging was performed to the labeled breast cancer LECs to investigate the signal characteristics. HDLECs without induction were used as control. Results The water-soluble PEG-GoldMag-pod nanoparticles were obtained successfully. Dose-dependence was