Matrix remodeling associated 7 (MXRA7) proteins are novel matrix constituents and participate in cutaneous wound healing

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报告摘要：

The ill-defined gene Matrix Remodeling Associated 7 (MXRA7) was firstly reported by this team to be involved in animal models concerning matrix remodeling, such as inflammatory neovascularization, autoimmune skin disease and acute liver injury. Here we continued to characterize the biological features of MXRA7 proteins. Western blotting and immunohistochemistry revealed that MXRA7 proteins were present in extracellular and intracellular spaces in murine tissues. In cultured vascular endothelial SVEC4-10 cells, fibroblasts or keratinocytes, secreted MXRA7 proteins were released into supernatant or colocalized with fibronectins in the scaffold formed by adherent cells. Pull-down plus mass spectrum identified a list of cytoskeleton members or proteinase as potential MXRA7 interaction partners in SVEC4-10 cells. Cross-co immunoprecipitation confirmed a direct binding of MXRA7 proteins with vimentin in cells. In a mouse ear punch injury model, MXRA7 expression manifested a dynamic changes in healing tissues. Ear wound closure was slower inMXRA7 deficient mice than in wild-type mice. Proliferation of primary fibroblasts was impaired upon MXRA7-deficiency but was restorable by recombinant MXRA7 proteins in a dose-dependent manner. In human skin samples, MXRA7 proteins manifested a preferential distribution in vascular walls or smooth muscles. In normal keratinocytes-derived HaCaT cells and epidermoid cancerous A431 cells,MXRA7 proteins manifested differential patterns of molecular sizes and distributions among intra-and/or extracellular compartments. In conclusion, MXRA7 proteins are new matrix-based biomaterials playing multifaceted roles in extracellular and intracellular matrixes.

硅酸钙浸提液对人胚胎干细胞肝向分化的影响

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报告摘要：

目的：人工诱导胚胎干细胞（ESCs）向肝细胞分化，不但能够为肝病治疗提供种子细胞，还能对了解肝组织的分化，发育和再生等具有重要意义。基于生长因子或者小分子的分化策略，由于所得的肝细胞的成熟度和功能性仍不尽人意，仍在不断探索完善中。同时，前人的研究中发现，具有生物相容性的无机盐离子能够调控多种干细胞的分化。本研究采用一种基于硅酸钙的无机纳米粒子，探索其浸提液对人胚胎干细胞肝向分化的影响。

方法：使用优化的人胚胎干细胞（hESCs）肝向分化四阶段诱导方案，即干细胞阶段（STEM），确定内胚层阶段（DE），前体肝细胞阶段（Pre-H）和成熟肝细胞阶段（M-H）。采用高、低两种不同浓度 CS 浸提液添加到分化培养基中，检测 ESCs 对 CS 浓度和添加顺序的依赖性。

结果： CS 浸提液中硅离子浓度在浸提液中显著提高，是主要作用因子。在分化的前两个阶段，即 STEM 和 DE 阶段，高浓度的 CS 浸提液能够迅速启动 ESCs 的 DE 向分化，而低浓度 CS 浸提液能维持 ESCs 的 DE 向分化。不同浓度 CS 浸提液的添加顺序对 DE 向分化的促进程度也不相同，并最终影响获得的 M-H 阶段肝样细胞（Hepatocyte-like cells, HLCs）的成熟度和功能。在 STEM 阶段添加低浓度 CS 浸提液能够促进肝细胞成熟，在 Pre-H 和 M-H 阶段添加 CS 浸提液能够提高 HLCs 的功能。

结论：纳米粒子硅酸钙能够促进 hESCs 的肝向分化，对肝再生和肝组织工程具有重要的意义。