

繁茂膜海绵原细胞富集细胞团培养过程中的 细胞迁移规律

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摘要: 海绵是重要的生物活性物质来源, 近 10 年来, 从海绵中发现的具有生物活性的新化合物占海洋生物来源的 30% 以上, 并且大多具有显著的抗肿瘤, 抗艾滋病病毒的活性。但是, 由于海绵生物量不能满足这些活性物质进一步研究和商业化的需求, 目前仅有一种活性物质被成功的商业化, 这不仅是商业开发的损失, 也是提高人类生活质量活动的一种损失。为了解决海绵供给不足的问题, 人们进行了包括化学合成、海绵养殖以及海绵细胞培养在内的多种尝试, 目前的研究结果表明, 海绵细胞离体培养技术是最有可能彻底解决海绵供给不足的途径之一。但是由于海绵自身的特殊性, 还没有人成功的建立起海绵细胞系以满足生产需要。人们发现, 海绵细胞的相互接触对于离体海绵细胞长期培养至关重要。经过多年的探索, 大连化物所海洋生物产品工程组建立了开发出了海绵原细胞富集细胞团培养技术, 通过对海绵组织内的原细胞进行富集来获得可长期培养的海绵细胞。海绵原细胞是海绵组织内的“干细胞”, 具有很强的分化、增殖潜力, 同时也是海绵组织内负责消化的主要细胞类型。为了探索海绵原细胞的增殖、分化规律, 本研究基于海绵原细胞富集细胞团培养体系, 构建了海绵细胞培养实时观测平台, 对繁茂膜海绵原细胞、领细胞、上皮细胞 3 类主要海绵细胞类型在海绵细胞团形成及生长的全过程进行观察, 了解不同类型细胞迁移规律的变化。通过对视频记录进行分析, 发现离散的海绵细胞与细胞团内的海绵细胞具有截然相反的运动规律, 海绵细胞的运动具有很强的协同性。伴随原细胞在细胞团内不停息的迁移, 还观察到海绵细胞团内新生骨针的迁移以及细胞间进行颗粒物质的传递。这些信息的获得, 将有助于进一步了解不同细胞的功能与作用, 也有助于在此基础上探索海绵细胞的增殖、分化控制规律。

关键词: 繁茂膜海绵, 原细胞富集细胞团, 细胞迁移

Cell Locomotion in Archaeocyte-dominant Cell Population (ADCP) Primmorph Culture of Marine Sponge *Hymeniacidon Perlevis*

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Abstract: The archaeocyte-dominant cell population (ADCP) primmorphs is a new sponge cell culture system and possible to

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develop into a continuous sponge cell line. However, the archaeocytes' division, differentiation and development as well as the cell interactions have not yet been clear. Cell movement (cell locomotion) is the base of other cell interactions. We use real-time video cinemicrography technique to document the cell locomotion continuously up to 90 days in the ADCP cultures of marine sponge *Hymeniacidon perlevis*. Locomotion of three typical cell types, archaeocytes for mesohyl cells, pinacocytes for surface cells and spicule-associated cells, were monitored and analyzed during the culture process including the inoculation of dissociated cells and the formation stage of functional primmorphs. We observed the unique particle transfer process between archaeocytes, the fluctuation spreading over cells and the production of silica spicules and the active transfer of spicules by sponge cells. A tentative model of material transfer and the coordinated locomotion of sponge cells were proposed.

Keywords: *Hymeniacidon perlevis*, archaeocyte-dominant cell populations (ADCP), cell locomotion

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