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## Expression of genes of pigment differentiation throughout the development and in cultured embryonic cells of the sand dollar *Scaphechinus mirabilis*

*Key words:* cell culture; gene expression; naphthoquinone pigments; pigment differentiation; sea urchin

Sea urchins, producing secondary metabolites, such as naphthoquinone pigments are possible sources of valuable biologically active substances for the pharmaceutical industry. Two gene families involved in the induction of pigment differentiation in the sand dollar *S. mirabilis* were selected for analysis, and their expression level was evaluated by quantitative real-time-PCR (q-RT-PCR) throughout the development and in cell cultures. *In vivo*, the highest level of expression of the *pks* and *sult* genes in sand dollar embryos was observed at the blastula and gastrula stages. In unfertilized eggs and spermatozooids, only trace amounts of these transcripts were detected. *In vitro*, genes of interest were also expressed significantly in blastula-derived cell cultures, confirming that primary embryonic cell cultures are suitable models for *in vitro* investigation of pigment differentiation. Pigmentation has been shown to be more intense when the cells were cultured in sea urchin coelomic fluids rather than in seawater. The maximal number of pigment cells of *S. mirabilis* was detected in the coelomic fluid of injured sea urchins. This assay is a useful tool for assessing the production of naphthoquinone pigments during development and cultivation and is important for the development of new techniques in marine biotechnology and pharmacology.

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