

# Sponge Cell Culture State-of-the-Art: What's Worked, What Hasn't, What's Next.

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Although sponge cell and developmental biology have been studied for more than 100 years, and research focused on the establishment of sponge cell lines has been conducted in earnest for at least the past 25 years, there are still no sponge cell lines. Contamination, cell dissociation techniques, and inadequate nutrient media contribute to failed attempts at establishment of sponge cell lines.

Regardless, much has been learned about sponge cell and molecular biology using primary cultures. The results--both positive and negative--form the basis for the next generation of sponge cell culture research.

Cell cycling studies demonstrate that there are significant differences among species, which must be considered when selecting a model sponge. Research on sponge-microbial symbioses provides insights into the relative importance of microbes in sponge cell cultures and could guide future efforts at control of "contaminants", which perhaps should be focused more on regulating, rather than eliminating, bacteria and fungi. And molecular research, ranging from analyses of sponge genomes to phylogenetic barcoding to transfection to gene expression studies, all provide information that will improve our ability to establish both normal and transformed cell lines.

Sponge cell cultures have the potential to be unique metazoan models for research in many diverse disciplines, including developmental biology, chemical ecology, human health, marine biotechnology, and impacts of climate change.