

# Successful cryopreservation and nano-laser warming of coral larvae

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## Abstract

*Stylophora pistillata* is an important scleractinian coral species that dominate the reefs in southern Taiwan. *S. pistillata* is an excellent candidate for cryopreservation due to its low resistance to coral bleaching exacerbated by ocean warming. The coral colonies were collected in the reefs of Houwan bay and kept in flow-through tanks for larval collection. The peak larval release was observed during the first quarter (Jan-Mar) of the year. Each coral larva was subjected to vitrification and laser warming (300V, 10 ms pulse width, 2 mm beam diameter) using vitrification solutions (VS) previously selected from suitable cryoprotectants. There were two VS used (VS1; 2M EGF, 1M DMSO and VS2; 2M DMSO and 1M EGF) mixed with 40% (w/v) Ficoll and 10% (v/v) of gold nano bars (GNBs) in FSW (final concentration of  $1.2 \times 10^{18}$  particles/m<sup>3</sup>,  $\lambda = 530$ nm). The initial results showed that VS1 yielded a higher vitality (16%), settlement (5%), and post-settlement survival (2.5%) rate than VS2. Thus, *S. pistillata* is a good candidate for rearing corals in captivity, given the higher post-settlement survival (5 months) among the cryopreserved corals to date. The GNBs also played an important role in even heat distribution during laser warming. This study will help the cryopreservation of corals in the same genera and enhance conservation efforts on threatened coral species.

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