

Resource Summary Report

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Electroporation transformation of FITC-dextran into Oxyrrhis marina - an early branching dinoflagellate.

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Proper Citation

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Protocol Information

URL: <https://dx.doi.org/10.17504/protocols.io.ginbude>

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Group: Protist Research to Optimize Tools in Genetics (PROT-G)

Summary: Here we describe a protocol for transforming *Oxyrrhis marina* with FITC-labelled dextran (a DNA analog) by electroporation. This protocol is reproducible, and results in a transformation efficiency of around 50%. We have confirmed the viability of transformed cells by allowing them to recover in the dark (and thus maintain fluorescence intensity) and then by observing fluorescent cells swimming normally, days after transformation (see the video here). As of yet we have been unable to demonstrate the actual uptake of plasmid DNA. We have tried using rhodamine labelled plasmids to demonstrate this but the results were inconclusive due to issues with cellular autofluorescence. We have also tried this method with a variety of expression plasmids encoding different promoters. For example, we tried the MOE promoter from *Perkinsus marinus* (a closely related species) and the generic eukaryotic CMV promoter. However no GFP fluorescence was detected in these samples. We have also tried transforming in vitro synthesized GFP encoding mRNA using this protocol. As of yet, no GFP production has been detected, but this may reflect non-canonical translational systems in dinoflagellates as the same mRNA could be translated in starfish embryos. Although the development of expression systems in dinoflagellates remains a challenge, our results suggest that *O. marina* may be amenable to genetic transformation.

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