

# AQUACULTURE

## Isolation of Fish Growth Factor

### Final Report

**Major Goals and Objectives:** The goal of this research is to purify and identify cell growth-promoting activity found in fish embryo extract.

#### Summary of Progress

Methods have been developed and optimized for the partial purification of cell growth promoting activity from fish embryos and the partially purified factor has been utilized to initiate cell cultures from early stage fish embryos.

#### Accomplishments

Large-scale preparation of the partially purified cell growth promoting activity has been achieved. The factor has been further characterized biochemically and utilized to initiate cell lines from early stage embryos. The cell lines are being used for gene transfer studies.

#### Benefits

The results of this work provide information concerning the characterization and purification of growth promoting activity from fish embryo extracts. The growth factor has been shown to enhance the in vitro growth of cells derived from early-stage embryos and may be used in the future to improve aquaculture production through the enhancement of fish growth and survival. Cell lines resulting from this work will be valuable for studies of cell differentiation and gene transfer in the fish embryo.

#### Narrative Report

Previous research has demonstrated that extract prepared from fish embryos contains a cell growth factor whose activity can be distinguished from known purified peptide growth factors. The acid and heat stable, trypsin sensitive activity stimulates the growth of cells from salmon, trout and other fish species but does not promote the growth of mammalian cells. Since the factor may exhibit a similar growth enhancing activity in vivo it could have valuable applications to aquaculture by improving fish growth and survival. In the current research, methods have been developed and optimized for the partial purification of the growth-promoting activity from fish embryo extracts. Using the partially purified activity, cell lines from early-stage fish embryos have been derived and their growth shown to be dependent on the presence of the embryo extract. The growth-promoting activity was purified greater than 100-fold from extracts prepared from 21-day-old trout embryos using a protocol consisting of hydrophobic interaction chromatography, ammonium sulfate precipitation, boiling and preparative gel electrophoresis. The partially purified activity stimulated the growth of salmon embryo cells when added at protein concentrations in the range of 1 to 5 mg/ml. Further purification will be achieved using reverse phase HPLC.

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#### Research Information

- **Principal Investigator:** Paul Collodi
- **Initiation Date:** March 1, 1997
- **Completion Date:** February 28, 1999
- **Affiliation:** Purdue University

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