



Brine shrimp used to help enhance understanding of cataracts

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Thomas MacRae's research may make a significant contribution to medicine by revealing the structural and functional relationships of medically important proteins. Of particular importance are the implications for "conformational diseases," where protein folding is aberrant, including cataract formation and possibly neurological disorders such as Parkinson's and Alzheimer disease.

Dr. MacRae is using *Artemia franciscana*, brine shrimp, to investigate a small heat shock/crystallin protein called p26, which protects lens proteins in the eyes of mammals. P26 has an essential protective role in *Artemia* embryos; it protects other proteins during physiological stress.

Normal and mutated forms of the protein were compared, either in the test tube or after expression in bacterial and mammalian cells. The results indicated that the protein protected cells from heat. These and related studies will reveal the role of individual amino acid residues in p26 function, of general importance in understanding similar proteins in other organisms. Preliminary experiments of this protein on fruit flies suggests that it enhances resistance in the organism. This provides a new avenue for exploring p26 function in an experimental animal for which excellent methodologies have been developed for genetic analysis and for which the entire genome is sequenced.

Dr. MacRae's results support the proposal that p26 is an excellent model protein for the study of small heat shock/crystallin proteins in diseases such as cataracts.

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