**Phylogenetic sleuthing: Radiation of teleosts is reflected in the expansion of Class I eIF4Es**

**Kathleen M. Gillespie**

Institute of Marine and Environmental Technology, University of Maryland Center for Environmental Science, 701 E. Pratt Street, Baltimore MD 21202, U.S.A.

Tsvetan R. Bachvaroff, Rosemary Jagus

Kgillesp@umces.edu

**Abstract**

The eIF4E family of proteins plays important roles in regulation of gene expression through mRNA recruitment, cell proliferation, muscle growth, embryonic development, differentiation and oocyte maturation. The three classes of eIF4Es in deuterostomes are eIF4E-1, eIF4E-2 and eIF4E-3. In vertebrates, the eIF4E family has expanded following two vertebrate- and one teleost-specific whole genome duplication (WGD). Multiple subclasses of eIF4Es have arisen, causing neofunctionalization and asymmetric loss. Duplication of Class I eIF4Es is originally observed in elephant shark, coelacanth, and a basal ray-finned fish. All have three eIF4E-1 subclasses: eIF4E-1A, -1B, and -1C. Both eIF4E-IA and -1C function as prototypical translation initiation factors, recruiting mRNAs by binding to mRNA 5’-caps. In teleosts, eIF4E-1C is the predominant form. In tetrapods, eIF4E-1C is lost. Some percomorphs have acquired new cognates of eIF4E-1A: eIF4E-1A1 and -1A2. eIF4E-1B prevents translation of mRNAs containing cytoplasmic polyadenylation elements and inhibits completion of meiosis. It is found in all tetrapods, but has been lost in more recently emerging teleosts that include species of importance to US fisheries. Investigating the functions of the expanded eIF4E family in teleosts will facilitate our understanding in control of muscle growth, oocyte maturation, and diversity of teleost body plans.