



COBRE
Investigators

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Title of project: .Regulatory Role of MicroRNA-124 in Neurogenesis and Pattern Formation

Summary:

miRNAs are a special class of small RNA molecules of 22 bases long that are expressed by all animals and plants and are critical for numerous biological processes. In animal cells, they fine tune gene expression by pairing to the 3' untranslated region (3'UTR) of protein coding mRNAs to repress their translation and/or induce mRNA degradation (1). In recent years, microRNAs (miRNAs) have been found to play a crucial role in neural cell differentiation (reviewed in (2, 3). miR-124 is highly conserved in both invertebrates and vertebrates and is the most abundant miRNA in the both the embryonic and adult central nervous system (4). We propose to use the purple sea urchin, *Strongylocentrotus purpuratus*, to examine the function of miR-124. It is an excellent model to study early developmental events due to its fully sequenced genome, its ability to generate large numbers of synchronous, translucent embryos that can be experimentally manipulated, its developmental commonalities with the vertebrates, and its simply patterned nerve net that forms within two days. The sequencing of the purple sea urchin genome revealed that there existed orthologues of transcription factors and signaling pathways that regulate neurogenesis in other animals (5). We **hypothesize** that miR-124 is involved in the regulation of genes critical for neurogenesis and pattern formation.