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OC.16- mRNA ANALYSIS OF NOVEL GENES DIFFERENTIALLY EXPRESSED DURING ADULT NEUROGENESIS IN THE SHORT LIVED TELEOST NOTHOBRANCHIUS FURZERI

A. Leggieri[1,2], L. D'Angelo[1,3], M. Baumgart[2], L. Castaldo[1], P. de Girolamo[1], C. Lucini[1], A. Cellerino[2,4], and L. Avallone[1]

[1]Università degli Studi di Napoli Federico II, Napoli, Italy;
[2]Leibniz Institute on Aging - Fritz Lipmann Institute, Jena, Germany; [3]Stazione Zoologica Anton Dohrn, Napoli, Italy; [4]Scuola Normale Superiore di Pisa, Pisa, Italy

Adult neurogenesis is a process that exponentially decreases with aging in many species. In mammals it occurs only into the subventricular and subgranular zones. In teleost fish, neurogenic areas are more numerous and distributed along the entire rostro-caudal brain axis. Among teleosts, Nothobranchius furzeri is a well-established aging model. Clustering temporal profile of gene expression in N. furzeri, has shown differentially expressed genes (DEGs). We investigated the neurogenic activity of three DEGs well conserved during evolution: Inhibitor of DNA Binding 3 (ID3), Alpha Chain 1 Collagen type IV (COL4A1) and XXV (COL25A1). Quantitative Real-Time PCR was assessed in the whole encephalon of young (5 weeks post hatching, wph) and old (27 wph) animals. Data show a significant age-related upregulation of ID3, COL4A1, and COL25A1. We localized the genes by means of fluorescence in situ hybridization (FISH) experiments, confirming their presence in neurogenic areas. Then, to identify cytotype expressing gene mRNAs, double labeling of FISH and immunofluorescence was performed with anti-PCNA, anti-S100; anti-DCX; anti-HuC/D, and anti-TH. A wide co-localization is observed in most of neurogenic areas of forebrain, midbrain, and hindbrain, particularly in periventricular areas. Furthermore, we performed a statistical analysis of ID3, COL4A1, and COL25A1 co-localization with single neural marker in each brain macro-area. In proliferating cells, ID3 is more expressed in new born neurons (DCX+), whereas COL4A1 and COL25A1 are homogeneously expressed in radial glia (S100+) and differentiating neurons (HuC/D+); in mature neurons (S100+ - TH+), COL25A1 is the most represented.