

Synuclein expression in the lizard *Anolis carolinensis*

Mattia Toni¹, Federica De Angelis¹, Rosa Vaccaro², Arianna Casini², Carla Cioni¹

¹Sapienza Università di Roma, Dip. di Biologia e Biotecnologie "Charles Darwin", Roma, Italy - ²Sapienza Università di Roma, Dip. SAIMLAL, sez. Anatomia, Roma, Italy

The synuclein (syn) family comprises three proteins: alpha-, beta- and gamma-syn. In mammals alpha- and beta- syn are primarily expressed in the brain where they are localized in pre-synaptic terminals while gamma-syn is mainly expressed in the peripheral nervous system. In humans, syns are involved in neurodegenerative diseases with high social impact such as Parkinson's disease and tumors. However, the normal cellular functions of the three syns have not yet been fully clarified.

Members of the syn family were sequenced in representative species of all vertebrates and the comparative sequence analysis suggested that syns are evolutionary conserved, although several differences in the number of genes encoding syn proteins have been identified in different taxa. On this knowledge, non mammalian vertebrates may represent useful models to understand the evolution and the physiological role of these proteins.

Our research focused on the evolution of syns with the aim of analyzing their molecular and cellular expression in the CNS of representative vertebrates. A first study was published on alpha-syn distribution in the CNS of the carp *Cyprinus carpio*, by using antibodies against human alpha-syn [1]. Results showed that alpha-syn proteins are expressed to different levels in the brain and spinal cord regions of the carp. Differently from mammals, neuronal expression was mainly localized in cholinergic cell populations. At intracellular level, alpha-syn expression was localized in neuronal perikarya, varicose axons and terminal varicosities, but never in the cell nucleus. Apart from the above differences, the comparison between carp and mammals also suggested similarities in the distribution at the level of definite cholinergic systems. Thus, alpha-syn possibly modulates similar molecular pathways in cholinergic systems of phylogenetically distant vertebrates as teleosts and mammals.

Current model of our comparative analysis is the lizard *Anolis carolinensis*, given the availability of sequenced genome in this species. Three syn genes (snca, sncb and sncg) have been identified in the lizard and their expression was studied by RT-PCR and Western blot experiments. Preliminary results on syns expression in the CNS are here reported.

References

[1] Vaccaro et al. J Comp Neurol. 2015 May 1;523(7):1095-124. doi: 10.1002/cne.23722

Keywords

Synuclein; lizard; *Anolis carolinensis*; Western blot; RT-PCR.