G. Apostolova and R. Dorn (Institute for Neuroscience) won a prize for their poster "Molecular Analysis of Neurotransmitter Plasticity in Sympathetic Neurons" at the 3rd European Science Foundation Functional Genomics Conference 2008, Innsbruck Austria October 1-4, 2008

An important and still unresolved question in developmental neurobiology is how the neurotransmitter phenotype of a mature neuron is acquired, maintained or switched during development. To address this question the authors use postganglionic sympathetic neurons as a model system. These neurons undergo a switch from noradrenergic to cholinergic neurotransmission at late developmental phases. Currently, the interplay between the extracellular signals and the transcriptional machinery mediating this plastic phenomenon is not known.

To gain insights into the transcriptional regulation of transmitter phenotype in sympathetic neurons the authors applied a comparative microarray-based approach. DNA microarrays were employed to analyze the transcriptome changes caused by four neurotrophic factors on avian and rat sympathetic neurons. This approach allowed the identification of groups of genes (so called synexpression groups), that were co-regulated with the neurotransmitter markers in noradrenergic vs. cholinergic phenotype in both species. Based on the assumption that important biological functions are conserved during evolution the authors hypothesize that some of these genes are not only co-regulated with the neurotransmitter markers but also might be causally involved in the segregation process between the two phenotypes.

To investigate the functions of individual genes in the neurotransmitter phenotype specification the authors use two experimental systems for genetic modification: an *in vivo* chick model, in which retroviruses serve as a gene transfer tool for targeted overexpression or gene silencing; and an *in vitro* rat model that combines microinjection of nucleic acids into primary neurons with single cell RT-PCR analysis. By applying these complementary tools for functional analysis they hope to be able to arrive at novel insights into the molecular mechanisms that steer developmental neurotransmitter plasticity.