

## Effects of perinatal hypothyroidism on gene expression during early postnatal development of mouse cerebellum: a study using original oligo DNA microarrays

<sup>1</sup>Masaki Takahashi, <sup>1</sup>Yuta Wakayama, <sup>2</sup>Yasumitsu Kondo, <sup>2</sup>Hideo Tashiro, <sup>3,4</sup>Misae Ohta, <sup>3,4</sup>Noriyuki Koibuchi, & <sup>1,4</sup>Tomoko Tashiro

<sup>1</sup>Department of Biochemistry, School of Science and Engineering, Aoyama-Gakuin University; <sup>2</sup>Advanced Engineering Center, RIIKEN; <sup>3</sup>Department of Physiology, Faculty of Medicine, Gunma University; <sup>4</sup>CREST, JST

To study the roles of thyroid hormone in the development of the central nervous system, we analyzed the expression of a group of 30 selected genes and their splice variants in the cerebellum of experimentally hypothyroid and control mice at 7 (P7) and 15 (P15) days postnatally using the DNA microarray technique. A Stanford-type, original DNA microarray was constructed with a total of 110 gene-specific oligonucleotide probes (30~45 bases) to monitor the synaptogenic process. The probes included those for cytoskeletal regulators, pre- and post-synaptic proteins, ion channels, growth factors, and neuron-specific enzymes. Messenger RNA extracted from mouse cerebellum was reverse-transcribed to yield cDNA, which was further labeled with the fluorescent dye Cy3 or Cy5. When cDNA from control and hypothyroid mice at P7 and P15 were compared by competitive hybridization, overall differences were small at P7 but were increased significantly at P15. Comparison with expression changes during normal development (P7-P15) confirmed that the probes could be grouped into a) growth-associated probes, which decrease in expression from P7 to P15 and b) maturation-associated probes, which increase during the period. Some of the group a) genes showed a smaller decrease in hypothyroid animals, while group b) genes showed a decrease rather than an increase in hypothyroid animals during this period, indicating a retardation in synaptogenesis.