THYROID HORMONE TRANSPORTERS MCT8 AND OATP1C1 ARE EXPRESSED IN NEURONS IN THE HUMAN AND MONKEY BASAL GANGLIA AND MOTOR THALAMUS.

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Thyroid hormone (TH) is essential for proper brain development, function, and metabolism. Monocarboxylate transporter 8 (MCT8) and organic anion transporting polypeptide 1C1 (OATP1C1) are highly specific TH transporters that facilitate TH to cross the plasma membrane to perform its bioactivity. Mutations of MCT8 and OATP1C1 affect inevitably the motor system in human, and so far it is unknown the nature of the neural cells in which these transporters are expressed in the adult monkey and human basal ganglia and motor related structures.

We performed immunohistochemistry, immunohistochemistry combined with NADPH-diaphorase histochemistry or double immunofluorescence of 30-50µm floating frozen brain sections from three cynomolgus monkeys and four adult humans. The immunolabeling results were plotted in distribution maps by means of the Neurolucida system (MicroBrightField Biosciences).

MCT8 and OATP1C1 are expressed in neuronal subtypes with different morphologies in the neostriatum both in human and monkey. MCT8 is expressed in medium-sized aspiny non-NOS expressing GABAergic interneurons. OATP1C1 and MCT8 are expressed in neurons in the globus pallidus and the motor thalamus. OATP1C1 and MCT8 distribution is similar in the human and monkey tissues, although their protein expression is stronger in the monkey brain. MCT8 is less abundant than OATP1C1 in general. In addition, we have noticed that both transporters are strongly expressed in substantia nigra in the monkey and in nucleus basalis of Meynert in human and monkey. MCT8 is expressed extensively in the endothelial cells of the various size vessels and capillaries in the basal ganglia and thalamus, while OATP1C1 is occasionally observed.

Our study provides the first evidence for the abundance of TH transporters MCT8 and OATP1C1 in the basal ganglia and thalamic neurons in the adult human and non-human primates, which suggests their important role in the motor system functionality.