

Preserving cholinergic interneurons in cryopreserved striatal neuron cultures.

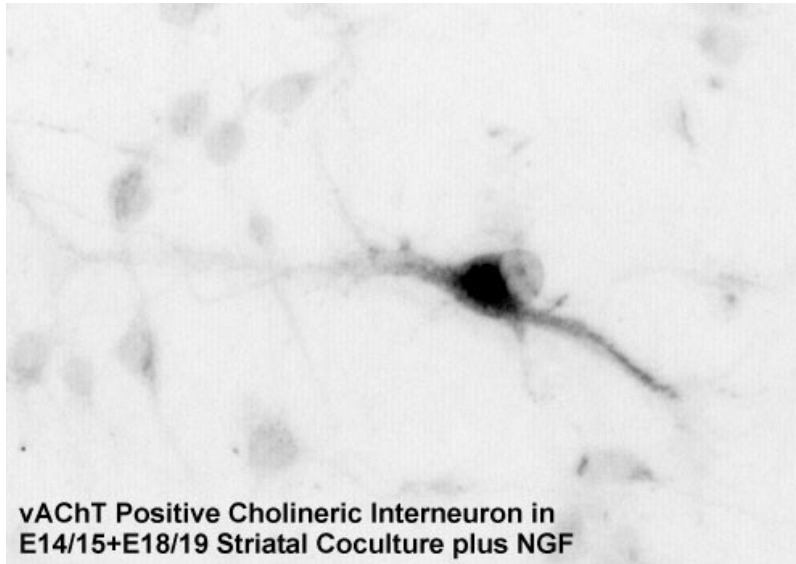
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Abstract: Cholinergic interneurons are a small but important population of the neurons in the neostriatum. It has been suggested that they hold the balance of striatal function along with the dopamine input from substantia nigra, and that parkinsonism is the result of an over-preponderance of cholinergic influence in the absence of dopamine innervation. In cultures of striatal neurons derived from E18/19 embryos we saw no cholinergic neurons. However, mixed striatal cultures formed from cryopreserved neurons of E14/15 together with E18/19 gestational ages do contain cells expressing the vesicular acetylcholine transporter (vAChT) but they do not have the typical morphology of cholinergic interneurons in vivo.

Cholinergic interneurons have been described in slice cultures but their ChAT activity was dependent on nerve growth factor (NGF) addition to the medium (Martinez et al 1985 PNAS 82:7777). In our experiments, the addition of NGF (100ng/ml) to the mixed gestational cultures allowed the development of large interneurons that stain for vAChT. These cells have the bipolar dendritic arrangement typical of striatal interneurons.

The ability to grow striatal networks with and without cholinergic interneurons will enable further insight into their role in striatal network dynamics. Cryopreserved substantia nigra neurons can also be added to the cultures in order to further examine the interactions between these proposed antagonistic influences on striatal output.



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