Abstract

CHARACTERIZATION OF A STABLE CELL LINE OF MOUSE FETAL HYPOTHALAMIC NEURAL STEM CELLS

A. Cariboni[1], L. Conti[1], V. Andrè[1], D. Aprile[1], J. Zasso[1], R. Maggi[1]

[1]Scienze Farmacologiche e Biomolecolari, CIRMAR, Università degli Studi di Milano - Milano

The mammalian hypothalamus is involved in regulating several physiological functions; many of these functions are exerted by the neuroendocrine system. The neuroendocrine hypothalamus contains two distinct subsystems, the parvicellular and magnocellular neuronal systems, however, the molecular pathways that mediate the development of such neurons are largely unknown. The study of neural stem cells (NSC) offers a useful model to investigate such mechanisms. Neurospheres of NSC from both fetal and adult rat hypothalami, able to differentiate into glia and neurons, have been recently isolated but the proportion of stem cells in neurosphere is low and they cannot directly observed and studied.

The present communication describes the setup and the characterization of a pure stable cell line of NSC from E12 fetal mouse hypothalamus. The cell line (named AC1) grows as a monolayer in continuous expansion, by symmetrical division, in a defined medium enriched in FGF-2 and EGF. AC1 cells express stemness (nestin, Sox-2 and Pax-6), neuronal, but not astrocytic, markers; moreover, the expression of hypothalamic patterning genes (Sim1, Sim2, Arnt2, Brn2) has been also confirmed. After prolonged expansion, they remain able to differentiate efficiently into neurons and astrocytes in vitro. In normal culture conditions, AC1 were found to express POMC and CRH; however, detectable transcripts for TRH, GHRH and somatostatin were evident after short-term induction of neuronal differentiation. The ability of AC1 cells to develop neuroendocrine lineages in vitro will help to elucidate the mechanisms involved in the specific differentiation of neurohormonal hypothalamic neurons as well as other physiological hypothalamic developmental processes. In perspective, AC1 cells, would offer a new valuable tool to develop future cellular approaches to neuroendocrine disorders (i.e., diabetes insipidus, obesity, Prader-Willi syndrome, etc.). *(granted by MIUR)*