



SEMINARIO PRESENCIAL

Viernes, 18 de marzo de 2022

12:30 h. Instituto Cajal (CSIC) Madrid

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β -catenin coordinates proliferation and differentiation during neural tube development.

Abstract

Neural stem cells (NSCs) of embryonic neural tube (NT), form a pseudostratified single-cell layered epithelium that displays a marked apico-basal polarity. The proteins present at the apical pole of NSCs are collectively called the apical complex. N-cadherin, α -Catenin and β -catenin are located in the sub-apical domain forming the adherens junctions (AJs). Initially, NSCs proliferate symmetrically in a self-expanding mode, later on, their mode of division changes to generate the first committed neurons that detach from the proliferative ventricle. To maintain the architecture of the nervous system, NSCs proliferation and differentiation must be tightly coordinated. β -catenin is a dual function protein, that plays important roles in cell polarity by associating with classic cadherins at the AJs. However, β -catenin also mediates canonical WNT signalling, by stimulating Tcf dependent transcription. Notably, β -catenin carries out two sequential but interconnected activities along NT development. Firstly, during the proliferation period β -catenin binds to pro-N-cadherin early in the secretory pathway promoting its maturation and delivery to the AJs, later, when neurogenesis begins, β -catenin is no longer sent at the AJs, instead, it is readdressed to the nucleus where it activates the transcription of different Tcf-dependent groups of genes that are crucial for the neural differentiation programme.

Affiliation and short bio

(1985-1989) Degree in Biology at the University of the Balearic Islands. **(1990-1993)** Doctoral thesis at the Cajal Institute directed by Dr Ignacio Torres Alemán. **(1994-1997)** Post-doc in Dr Morris White's lab at Joslin Diabetes Center (Harvard Medical School), there, we described a new subunit of PI3K (PIK3R3). **(1998)** Back to Cajal Institute with Dr. Torres Alemán, where I studied the neuroprotective activity of IGF-1. **(2001)** Gained a position of Científico titular del CSIC at the IIBB (Barcelona), to study the regulation of proliferation and differentiation of embryonic neural stem cells. **(2014)** Moved to the IBMB (Barcelona). Although our main interest has always been studying the proliferation and differentiation process, our research led us to study the activity of molecules such as Sonic Hedgehog, BMPs or Wnt factors. Thus, we studied the relevance on Shh pathway of Adenylate Cyclases, Heterotrimeric G proteins or PKA (Barzi et al 2010, Barzi et al 2011, Vuolo et al 2015). Similarly, we used chicken embryos to generate a model of Wnt-type Medulloblastoma (Herrera et al, 2014), where we studied the early events occurring in this tumor, or the role of PI3K in intraepithelial positioning (Torroba et al. 2018). In this line, we have recently shown that β -catenin binds to pro-N-cadherin early in the secretory pathway promoting its maturation and its delivery to the adherens junctions (Herrera et al 2021).

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