



RESEARCH TOPIC MEM 19

Functional validation of RNA-based drugs in the CNS Curriculum MEM

Laboratory name

Developmental Neurobiology Lab

Pre-clinical Supervisor

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Abstract

RNA therapy implies the use of RNA-based molecules to modulate biological pathways to cure specific conditions, and advancement in the RNA-targeting field allow a wide range of applications to treat rare and common diseases. RNA drugs can be classified into three categories: 1) antisense oligonucleotides or RNA interference for modifying gene expression; 2) RNA aptamers that can modulate the function of proteins; and 3) mRNA drugs encoding proteins. In this project, we will employ multiple model systems (including pure cultures and co-cultures of neurons, astrocytes, and microglia obtained from the differentiation of patient-derived iPSC cells as well as 3D organoids and assembloids obtained from the differentiation of patient-derived iPSC cells, as well as microfluidic models of neurovascular barriers) to test new RNA drugs for the treatment of genetic diseases impacting on the central nervous system by exploiting novel strategies that allow an in-depth characterization of their pharmacodynamic profile and pharmacokinetics. Functional characterization of the lead compounds will be followed through both electrophysiological and molecular analysis in multiple model systems to allow a comprehensive and integrated evaluation of the drug properties.

Main technical approaches

iPSC culture, 2D neuronal differentiation, 3D organoids and assembloid generation, and/or microfluidics

Type of contract

PhD scholarship of € 18.000 gross per year awarded by Humanitas University. This sum is exempt from IRPEF income tax according to the provisions of art. 4 of Law no. 476 of 13th August 1984, and is subject to social security contributions according to the provisions of art. 2, section 26 and subsequent sections, of Law no. 335 of 8th August 1995 and subsequent modifications.

Borsa di dottorato pari a € 18.000 annui lordi erogata da Humanitas University. Importo non soggetto a tassazione IRPEF a norma dell'art. 4 della L. 13 agosto 1984 n. 476 e soggetto, in



materia previdenziale, alle norme di cui all'art. 2, commi 26 e segg., della L. 8 agosto 1995, n. 335 e successive modificazioni.