**Gianvito Martino, MD**

Gianvito Martino received his degree in medicine in 1987 from the University of Pavia, Italy where he stayed to complete his residency in neurology. Soon after, he assumed the position of Visiting Scientist at the Karolinska Institute in Stockholm, Sweden and subsequently moved to the USA to become a Research Associate at the University of Chicago, a position he held from 1991 to 1992. Returning to Italy, he became a Research Associate at the San Raffaele University Hospital in Milan and has been active in research at this hospital ever since. Gianvito Martino is currently Director of the Division of Neuroscience at the San Raffaele University Hospital. He is a member of several scientific advisory boards and has been the President of the Italian Neuroimmunology Society since 2009. He has been recently appointed as honorary professor at the School of Medicine and Dentistry of the Queen Mary University of London, UK. His medical and scientific interests range from the elucidation of the pathogenic mechanisms of to the development of gene and stem-cell based therapies for inflammatory and neurodegenerative CNS disorders.

**Abstract**

The potential of neural stem/precursor cell (NPC)-based therapies to revolutionize the treatment of neurological disorders is an exciting prospect for modern medicine. The results so far obtained in pre-clinical models of inflammatory as well as degenerative neurological disorders consistently challenge the sole and limited view that NPCs therapeutically work exclusively throughout cell replacement. As a matter of fact, transplantation of NSCs may promote central nervous system (CNS) repair (neuroprotection) trough cell replacement but also via bystander capacities, mainly exerted by undifferentiated cells releasing, at the site of tissue damage, a milieu of *neurotrophic* and *immunomodulatory* molecules whose release is temporally and spatially orchestrated by environmental needs. These molecules acting in a paracrine fashion are, at least in part, '*constitutively*' secreted by stem cells thus representing a sort of *stem cell signature*. Along with developmental and differentiation plasticity which are cardinal features of NPCs, the concept of *therapeutic plasticity* – which can be viewed as the capacity of somatic NPCs to adapt their fate and function(s) to specific environmental (e.g. CNS) needs occurring as a result of different pathological conditions – is now emerging. However, still there are some preliminary questions that need to be solved before envisaging any potential human applications of these therapies in neurological disorders. Not only the ideal cell source for transplantation and the best route of cell administration have to be determined, but it is still unclear, and even more challenging, the best way to tightly control the different NPC-mediated mechanism(s) sustaining the repair capabilities of these cells once in vivo transplanted.