Symposium 32: Understanding microglial functional heterogeneity in the healthy and diseased brain

Sponsored by Alzheimer's Research UK

Theme: Neuronal, glial and cellular mechanisms

Thursday 13th April, 9:00 – 10:40

The field studying microglial biology has experienced profound changes in the last years. The developmental origins of microglial cells have been recently redefined, establishing them as an independent cell lineage that is maintained by self-renewal during the lifetime of the individual. Also, there is growing awareness of the array of microglial functions during brain development, homeostasis, immunity, injury and repair. Heterogeneity and plasticity in microglia, and more broadly in CNS myeloid cells, is central to enabling these diverse functions. This has profound repercussions on the roles of microglia during early development, adult age and ageing.

The diseased brain hosts a heterogeneous population of myeloid cells that, to date, have been discriminated solely on the basis of their localization, morphology and surface epitope expression. However, recent data suggest that resident microglia may be functionally distinct from bone marrow- or blood-derived phagocytes, which invade the CNS under pathological conditions. During the last few years, research on brain myeloid cells has been markedly changed by the advent of new tools in imaging, genetics and immunology. These methodologies have yielded unexpected results, which challenge the traditional view of brain macrophages in disease.

With this newly redefined panorama, we face relevant and unanswered questions in microglial biology, like: How is the microglial population maintained in the healthy brain? What are the functional implications of microglial heterogeneity? Is heterogeneity defining different responsiveness to brain pathology? Can we control the expansion and activation of the microglial population in brain disease? In the current proposal we will give an updated and comprehensive view of microglial functional heterogeneity in health and disease, aiming at deciphering the critical roles that these cells have in both brain homeostasis and pathology.

Chair: Dr Diego Gomez-Nicola (University of Southampton)

Co-Chair: Dr Barry McColl (University of Edinburgh)

Speaker 1: Professor Marco Prinz (University of Freiburg, Germany)

'Origin and fate of CNS macrophages'

Speaker 2: Dr Barry McColl (University of Edinburgh)

'Multiple identities of microglia across the adult lifespan'

Speaker 3: Dr Diego Gomez-Nicola (Southampton)

'Microglial self-renewal and proliferation in health and disease'

Speaker 4: Dr Veronique Miron (University of Edinburgh)

'Cellular and molecular mechanisms underpinning microglia-driven myelin regeneration'