

Objectives

NINA has three overarching research and training objectives:

- to build multidisciplinary ageing research and training capacity in Europe
- to foster mobility and improve career options of early career researchers in Europe
- to improve our understanding of how the ageing process affects communication between the Endocrine, Immune and Central Nervous systems and how these impact upon health.

Science & Technology objectives

Although ageing is a complex process, we now know much about its actions at the cellular and tissue level. In contrast, our understanding of how the various age-related changes interact to result in loss of homeostasis, frailty and disease is incomplete.

The nervous system, the endocrine system and the immune system may be thought of as “master systems” because they integrate many processes in the body to maintain homeostasis, including defense against pathogens, energy supply and reproduction. These master systems communicate primarily via humoral signals - cytokines and endocrine hormones. Ageing is known to be accompanied by significant changes in many of these factors, including an increase circulating pro-inflammatory cytokines (Inflammaging), reduced growth hormone (GH)-IGF1 and melatonin levels, alterations to the Hypothalamic-Pituitary-Thyroid (HPT) axis and a decline in the Hypothalamic-Pituitary-Adrenal (HPA) axis.

The central hypothesis of NINA is that these combined changes disrupt normal homeostatic regulation and increase the susceptibility of older subjects to the adverse effects of physical and emotional stress, resulting in physical and mental frailty. NINA will test this hypothesis through an integrated multidisciplinary research and training programme which will identify those age-related changes to neuroendocrine factors that influence key aspects of health, namely immunity, sleep, metabolism, mood and cognition, which are disturbed in older people resulting in poor health.

Research objectives

The aims of the project will be met by addressing 5 distinct research objectives:

- To determine how early life feeding patterns, via the HPA and HPT axes, influence the response to stress in later life and impact on cognition, metabolism, immunity, mood and behaviour.
- To determine how the neuroendocrine response to stress may accelerate the immunological, cognitive and psychological changes that characterise senescence.
- To determine the role of neuroendocrine factors in thymic atrophy.
- To determine the role of age-related changes in neuroendocrine networks in sleep disruption.
- To determine the impact of altered sleep duration and quality upon health in old age, specifically effects on mood, cognition, metabolism and immunity.