Universidad de Navarra

Máster en Investigación Biomédica
Facultad de Ciencias

Research Project Proposal
Academic year 2016-2017

Project Nº 21 ASIGNADO
Title: Stimulation of central nervous system through the olfactory system as a method to improve antiviral and antitumoral immune response
Department/ Laboratory Immunology and Immunotherapy program, Center for Applied Medical research, CIMA
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Summary The use of adjuvants and immunostimulants is essential for improving the efficacy of vaccines. However, these reagents can cause significant local reactions such as inflammation, edema, necrosis, ulcers as well as systemic reactions and autoimmune diseases, which make them unsuitable for use in humans. It is therefore desirable to promote alternative research to identify safer, less invasive and easy to apply immunopotentiating strategies for their use in vaccination protocols. The central nervous system (CNS) and the immune system are connected by a bidirectional signaling pathways, so that changes in the CNS may influence immune functions. Thus, the perception of external signals through the sense organs can significantly affect the immune system. Research in the field of immunology indicates a complex network of interactions between the immune system and the olfactory system. Smells can act on the neuroendocrine system, stimulating the production of neurotransmitters and neuromodulators which may strongly influence the immune system. There are evidences suggesting the association between the olfactory system dysfunction and autoimmune diseases such as multiple sclerosis, Alzheimer's, Parkinson's, schizophrenia or depression. The aim of this project is to explore this interconnection in order to find substances able to activate/inhibit the immune system for therapeutic purposes. We propose an exploratory study of a wide range of chemical compounds belonging to the recently defined 10 olfactory categories, which after inhalation could modulate the immune system and thus might be used as alternative adjuvants in vaccination. This work could open the door to a new alternative strategy for the development of safer and easy to implement adjuvants.

References

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D. M. Nance, V. M. Sanders, Brain Behav Immun **21**, 736 (Aug, 2007).

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POSSIBILITY OF PhD

YES*

If a PhD grant is available

* (PhD grant required)