

It is common to think that humans have worse sense of smell than other species, because we do not need the sense of smell for survival. Although in the modern world our existence may indeed depend less on the sense of smell than it used to in the past, it has been noted by the scientists, that in the specific circumstances, human sense of smell is remarkably good. For instance, humans can very well judge palatability of food or build memory-emotions associations that are triggered by odors. To date researchers have focused on the individual differences and olfactory receptor genes expression as factors explaining intra- and interindividual variability in human olfaction. A common assumption has raised, that olfactory sensitivity should be similar across the globe. Little scientific effort has been made to quantify individual- and regional-level variability in olfactory sensitivity to further encourage investigations focused on the interplay of these underpinnings of olfactory sensitivity. The pilot study for this project examined human olfactory sensitivity in 11 locations representing 4 continents. Human olfactory sensitivity has been to distinctly vary between the locations, further proving the assumption of its universality wrong and urging research in this direction. The pilot study has left us with unraveled threads that should now be linked within the three main categories of (1) health; (2) socio-psychological; (3) environmental factors potent to comprehensively explain the global variability in human olfactory sensitivity. The current project aims to empirically verify the theory-based comprehensive model merging these factors and describing underpinning of human olfactory variability.

The proposed project is a multicenter study within a network of specialized chemosensory laboratories from various parts of the globe, collecting data potent to explain variability in human olfactory sensitivity. In the first part we will examine factors related to individual and public health. In the second part we will look into socio-psychological factors that have been demonstrated to be linked with olfactory sensitivity. In the third part we will examine environmental factors likely to shape olfactory sensitivity. A total sample of at least 1040 people will comprise at least 20 different populations from locations varying in public health policies, ethnical background of the inhabitants and environmental conditions. To minimize the uncontrolled variance resulting from olfactory sensitivity fluctuations each subject's olfactory sensitivity will be tested twice with 15 minutes break in-between. It is hypothesized that **(1) the variability in human olfactory sensitivity will be observed again in the replication paradigm including a larger pool of laboratories involved in the project, extended with the areas rarely included in the past studies; (2) the factors grouped into three main categories, namely: (a) health, (b) socio-psychological and (b) environmental, that have been individually demonstrated to determine human olfactory sensitivity but have never been investigated together on a large scale, will build a model explaining variability in human olfactory sensitivity.** The expected outcome of this project is a powerful scientific evidence useful for supporting olfactory rehabilitation adapted to the specificity of a given region.

The proposed project will be of the fundamental meaning for future scientific endeavors aimed to understand the relationship between health, socio-psychological and environmental factors and their interplay in shaping human olfactory sensitivity. The project has a chance to demonstrate a set of core individual factors shaping human olfactory sensitivity and their interplay with the region-level factors. This may translate into adjustments of olfactory rehabilitation protocols to better fit the needs of patients in various parts of the globe, especially important after the SaRS-COV-2 pandemic is over and the protocols for treatment of olfaction, proven to be one of the specific symptoms of COVID-19 infection, will have to emerge in every part of the world. Thus, knowledge gathered in the course of this project is likely to be useful for basic research in the field of social and life sciences as well as in the clinical practice.