Temporally complex odour information encoding

Fact Sheet

Project Information

**TempCOdE**
Grant agreement ID: 101077017

**Funded under**
European Research Council (ERC)

**DOI**
[10.3030/101077017](10.3030/101077017)

**Start date**
1 August 2023

**End date**
31 July 2028

**Total cost**
€ 1 500 000,00

**EU contribution**
€ 1 500 000,00

**Coordinated by**
UNIVERSITATSKLINIKUM BONN
Germany

Objective

A fundamental challenge for the brain is to extract relevant information from an ever changing external world. Natural odours are in a constant state of flux. Turbulent airflow shapes odours into spatiotemporally complex plumes that carry information about the olfactory scenery and provide vital clues about the location of, for example, food sources or predators. How the mammalian olfactory system extracts information about space from temporal odour dynamics, however, is still not well understood. Recent methodological advances in presenting dynamic odour stimuli, neural activity recordings and machine-vision algorithms now offer the exciting opportunity to address this fundamental question. Using a multidisciplinary approach, this project will uncover how temporally complex odour information is processed across the olfactory system and how odour dynamics give rise to behaviour.
We will first investigate how temporally complex odour information is represented across key structures of the mammalian olfactory system using in vivo physiology. This will provide important groundwork for the next step, elucidating the cellular and circuit mechanisms underlying the encoding of dynamic odours in the early olfactory system. Finally, we will study which features of temporally complex odours are used for navigation behaviour by simultaneously recording and correlating the animal's respiration sampling strategy, the dynamic odour profile encountered by the animal and neural activity from early and higher order olfactory areas in freely moving mice.

By combining cellular and systems neuroscience with behavioural investigations, we aim to directly assess how mammals use olfaction to extract information about space from time. I strongly believe that this innovative research programme will generate novel and highly generalizable insights into how naturalistic sensory information is processed and that it will uncover neural mechanisms that give rise to our perception of the world.

Fields of science

natural sciences > biological sciences > neurobiology
medical and health sciences > basic medicine > physiology
natural sciences > biological sciences > zoology > mammalogy

Keywords

olfaction  sensory processing  temporally complex odours
olfactory-guided navigation  plumes

Programme(s)

HORIZON.1.1 - European Research Council (ERC)  MAIN PROGRAMME

Topic(s)

ERC-2022-STG - ERC STARTING GRANTS

Call for proposal
Funding Scheme

HORIZON-ERC - HORIZON ERC Grants

Coordinator

UNIVERSITATS KLINIKUM BONN

Net EU contribution

€ 1 500 000,00

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Region

Nordrhein-Westfalen > Köln > Bonn, Kreisfreie Stadt

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation
Website
Participation in EU R&I programmes
HORIZON collaboration network

Other funding

€ 0,00

EC signature date 24 July 2023
Last update: 10 August 2023

Permalink: https://cordis.europa.eu/project/id/101077017

European Union, 2023