

DANDRITE Lecture

Date: 3 September
Venue: 1871-120
Time: 11.15-12.15



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The extraordinary neurobiology of the naked mole-rat

The African naked mole-rat (*Heterocephalus glaber*) is a eusocial rodent species that was first kept in captivity in the early 1980s by Jenny Jarvis at the University of Cape Town in South Africa. In my laboratory we have been working with our own naked mole-rat colonies since 2003. Naked mole-rats have many neurobiological traits that make them unique. The first of these traits was investigated by Thomas Park with my lab where we showed that the somatosensory system shows some really unique features, for example mole-rats have reduced numbers of nociceptors and do not react to painful (algogenic) substances like capsaicin and acid¹⁻³. However, naked mole-rats show many “gain of function” traits such as an extraordinary resistance to hypoxic stress⁴, ability to communicate with a rich vocal repertoire⁵. In my lecture I will elaborate on these traits and also introduce new data on the naked mole-rats ability to navigate without vision. Finally, the mechanism by which eusociality arises in this species is unknown. Naked mole-rat colonies have just one breeding female, the queen and all other animals are reproductively suppressed in her presence. I will present data outlining a novel chemical-based mechanism that enables Queen dominance and eusocial living⁶.

1. Park, T. J. et al. *PLoS Biol* (2008); 2. Smith, E. S. J. et al. *Science* (2011); 3. Eigenbrod, O. et al. *Science* (2019); 4. Park, T. J. et al. *Science* (2017); 5. Barker, A. J. et al. *Science* (2021); 6. Khallaf, M. A. et al. *Nature* (2026)

Technology Keywords

Omics including proteomics and metabolomics, Genome sequencing, neurophysiology, olfaction, navigation, mitochondrial biology, somatosensory, hypoxia resistance, non-model organisms, mouse genetics

Host: Anders Nykjær, Professor at Department of Biomedicine.

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