

Naked mole-rats: behavioural phenotyping and comparison with C57BL/6 mice

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Abstract:

Naked mole-rats (NMR) live underground in large eusocial colonies in East Africa. They are extremely long-lived, some individuals having a lifespan of over 30 years. This has attracted research into longevity and possibly neurodegenerative disorders. However, very little is known about their basic behaviour, particularly in tests commonly used to characterise the behaviour of the laboratory rat and mouse, for which there is an enormous database. Recently the authors carried out comprehensive behavioural phenotyping on NMRs, comparing them on most tasks directly with C57BL/6 mice, the strain for which there is the largest behavioural database. The NMR colony had been obtained from the wild originally, but housed in an animal facility for about two years. Large inter-species differences in behaviour were seen between the mice and the NMRs. The latter had generally poor sensorimotor function, including cutaneous sensation, strength and even grasp reflexes. They were often reluctant to enter or head-dip into small holes that mice readily entered. Their vision (generally considered to be very poor) was sufficient to distinguish the two zones of a light–dark box. Although, as expected, the NMRs were capable of burrowing and digging, when individually housed they did not shred cotton material to make nests. Shredding was seen in a colony cage containing a queen, but no nests were made there even when a nesting box was provided. In cognitive testing, although, unlike mice and rats, they did not spontaneously alternate in a T-maze, they learnt rewarded alternation and a cued position task well. This study demonstrates how behaviour uniquely reflects the natural environment in which these unusual animals have evolved and live, and provides baseline data for future work.