

Scientists sequence DNA of cancer-resistant rodent

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Scientists at the University of Liverpool, in partnership with The Genome Analysis Centre, Norwich, have generated the first whole-genome sequencing data of the naked mole-rat, a rodent that is resistant to cancer and lives for more than 30 years.

The [naked mole-rat](#) is native to the deserts of East Africa and has unique physical traits that allow it to survive in [harsh environments](#) for many years. It has a lack of [pain sensation](#) in its skin and has a low metabolic rate that allows it to live underground with limited [oxygen supply](#).

For the first time, scientists have sequenced the genome of the naked mole-rat to understand its longevity and resistance to diseases of ageing. Researchers will use the genomic information to study the mechanisms thought to protect against the causes of ageing, such as [DNA repair](#) and genes associated with these processes.

To date, cancer has not been detected in the naked mole-rat. Recent studies have suggested that its cells possess anti-tumour capabilities that are not present in other rodents or in humans. Researchers at Liverpool are analysing the [genomic data](#) and making it available to researchers in health sciences, providing information that could be relevant to studies in human ageing and cancer.

Dr Joao Pedro Magalhaes, from the University of Liverpool's Institute of [Integrative Biology](#), said: "The naked mole-rat has fascinated scientists for many years, but it wasn't until a few years ago that we discovered

that it could live for such a long period of time. It is not much bigger than a mouse, which normally lives up to four years, and yet this particular underground rodent lives for three decades in good health. It is an interesting example of how much we still have to learn about the mechanisms of ageing.

"We aim to use the naked mole-rat genome to understand the level of resistance it has to disease, particularly cancer, as this might give us more clues as to why some animals and humans are more prone to disease than others. With this work, we want to establish the naked mole-rat as the first model of resistance to chronic diseases of ageing."

Dr Mario Caccamo, Head of Bioinformatics at TGAC, said: "We used the latest sequencing technologies for the naked mole-rat project. Due to the latest sequencing technology advances, we generated enough sequence to be able to obtain a first draft of the genome reference, in only a few days. This is a great achievement considering that this is a mammalian species with typically complex and repetitive genome".

The work follows the launch of an online database detailing the life history of more than 4,000 animal species. The online resource, which is the most extensive and complete record of animal longevity, details the maximum and average lifespan of an animal, its weight, age of sexual maturity, litter size and other life history traits. It can be used to examine why different species age at different rates in order to further understanding of the mechanisms of ageing.

Provided by University of Liverpool

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