

**The reproductive biology of the solitary Cape mole-
rat, *Georychus capensis* and the social Natal mole-rat,
Cryptomys hottentotus natalensis (Rodentia:
Bathyergidae).**

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ABSTRACT

The seasonality of wild caught Cape mole-rats was investigated, focusing on endocrine, neuroendocrine and neuroanatomical parameters. The Cape mole-rat reproduces only during the winter rainfall period of the western Cape Province. Interestingly, the gonadal steroid hormones do not show any significant seasonal patterns in either males or females. In addition, the pituitary does not exhibit a reduced sensitivity to GnRH stimulation during the non-breeding season in either sex. Moreover, in the brain the distribution, number and size of GnRH perikarya do not differ with respect to season. Therefore, although only producing young during a specific period of the year, the Cape mole-rat does not appear to be physiologically repressed from reproducing throughout the year. The results of this study imply that the Cape mole-rat is an opportunistic breeder that is reproductively quiescent during the dry season as a consequence of ecological factors such as lack of favourable burrowing conditions and that when opportunities avail themselves following aseasonal rainfall, reproduction may occur.

The seasonality and socially induced infertility of the Natal mole-rat was examined via endocrine, neuroendocrine and neuroanatomical investigations. In contrast with the phylogenetically closely related common mole-rat and highveld mole-rat, the Natal mole-rat does not appear to breed seasonally. Post-mortem examination of animals collected revealed pregnant reproductive females throughout the year. A similar scenario is reflected in gonadal steroid concentrations, with no major seasonal differences observed in either males or females. Likewise, pituitary sensitivity to GnRH does not change over season in males or females, and all neuroanatomical parameters investigated remained stable over season in both males and females. Natal mole-rats captured for this study occur in an area with a high annual rainfall, (almost

double that of the common mole-rat habitat and one and a half times that of the highveld mole-rat) and the relatively higher rainfall and hence soil moisture content may provide the Natal mole-rat with increased foraging time as a result of increased periods over which the soil is optimal for burrowing.

Socially induced infertility in the Natal mole-rat appears to be enforced behaviourally as a result of active incest avoidance. The circulating testosterone concentrations were not significantly different in reproductive and non-reproductive males, and likewise oestrogen concentrations did not differ between reproductive and non-reproductive females. Progesterone concentrations were very low in subordinate females, but markedly higher in reproductive females. This is not surprising since the Natal mole-rat is an induced ovulator, thus coitus is required to induce the LH surge that stimulates ovulation. The sensitivity of the pituitary to a GnRH challenge did not differ between reproductive and non-reproductive animals from either sex. No neuroanatomical differences were observed between reproductive and non-reproductive animals of either sex, however, non-reproductive males and females had significantly higher amounts of GnRH in the median eminence, implying that GnRH is synthesized and transported to the median eminence but not released in the portal system to the anterior pituitary. These findings suggest that non-reproductive animals of both sexes are not sterile, but merely sexually quiescent.

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THE UNEXAMINED LIFE IS NOT WORTH LIVING - SOCRATES

GLOSSARY

AFDH	Aridity food distribution hypothesis
CNS	Central nervous system
ER α	Estrogen receptor- α
ER β	Estrogen receptor- β
FSH	Follicle stimulating hormone
GnRH	Gonadotropin releasing hormone
HPG	Hypothalamo-pituitary-gonadal
LH	Luteinising hormone
MBH	Mediobasal hypothalamus
ME	Median eminence
POA	Preoptic area

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