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Neurogenesis in the brains of subadult and adult South African ground squirrels (Xerus inauris)

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ABSTRACT

Neurogenesis is the ability of the brain to generate new neurons. Neurogenic sites and rates of neuronal proliferation were investigated in the brains of subadult and adult South African ground squirrels. Seven female ground squirrels were trapped; euthanised and their ages determined using body masses and paired dry lens masses. Their brains were perfusion fixed with 4% paraformaldehyde before sectioning at 50 µm in a sagittal plane from which every fifth section was stained with cresyl violet to determine the architecture of the brain. Immunolocalisation of Ki-67 for neuronal cell proliferation and doublecortin (DCX) for immature neurons was also carried out on adjacent sections to those stained for cresyl violet. Ki-67 immunopositive neurons were counted in the dentate gyrus of the hippocampus to determine the changes in the rate of cell proliferation with age. Proliferating and immature neurons, DCX immunopositive, were observed in the subventricular zone (SVZ) of the lateral ventricles, the subgranular zone (SGZ) of the dentate gyrus, the rostral migratory stream (RMS), olfactory bulb, piriform cortex and neocortex of both age groups. Adult squirrel brains were heavier than the subadult brains, but showed significantly lower numbers of proliferating neurons in the dentate gyrus when compared to subadult brains.