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DIFFERENCES IN Ca²⁺ CURRENTS IN ACTIVE AND INACTIVE PITUITARY MELANOTROPES

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The amphibian *Xenopus laevis* is used to study neuro-endocrine cell-activation processes. The animal adapts its skin colour to the background light condition, a process in which the pituitary melanotrope cells are involved. On a black background, the melanotropes become activated and secrete α -MSH; adapting to a white background will inactivate the melanotropes and α -MSH secretion is inhibited. The result of this activation or inactivation is a change in cell size: active cells have an extended biosynthetic apparatus and are approximately 3 times larger than inactive cells. It is known that active melanotropes *in vitro* display spontaneous Ca²⁺ oscillations, with a characteristic stepping pattern in the rising phase due to bursts of Ca²⁺-driven action potentials. Inactive cells display Ca²⁺ oscillations, but with a different stepping pattern. We investigated kinetics of Ca²⁺ currents of active and inactive melanotropes. When the melanotrope changes its activity state, different classes of voltage-activated Ca²⁺ channels appear on the cell membrane: active cells have a pronounced N-type Ca²⁺ current that is absent in inactive cells. Moreover, the kinetics of the individual currents changes with the activity change. We postulate that the differences in the Ca²⁺ currents account for the differences in Ca²⁺ oscillations observed.