

MODELING CURRENTS ABOUT PANOISTIC INSECT OOCYTES. J. G. Kunkel and E. Bowdan. Zoology Department, University of Massachusetts, Amherst MA 01003.

Vitellogenic oocytes from the cockroach Blattella germanica examined by means of a vibrating probe (Jaffe and Nucitelli, 1974) exhibit currents which are stable for hours. In the mid-sagittal plane ventral currents are inward and narrowly focused whereas dorsal currents are outward and broadly focused (Kunkel, 1986). The sources of these currents can be modelled by measuring the decay of potential, E , with distance normal to the oocyte surface at a position where current vectors are at a maximum, and fitting the values to the equation:

$$E = 2 \pi s (1 - (k / \sqrt{k^2 + a^2})),$$

for a disc shaped source of radius 'a', current density 's' and measured at a distance 'k' from the center of the disc. The model was fit to data from known point or disc sources and known current. Now this approach can be used to characterize both current density and shape of current sources at particular regions of the oocyte surface. The model is also being used to test whether development or experimental treatments influence the location or intensity of channel function.

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