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Morphogenesis of *Drosophila melanogaster* mechanoreceptors: system regulation

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The drosophila mechanoreceptors, residing on the head and body of imago according to a strictly ordered pattern, are the result of determined conversion of the ectodermal cells of imaginal discs into progenitor neural cells. The morphogenesis of mechanoreceptors comprises three successive stages: (1) separation of the proneural clusters out of the ectodermal cell population; (2) separation of a single sensory organ precursor (SOP) cell in every proneural cluster; and (3) its asymmetric division with further specialization of the daughter cells into the components of definitive mechanoreceptor. The listed events of the morphogenesis of both an individual mechanoreceptor and the overall bristle pattern are controlled by a hierarchically organized molecular genetic system. This system limits the number of neurally predetermined cells, first to several tens of cells in the proneural clusters and then to a single SOP cell within a cluster. Our reconstruction of the system suggests that its elements group into three modules that correspond to the stages of mechanoreceptor morphogenesis – the gene networks named "Neurogenesis:prepattern", "Neurogenesis:determination", and "Neurogenesis: asymmetric division". These gene networks form a hierarchically organized molecular-genetic system that ensures the morphogenesis of an individual mechanoreceptor and the bristle pattern as a whole. The connecting link of the networks is the *AS-C* proneural genes complex and ASC proteins. The activity of the complex acquires a special role at the stage of separation of SOP cells. This stage is controlled by the "Neurogenesis:determination" gene network and its operation is coordinated by the central regulatory circuit (CRC).
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