

## 219. Modulation of *C. elegans* Egg-laying Behavior by the Environment and Experience

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The egg-laying behavior of *C. elegans* is modulated by the environment and experience. When a well-fed hermaphrodite is removed from a food source, the animal stops laying eggs. We have observed that upon return to food, the frequency of egg-laying events by food-deprived animals increases over that of animals left on food, and the magnitude of this increase is proportional to the duration of time spent away from food.

We have scored egg-laying defective (Egl) mutants for defects in the modulation of egg-laying behavior. In particular, we have examined class C, D, and E Egl mutants (Trent et al., 1983), which have HSNs with apparently normal morphology, have functional sex muscles, and have a normal vulva, yet lay fewer eggs than wild-type animals. These mutants, like wild-type animals, lay eggs in response to exogenous serotonin and in response to the serotonin reuptake inhibitor imipramine, which is thought to potentiate the signaling from the serotonergic HSNs to the sex muscles. It therefore seems that these mutants release serotonin from the HSNs and possess an egg-laying neuromusculature able to respond to serotonin. One possibility is that mutations causing the egg-laying defects in serotonin- and imipramine-responsive Egl mutants act by inappropriately activating pathways that normally inhibit egg-laying behavior.

We have found that *egl-6(gf)* and *unc-31(lf)* mutants, in addition to having reduced rates of egg-laying, fail to inhibit egg-laying in the absence of food. We have also found that *egl-7(gf)* mutants fail to upregulate egg-laying after a period of food deprivation. *unc-31* has been cloned by others and encodes a CAPS-like protein implicated in the exocytosis of neuromodulators and neuropeptides stored in dense-core granules. We have cloned *egl-6* and found that it encodes a putative neuropeptide receptor related to insect receptors for FMRFamide-containing peptides. These results suggest that the regulated secretion of neuropeptides is required both to stimulate egg laying in the presence of food and to inhibit egg laying in the absence of food. We have mapped *egl-7(n575)* to a small interval on LGIII and are pursuing its cloning and characterization.