Suppressed Males' Response to Reproductive Opportunity

➤ In many species, the social environment is important in regulating reproductive physiology. Typically, dominant individuals suppress subordinates' reproductive function through social interactions, which in turn repress fertility via the conserved brain-pituitary-gonad (BPG) axis.

In the African cichlid, *Astatotilapia burtoni,* reproductive capacity is tightly coupled to social status, making it an excellent model for examining how the social environment regulates different BPG axis components. Males have two distinct, reversible phenotypes. Dominant males are brightly colored, defend a spawning territory, and display aggressive courtship behaviors. Subordinate males are cryptic in color, similar to females. They lack a spawning territory, display submissive behaviors, and do not court females.

Karen P. Maruska, Ph.D., at Stanford University, and her colleagues removed higher status males from tanks with reproductively suppressed males, allowing them to ascend in status. They then examined how quickly this opportunity caused BPG axial changes, measuring mRNA and protein levels of the pituitary gonadotropins and gauging testes-related changes.

In the pituitary, mRNA levels of luteinizing hormone (LH) and follicle-stimulating hormone (FSH) β-subunits rose rapidly just 30 minutes after suppressed males perceived a chance to ascend. Circulating levels of both hormones also rose quickly.

Another response was rapid mRNA up-regulation of the FSH receptor and several steroid receptor subtypes in the testes. Both the pituitary and the testes are stimulated extremely rapidly after perception of social opportunity. In two papers to be published in ***Endocrinology,*** * the researchers suggest the BPG axis and spermatogenesis are maintained at sub-threshold levels in anticipation of any chance to become reproductively active. ■

Photo credit: Vince Mugli

* Maruska KP, Levavi-Sivan B, Biran J, Fernald RD. Plasticity of the reproductive axis caused by social status change in an African cichlid fish: I. pituitary gonadotropins. *Endocrinology*, in press.

* Maruska KP, Fernald RD. Plasticity of the reproductive axis caused by social status change in an African cichlid fish: II. testicular gene expression and spermatogenesis. *Endocrinology*, in press.

Gene Profiling Implicates Oviducts in Ovarian Cancer Genesis

➤ A better understanding of how ovarian cancer progresses, including early markers for detection, could help reduce mortality from this often deadly disease. A group of researchers at Cornell University in Ithaca, N.Y., led by Patricia A. Johnson, Ph.D., used microarray technology to compare gene expression in ovarian tissue from normal chickens with that of tissue from chickens with this cancer. Hens, which have a high incidence of ovarian cancer, are the only known spontaneous animal model of ovarian cancer.

In their analysis of differentially expressed genes, the researchers discovered that 10 of the top 25 genes up-regulated in ovarian tumors are oviduct-related. These genes are expressed in early- and late-stage tumors, as well as in the oviduct, but not in the ovarian surface epithelium (OSE). This finding is noteworthy because, despite the fact that this cancer is a heterogeneous disease comprising a variety of cell subtypes, the OSE has traditionally been viewed as the common site of ovarian tumor origin. This study joins others in calling that view into question.

Estrogen is thought to promote ovarian tumor progression by regulating cell proliferation, motility, and invasion. The researchers found that several oviduct-related genes they identified are regulated by estrogen.

In an article to be published in ***Hormones & Cancer,*** * the researchers say their identification of up-regulated, oviduct-related genes in ovarian tumors gives evidence that at least some of these tumors do not originate in the OSE. Their finding that oviduct-related genes appear to be regulated by estrogen highlights the importance of estrogen signaling in these tumors.

The researchers propose that the secretions of a number of these genes are candidate serum biomarkers for ovarian cancer. ■

* Trevino LS, Giles JR, Wang W, et al. Gene expression profiling reveals differentially expressed genes in ovarian cancer of the hen: Evidence of oviductal origin? *Hormones & Cancer,* in press.