

NOGLSTP Bulletin - Spring 1997
(featured excerpt)

Homosexuality Among Non-Humans

ANIMAL BEHAVIOR AND SEXUAL ORIENTATION

Science News, January 4, 1997, featured a write up on "Animal Fancies -Why members of some species prefer their own sex." The article discusses Anne Perkins' (Carroll College, Helena Montana) and James A. Fitzgerald's (Oregon St. U.) new book *Sexual Orientation* which is in press from Praeger. Perkins has been studying sex drive and sexual orientation in domesticated and wild rams. Up to 16% of domesticated rams never mate with females - 6% are asexual and 10% prefer other rams even if females are available. Wild ram behavior seem to resemble their domestic counterparts. Wild and domesticate ewes, however, rarely engage in homosexual relations. Perkins and her colleagues hope to provide a blood or genetic test for these rams in the future by looking at brain chemistry between the low and high libido sheep. They have found that estradiol (a form of estrogen) is accumulated in the brain (amygdala) to a higher extent in heterosexual rams than in either ewes or homosexual rams. Aromatase activity, an enzyme which converts testosterone to estrogen, is also lower in the brain's preoptic area (which helps control sexual behavior) in homosexual rams. The *Science News* article also reports on same- sex behavior in Japanese macaques, California gulls, and zebra finches.

FRUITFLY - *FRU* GENE FOUND TO BE A REGULATOR OF MALE SEXUAL BEHAVIOR

Geneticist Jeff Hall (Brandeis Univ.) has been working on a gene called *fruitless (fru)* since the 1970's. Hall has previously shown that a mutation in this gene results in bisexual male behavior. In a December, 1996 *Cell* study, Hall and his colleagues report that more severe mutations in *fru* produce sexless males. Other researchers from Texas Southwestern have now cloned the entire *fru* gene and have found that it codes for a protein that is likely a transcription factor which can turn other genes on and off. The RNA making the *fru* protein is apparently spliced together in distinctive male and female forms by the Tra and Tra-2 proteins (involved in fruit fly sex determination). Apparently, males with severe mutations of *fru* lose the will to follow other flies, play courtship songs on their wings, or attempt copulation, whereas lesser mutations bring on bisexual behavior. The *fru* gene appears to expressed primarily in nine small clusters of nerve cells including several previously mapped as "courtship centers". This lends credence to the idea that these kinds of neural circuits can generate complex behaviors which can be programmed and regulated genetically.

MORE ON FISH SEX, TRANSGENDER, AND BRAIN CHEMISTRY

Science reported in the December 13, 1996 issue that hormonelike chemicals may be harming aquatic ecosystems on a broad scale. USGS researchers have analyzed more than 600 carp from 25 sites in the basins of 11 rivers and found that fish at polluted sites tend to have abnormal sex hormone levels when compared to fish at clean sites. At Lake Mead they also found that a protein, vitellogenin, involved in egg-laying normally found only in females was found in males at high levels. British scientists studying sewage

outfall which produced high levels of vitellogenin in males have found estrogenic compounds. These compounds were not industrial pollutants, but rather, 17 β -estradiol, estrone and ethynyl estradiol (found in birth control pills) which are excreted in women's urine and are usually modified by the kidneys to render the chemical biologically inert. The sewage treatment however, cleaves off the modification and the resulting hormones are very active in small amounts causing the high level of vitellogenin in male fish. This may be the cause of the growing numbers of hermaphroditic fish found at sites polluted by sewage effluent.

A new report in 22 December 1996 *Proceedings of the Royal Society* describes behavior in the Caribbean bluehead wrasse, *Thalassoma bifasciatum*, a coral reef fish distinguished by the ability of females to change into males when males are lacking. John Godwin, a behavioral endocrinologist at North Carolina State University, and his colleagues theorize that the fish's masculinity is governed by the brain in that the mRNA of the hormone arginine vasotocin, which is associated with sexual behavior, is increased 4 fold in the females that transform. Nontransforming females hardly make the hormone at all. Interestingly, dominant males make less AVT than the transforming females which become supermales. When a supermale leaves a spawning site the females and less dominant males attempt to make the transformation in minutes, both changing coloration temporarily until a dominance is established. These changes occur even when the gonads have been removed.

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