

# Temperament linked to onset of cancer and early death in female rats

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Female rats that are apprehensive of new experiences as infants maintain that temperament and die earlier from mammary and pituitary tumors than do their more adventuresome sisters, according to new research by a team based at the University of Chicago.

The apprehensive rats were more likely to have irregular reproductive cycles than adventuresome rats, and that disruption could account for hormonal differences linked to the development of cancer earlier, the scholars found. There was no difference in the length of time between onset of cancer and death in the two set of rats, however, the scholars found.

Because the findings have identified a difference in temperament that is associated with the onset of cancer, the findings may have implications for research on the development of cancer in humans, said Martha McClintock, the David Lee Shillinglaw Distinguished Service Professor in Psychology at the University of Chicago, and a member of the team that reports its findings in the paper “Infant Temperament Predicts Life Span in Female Rats that Develop Spontaneous Tumors” in the current issue of *Hormones and Behavior*.

Current human studies on the relationship between cancer and personality primarily focus on survival once a tumor has been identified.

“Human studies may need to consider more basic behavior traits than those already considered,” McClintock explained. By understanding the

development of basic traits, researchers will be better equipped to link the connections between personality and cancer development, the team suggests.

The links between behavior traits and cancer in rats are striking, the scholars found.

“This is the first evidence that infant temperament among rats predicts the time at which these tumors appear and the age at which the females will die,” said lead author Sonia Cavigelli, a former University researcher who is now Assistant Professor in Biobehavioral Health Pennsylvania State University. Jason Yee, a graduate student in the Department of Comparative Human Development at University of Chicago researcher, is also an author of the paper.

For their study, the researchers selected 81 female Sprague-Dawley rat pups. The breed is prone to development of breast and pituitary tumors. In order to minimize the differences in temperament that are accountable to differences between rat families, the researchers compared behavior among sisters.

The rats were tested at 20 days and 11 months of age in a cage to see how willing they were to explore a new environment, which contained non-threatening items such as toys. The researchers measured adventuresomeness by recording how far the rats wandered in the environment.

They found that by age 390 days, middle age for rats, 80 percent of the fearful rats had mammary cancer while only 38 percent of the adventuresome rats had the illness. The fearful rats had a life span of 573 days, versus 850 for the adventuresome rats. They found similar life span results for females with pituitary tumors.

The researchers also monitored ovarian cycles daily from the time the rats were 55 days old until they were 450 days old. In studying their ovarian cycles, the scholars found that during puberty, the fearful rats were twice as likely as the adventuresome rats to have irregular cycles (52 percent, versus 22 percent). The cycles stabilized after the rats reached adulthood, and then became differentiated again during middle age with the fearful rats having irregular cycles more often. The aging affects on reproduction were also accelerated in the fearful rats.

In an earlier study, University of Chicago researchers looked at the lifespan of male rats and found that the adventuresome males lived longer. Because the male rats died of a variety of diseases, they could not establish a reason for the differences. The new study links personality specifically with cancer.

Source: University of Chicago

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