Fungi can tell us about the origin of sex chromosomes

March 17 2008

Fungi do not have sexes, just so-called mating types. A new study being published today in the prestigious journal *PLoS* shows that there are great similarities between the parts of DNA that determine the sex of plants and animals and the parts of DNA that determine mating types in certain fungi. This makes fungi interesting as new model organisms in studies of the evolutionary development of sex chromosomes.

In the plant and animal kingdoms there are individuals of different sexes, that is, bearers of either many tiny sex cells (males) or a few large ones (females). In the third eukaryote kingdom (organisms with DNA gathered in the cell nucleus), the fungi kingdom, there are no sexes but rather a simpler and more primitive system of different so-called mating types. These are distinguished by different variants of a few specific genes.

There are many ways to determine sex. In humans it is done by sex chromosomes. It is thought that this sex difference arose in the plant and animal kingdom from the simpler system of mating types and that this happened several times independently of each other throughout evolution. The change is believed to have happened with the inhibition of a step in the copying process in DNA, which led to two separate chromosomes. These then developed further over a long period of time.

“In humans, sex chromosomes are believed to have developed over the last 300 million years from a common ‘proto-sex chromosome,’” says Hanna Johannesson, who directed the study.

The new study shows for the first time that even though fungi do not have sexes, there are many similarities between the parts of the genome that determine sex in plants and animals and the parts of the genome that control mating types in certain fungi. The research group specifically studied a spore sac fungus (Neurospora tetrasperma) and can show that the similarities are great, regarding both present-day structure and the way in which it arose.

“It’s hard to study the evolution of sex chromosomes, partly because so many different and important sex-specific characters are tied to them. But much of this can be avoided if we use simpler systems, like fungi, as models.”

Source: Uppsala University

Citation: Fungi can tell us about the origin of sex chromosomes (2008, March 17) retrieved 26 April 2024 from https://phys.org/news/2008-03-fungi-sex-chromosomes.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.