

What determines body size?

August 3 2006

How does a growing organism determine what its final body size will be? In the moth *Manduca sexta*, also known as the tobacco hornworm and recognisable by its distinctive blue-green caterpillar, adult body size is largely determined at the end of larval life, when the caterpillar has reached its final weight and is about to metamorphose into a moth.

In a study published today in the open access journal *Journal of Biology*, Frederik Nijhout, from Duke University in Durham, USA and colleagues built a new mathematical model that allows them to predict the size of an adult moth, on the basis of three parameters: the initial weight of the juvenile caterpillar, its growth rate and the rate at which the effect of a developmental hormone decays.

These three factors are independent of each other and each of them is determined by many genes.

The regulation of body size is therefore the result of the interactions among many genes involved in many different processes. These processes are themselves strongly influenced by external factors such as temperature and nutrition and Nijhout et al.'s study therefore sheds light on how environmental and genetic factors can interact to determine final adult body size.

Their new model is likely to have broad applicability and could explain size variations in flies and other insects as well as in moths.

Source: BioMed Central Limited

Citation: What determines body size? (2006, August 3) retrieved 27 January 2023 from <https://medicalxpress.com/news/2006-08-body-size.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.