Scientists find out why living things are the size they are -- and none other

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If you consider yourself to be too short or too tall, things are looking up, or down, depending on your vertical disposition. New research published online in The *FASEB Journal* explains how we grow, how our bodies maintain correct proportions, and offers insight into what goes wrong with growth disorders and unregulated cell growth in cancer.

"We hope that these insights into the mechanisms controlling body growth will help us understand better the reasons for the excessive growth of cancer cells and also provide new approaches to turn growth back on in normal cells in order to regenerate damaged organs," said Julian C. Lui, Ph.D., a researcher involved in the work from the Eunice Kennedy Shriver National Institute of Child Health and Human Development at the National Institutes of Health in Bethesda, Maryland.

Scientists studied which genes were active in young animals (growing rapidly) and compared them to the same genes in older animals (growing slowly). Then they identified which genes were "turned off" simultaneously in multiple organs with age. To understand the consequences of these genes being turned off, the researchers experimentally turned them off in cultured cells and observed the effects.

They found that rapid growth in early life is a response to the activation of multiple genes that stimulate growth. These same genes are progressively turned off during the maturation process, causing growth to slow. This process occurs simultaneously in multiple organs, which

explains why organs all stay in proportional size as the body grows. This process is not controlled by age. Instead, genes are turned off when organs achieve a certain level of growth.

"This important work answers the question of why any animal- including us - has a certain size," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal, "As this study shows, growth is dictated by organ development, and no one wishes their organs to be abnormally large or small."

More information: Julian C. Lui, Patricia Forcinito, Maria Chang, Weiping Chen, Kevin M. Barnes, and Jeffrey Baron. Coordinated postnatal down-regulation of multiple growth-promoting genes: evidence for a genetic program limiting organ growth. FASEB J. doi:10.1096/fj.09-152835

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