Trans-species head transplant accomplished in worms

The GLP aggregated and excerpted this blog/article to reflect the diversity of news, opinion and analysis.

Biologists at Tufts University have succeeded in inducing one species of flatworm to grow heads and brains characteristic of another species of flatworm without altering genomic sequence. The work reveals physiological circuits as a new kind of epigenetics – information existing outside of genomic sequence – that determines large-scale anatomy.

The finding that head shape is not hard-wired by the genome but can be overridden by manipulating electrical synapses in the body suggests that differences in species could be determined in part by the activity of bioelectrical networks. The discovery could help improve understanding of birth defects and regeneration by revealing a new pathway for controlling complex pattern formation. It has long been known that neural networks exploit bioelectric synapses to store and re-write information in the brain.

The findings are detailed in the cover story of the November 2015 edition of the*International Journal of Molecular Sciences*.

“It is commonly thought that the sequence and structure of chromatin – material that makes up chromosomes – determine the shape of an organism, but these results show that the function of physiological networks can override the species-specific default anatomy,” says the paper’s senior and corresponding author Michael Levin, Ph.D., who holds the Vannevar Bush Chair in biology and directs the Center for Regenerative and Developmental Biology in the School of Arts and Sciences at Tufts.

Read full, original post: Biologists Induce Flatworms to Grow Heads and Brains of Other Species