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Function Constrains Topology. CHAO TANG, University of California at San Francisco, WENZHE MA, QI OUYANG, Center for Theoretical Biology, Peking University — In the biological world, intimate relations between function and form are well established on the macroscopic and the microscopic scales. However, on the “mesoscopic” scales, to what extent the function of a system and the organization of its parts are related? In this talk, I will present a case study of the segmentation polarity gene network in *Drosophila*. The function of this network is to stabilize the segmentation pattern of gene expression during the development. We found that although there are numerous networks which can perform the function, the requirement for the function to be robust severely constrains the network’s topology. The network selected by nature is among the most robust topological classes. Furthermore, I will show that the knowledge of viable topologies can be used to help identify “missing” links in the network.

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