



Biology Seminar

By: Dr. Kimberly Cooper

University of California, San Diego | Assistant Professor, Division of Biological Sciences

<http://www.ucsdcooperlab.com/>

How and why the jerboa got its long legs



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The vertebrate skeleton is extraordinarily modular. The axial column is an array of segments grouped into cervical, thoracic, lumbar, sacral, and caudal vertebrae, and the limbs are comprised of the upper and lower limb and hand or foot. Growth of the skeleton is also modular; adult

human skeletal proportion is strikingly different from that of an infant, and one can imagine stretching the bones of the hand to give rise to the disproportionate wing of a bat. However, most protein coding mutations that affect long bone growth in mice and humans cause proportionate dwarfism, suggesting bone growth throughout the body is controlled by a common genetic 'toolkit'. Using the laboratory mouse and jerboa, a bipedal rodent with extremely disproportionately long hindlimbs, we seek to identify modular cis-regulatory elements that control gene expression in subsets of growing bones and therefore control the modular development and evolution of skeletal proportion. We are also developing mouse models to understand the mechanisms of developmental modularity and genetically encoded CRISPR/Cas9 tools to understand the interactions of multiple loci that control skeletal growth.

