

The Center for Genome Dynamics At The Jackson Laboratory



Gary Churchill, Director

Mission Statement

The physical and functional organizations of the mammalian genome are correlated outcomes of evolution. The genome contains extensive, regional domains of functionally related elements that have coalesced over evolutionary time to promote the co-inheritance and survival of compatible sets of alleles. Moreover, domains on separate chromosomes interact in a distinctly non-random manner, forming scale-free networks. In effect, the mammalian genome is a dynamic system that varies spatially in its organization and expression and temporally in its evolution and inheritance.

Our initial studies were carried out using inbred mice, which provide a remarkable evolutionary experiment in that they contain mixtures of genomes from several distinct subspecies previously separated by millions of generations. The strong conservation of gene order among all mammals suggests that we all share a common pattern of genome organization. By developing detailed maps of interactions that encompass allelic diversity, functional categories, gene expression, recombination hotspots, and phenotype associations we can evaluate the role of genome-wide organization in mammalian biology.

We believe that understanding these principles will provide new genetic approaches to understanding human health and disease at the systems level.

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