CONTROL IN BIOLOGICAL SYSTEMS

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While mathematical theory, simulation, numerical analysis, and statistical analysis of mechanical systems has been developed within the engineering curriculum for years, extension of these techniques to biological systems is relatively new. With the advent of sophisticated computing technologies, mathematical models in biology and medicine have grown to a point that there is now a reasonable process in place which marries biomedical experimentation to systems and control theory.

Biology requires homeostasis; chaos is probably a fatal state. Excitation and suppression of intercellular signalling, up- and down-regulation of signal processing elements (e.g., receptors or second messenger systems), and on/off signal pro- cessing at the genetic level all provide the exquisite controls needed to keep an organism balanced and still flexible enough to respond to hostile and variable environments. In this minitrack, we will preview four contributions, each dealing with one of these facets of biological control:

A Biomathematical Model to Predict Bone Healing - Eberhard Hofer, University. of ULM, Germany.

A Parallel Computational Model of Attention and Saccade Generation in the Human Visual System - Barnabas Takacs, George Mason University, Virginia.

A New Mathematical Model of Slow-Binding Enzyme Inhibition - Ondine Callan and David Sweeny, Roche Bioscience, Palo Alto, California

Biological Control in Tumor Growth - Seth Michelson, Roche Bioscience, Palo Alto, California.