Mathematical Biomedicine: Examples

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Mathematical biomedicine is a research area where questions that arise in medicine are addressed by mathematical methods. One can develop a mathematical model by setting up a biological network of variables that are cells, proteins, genes and other molecules, using only the variables that are needed to address the specific medical question. One then proceeds to represent the network by a dynamical system and estimate the parameters using biological data. Simulations of the model can be used to validate it, by showing agreement with experimental studies. The model can then be used to address the medical question.

The gigantic progress in the medical sciences offers a great opportunity for advances in mathematical biosciences. In this talk, I will give examples from Alzheimer disease, cancer drug resistance, overcoming severe side-effects of immune therapy, chronic wounds, autoimmune diseases, and cancer bone metastasis.

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