

Personalizing Chemotherapy based on Mathematical Modeling

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Abstract: The combination of engineering and mathematics with medical sciences already proved useful in medical diagnosis. A similar approach in treatments has great potential. The fundamental component of mathematical therapy generation is the underlying mathematical model describing the effect of the therapy on the subject that is treated. After the form of the equations is described, the model parameters specific to the individual have to be identified, which is required for personalizing the therapy. Finally, based on the mathematical model and the individual parameters, personalized therapy can be generated based on optimization and control engineering methods. The talk discusses a mathematical model that describes the effect of chemotherapy on tumor growth and is formulated using formal reaction kinetics, providing an effective tool for communication in interdisciplinary research. The challenges of parameter identification and personalization of therapy are discussed, along with several approaches to generate personalized therapies.

