1163-92-51 **Angela M. Jarrett*** (ajarrett@utexas.edu), **David A. Hormuth**, **Guillermo Lorenzo**, **Julie C. DiCarlo**, **John Virostko**, **Anna G. Sorace**, **Russell C. Rockne** and **Thomas E. Yankeelov**. *Preclinical and clinical studies of mathematical modeling for individualizing therapeutic regimens in breast cancer.*

One of the great challenges in treating cancer is the optimization of therapeutic regimens for the individual patient. Current experimental and clinical approaches are fundamentally limited to trial and error. To overcome this issue, we posit the use of a data-driven mathematical framework to design personalized optimal treatment plans. We present three mathematical models of breast cancer informed by experimental and imaging data ranging from cellular to tissue scales. First, we discuss a preclinical ODE model that was calibrated with in vitro microscopy data to quantify the synergistic potential of combined cytotoxic and targeted therapies based on the order and timing of doses. Second, we present a clinically oriented 3D PDE system constrained by patient-specific MRI data for predicting tumor response to neoadjuvant therapies and demonstrate its potential for optimizing chemotherapeutic dosing and scheduling for individual patients. Third, we discuss preliminary modeling efforts translating our understanding of breast cancer therapeutic regimens in vitro with clinical precision imaging in vivo to improve and enhance our therapeutic outcome predictions.

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