Characterizing the efficacy of anticancer drug treatment using mathematical models HOPE MURPHY, ELIZABETH SIZEMORE, ANTON NAUMOV, HANA DOBROVOLNY, Texas Christian University — In order to determine correct dosage of chemotherapy drugs, the effect of the drug must be properly quantified. There are two important values that characterize the effect of the drug: $\epsilon_{\max}$ is the maximum possible effect from a drug, and IC_{50} is the drug concentration where the effect diminishes by half. Currently, the technique used to measure these quantities gives estimates of the values that depend on the time at which the measurement is made. We use mathematical modeling to test a new method for measuring $\epsilon_{\max}$ and IC_{50} that gives estimates independent of measurement time. We fit treatment data from the literature to determine values for $\epsilon_{\max}$ and IC_{50} using mathematical models under two assumptions: that the drug reduces growth rate, or maximum number of cells. Our method produced IC_{50} estimates similar to estimates derived using current techniques. This work is intended to characterize the efficacy of anticancer drug treatments and determine the correct doses before trying those in patients to get the most effective therapeutic treatment.

Hope Murphy
Texas Christian University

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