## Mathematical Modeling of Hepatocellular Carcinoma Incorporating Immunotherapy BIOMATH 2024

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We develop a within-host mathematical model for hepatitis B virus infection that leads to hepatocellular carcinoma incorporating immunotherapy as an intervention strategy and also demonstrating drug effects in the sub-therapeutic, therapeutic and toxicity regions of concentration. The model includes the dynamics of hepatocytes, immune cells, cytokines and hepatitis B virus dynamics using a system of ordinary differential equations. Model parameters were estimated using the flexible modeling environment algorithm. Treatment was presented replicating realistic pharmacokinetics of a drug called Nivolumab as a monoclonal antibody type of immunotherapy. Results suggests that immunotherapy reduces the growth of cancer cells when the drug concentration is in a therapeutic region but complete eradication is not possible. Drug concentration above the therapeutic region reduced the cancer cells to better levels but this benefit is associated with toxicity of the drug. Drug concentration below the therapeutic region is associated with little reduction in cancer cells

## References

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