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Modeling HIV dynamics following 3BNC117 antibody infusion

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Broadly neutralizing antibodies against HIV are able to act in many different ways *in vivo*: they can block viral entry, clear plasma virions, or lead to the death of virus-expressing cells. Recently, the 3BNC117 broadly neutralizing antibody has been tested in a phase 1 clinical trial as a potential alternative treatment of HIV. We test if 3BNC117 presents with one or a combination of these antiviral effects by developing a pharmacokinetic model of 3BNC117 dynamics and estimating patient's parameters. We use this model together with a viral dynamics model to test the effects of 3BNC117. We fit the viral dynamics model to HIV RNA measurements from patients given antibody therapy and conclude that 3BNC117 elicits both neutralizing and non-neutralizing effects across most patients. We predict that the combined effects of initial CD4 T cell count, initial HIV levels, and virus production are strong indicators of patient's response to 3BNC117 as an immunotherapy. We end by modeling the effect of antibody boosting on the long-term HIV levels.