**Steps to reproduce Figure 6 of main manuscript.**

**Construct the HNSCC model from the model equations given in the filename ‘HNSCC\_model\_equation’.**

**For Figure 6(b)**

1. Use the following values value of barrier building CAF proportion (alpha)

alpha[ 0.0100 0.0200 0.0500 0.0800 0.0900 0.0950 0.1000 0.1500 0.2000 0.2500 0.3000 0.5000]

1. For each value of alpha, load the parameter set for given alpha and from the document ‘HNSCC\_parameters’. Store it in a vector P.
2. Set the initial condition (y\_0) for simulation as

Y\_0=[1089.2; 4820.3; 3302.5; 4106.2; 2576.4; 0990.7; 1340.2; 4718.3; 0; 4673.2; 2045.2; 684.8; 502.5; 797.0; 2504.0; 4912.0; 2114.7; 1753.9; 1601.0; 4659.6; 4097.4; 663.8; 3277.8; 732.9] for before anti-PD1 simulations. The initial condition for post-ICI scenario is the steady-state of the corresponding pre-ICI scenario.

1. Simulate the HNSCC model without and with anti-PD1 (dosage=1) for different parameter sets against alpha.
2. Plot pre/post-anti-PD1 total tumor cell population at steady state vs the immune accessibility index.
3. Repeat the exercise for the following values of Killer T cell cytotoxicity (P(16))

P(16)[ 50 100 300 600 900 1200 1500];

**For Figure 6(c-d)**

1. Use the following values value of barrier building CAF proportion (alpha)

alpha[ 0.0100 0.0200 0.0400 0.0500 0.1000 0.3000 0.5000]

1. For each value of alpha, load the parameter set for given alpha and from the document ‘HNSCC\_parameters’. Store it in a vector P.
2. Set the initial condition (y\_0) for simulation as

Y\_0=[1089.2; 4820.3; 3302.5; 4106.2; 2576.4; 0990.7; 1340.2; 4718.3; 0; 4673.2; 2045.2; 684.8; 502.5; 797.0; 2504.0; 4912.0; 2114.7; 1753.9; 1601.0; 4659.6; 4097.4; 663.8; 3277.8; 732.9] for before anti-PD1 simulations. The initial condition for post-ICI scenario is the steady-state of the corresponding pre-ICI scenario.

1. Simulate the HNSCC model without and with anti-PD1 (dosage=1) for different parameter sets against alpha.
2. Plot post-anti-PD1 total tumor cell population vs the LIF levels for different immune accessibility.
3. Plot the CAF population with respect to time for different immune accessibility