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name="1/(centimeter^3*minute)">
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name="cell/milliliter">
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multiplier="6.97007174768519e+18"/>
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name="molarity/cell">
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id="MWDERIVEDUNIT_1__second_molecule__micrometer___2"
name="1/(second*molecule/micrometer^2)">
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id="MWDERIVEDUNIT_1__micromolarity_nanometer_second"
name="1/(micromolarity*nanometer*second)">
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multiplier="0.0002777777777777778"/>
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name="1/(molarity*second)">
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name="1/nanometer">
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name="1/(molarity*nanometer*second)">
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name="V_C" spatialDimensions="3" size="5" units="MWBUILTINUNIT_liter"
constant="true">
        <notes>
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compartment (C) Central compartment volume</body>
        </notes>
      </compartment>
      <compartment id="mwfa3bc17c_3f2b_4900_afd9_70a9e6afc56c"
name="V_P" spatialDimensions="3" size="60" units="MWBUILTINUNIT_liter"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Peripheral
compartment (P) Peripheral compartment volume</body>
        </notes>
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      </compartment>
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name="V_T" spatialDimensions="3" size="0.001"
units="MWBUILTINPREFIX_micro_MWBUILTINUNIT_liter" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Tumor compartment
(T) Cancer-free Tumour compartment volume</body>
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name="V_LN" spatialDimensions="3" size="1374.44678594553"
units="MWDERIVEDUNIT_millimeter___3" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Lymph node (LN)
compartment volume Lymph Node compartment volume</body>
        </notes>
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name="V_e" spatialDimensions="3" size="4e-16" units="litre"
constant="true">
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comparment Endosomal Volume</body>
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name="A_e" spatialDimensions="2" size="15"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
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surface comparment Endosomal Surface Area</body>
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name="A_s" spatialDimensions="2" size="900"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
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name="syn_T1_C1" spatialDimensions="2" size="37.8"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
        <notes>
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        </notes>
      </compartment>
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units="MWDERIVEDUNIT_micrometer___2" constant="true">
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name="TCEsyn_T1_C1" spatialDimensions="2" size="75.6"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
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comparment between T1 and C1 (Janssen 2007)</body>
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name="TCEsyn_T0_C1" spatialDimensions="2" size="75.6"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
        <notes>
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        </notes>
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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cells in the central compartment</body>
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      <species id="mw2f881f74_14f8_45be_ac4a_bb4e1e3ede99" name="T0"
compartment="mw8cfbefd5_8b10_411d_9d84_300692817ff2" initialAmount="0"
substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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cells in the central compartment</body>
        </notes>
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name="atezolizumab"
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initialConcentration="0" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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initialConcentration="0" substanceUnits="mole"
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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boundaryCondition="false" constant="false">
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constant="false">
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cibis in peripheral compartment</body>
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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in the tumour compartment</body>
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initialAmount="0" substanceUnits="MWUSERUNIT_cell"
hasOnlySubstanceUnits="true" boundaryCondition="false"
constant="false">
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cells</body>
        </notes>
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      <species id="mw2aafd721_12db_4909_b572_82abf04c578d" name="C1"
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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cells in tumour</body>
        </notes>
      </species>
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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        </notes>
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      <species id="mwa5fd10b1_5a9e_41d2_a246_260c6fc1dbf5" name="T0"
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boundaryCondition="false" constant="false">
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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antigen presenting cells in the tumour</body>
        </notes>
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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antigen presenting cells in the tumour</body>
        </notes>
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initialConcentration="0" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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maturation cytokines in the tumour</body>
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          </SimBiology>
        </annotation>
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hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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            <Unit Numerator="mole" Denominator="liter"/>
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
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        </notes>
      </species>
      <species id="mwf317e8cb_4357_45f5_b8c5_961986d1cb12" name="aT1"
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of
activated T1 cells in the lymph node</body>
        </notes>
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      <species id="mw975fec59_e535_46d1_98b4_82ad5cb2c176" name="T1"
compartment="mwb4901521_e24a_4f39_acff_107e3522faa9" initialAmount="0"
substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of T1
cells in the lymph node compartment</body>
        </notes>
      </species>
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      <species id="mw479632c6_8f17_47aa_b429_216752f11c51" name="IL2"
compartment="mwb4901521_e24a_4f39_acff_107e3522faa9"
initialConcentration="1e-24" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
IL2 in the lymph node compartment</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="mole" Denominator="liter"/>
          </SimBiology>
        </annotation>
      </species>
      <species id="mw8607693c_2da9_4dd0_9167_ab2793ec2f3a" name="nT0"
compartment="mwb4901521_e24a_4f39_acff_107e3522faa9" initialAmount="0"
substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of naive
T0 cells in the lymph node</body>
        </notes>
      </species>
      <species id="mw26ca4282_20b3_4f9b_8ce4_58824cec85fc" name="aT0"
compartment="mwb4901521_e24a_4f39_acff_107e3522faa9" initialAmount="0"
substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
        <notes>
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activated T0 cells in the lymph node</body>
        </notes>
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      <species id="mwd3fc3e45_040b_42b7_b9c1_0f60a875237c" name="T0"
compartment="mwb4901521_e24a_4f39_acff_107e3522faa9" initialAmount="0"
substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of T0
cells in the lymph node compartment</body>
        </notes>
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      <species id="mw0f3e4986_c5c0_4e85_8f07_03bf0ed91f2b" name="APC"
compartment="mwb4901521_e24a_4f39_acff_107e3522faa9" initialAmount="0"
substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of naive
antigen presenting cells in the lymph node</body>
        </notes>
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      <species id="mw507424c1_49c9_4a06_8493_4e61e9f65e52" name="mAPC"
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substanceUnits="MWUSERUNIT_cell" hasOnlySubstanceUnits="true"
boundaryCondition="false" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of mature
antigen presenting cells in the lymph node</body>
        </notes>
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      <species id="mwfd9cdc6d_ef96_441b_9ef2_89e3ce96bf71" name="P0"
compartment="mwb4901521_e24a_4f39_acff_107e3522faa9"
initialConcentration="1e-24" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
free antigen (P0) in the LN compartment</body>
        </notes>
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initialConcentration="1e-24" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
free antigen (P1) in the LN compartment</body>
        </notes>
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name="atezolizumab"
compartment="mwb4901521_e24a_4f39_acff_107e3522faa9"
initialConcentration="0" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
atezolizumab in lymph node compartment</body>
        </notes>
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            <Unit Numerator="mole" Denominator="liter"/>
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          </SimBiology>
        </annotation>
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      <species id="mw98d3c290_6a02_4140_b562_ca1a3cb39c99"
name="cibis" compartment="mwb4901521_e24a_4f39_acff_107e3522faa9"
initialConcentration="0" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
cibis in lymph node compartment</body>
        </notes>
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compartment="mwf681189d_0fc1_4538_a15f_815606c049a6"
initialConcentration="1e-18" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
antigen P0 in the APC endosomes</body>
        </notes>
        <annotation>
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            <Unit Numerator="mole" Denominator="liter"/>
          </SimBiology>
        </annotation>
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compartment="mwf681189d_0fc1_4538_a15f_815606c049a6"
initialConcentration="1e-18" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
epitope P0 in the APC endosomes</body>
        </notes>
        <annotation>
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        </annotation>
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initialConcentration="1e-18" substanceUnits="mole"
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hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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antigen P1 in the APC endosomes</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="mole" Denominator="liter"/>
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initialConcentration="1e-18" substanceUnits="mole"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
epitope P1 in the APC endosomes</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="mole" Denominator="liter"/>
          </SimBiology>
        </annotation>
      </species>
      <species id="mw942caa29_eb06_4495_9672_6335f8011e75" name="M1"
compartment="mwc9c2eea0_d90b_4a89_901f_6f5f9de09f35"
initialConcentration="2185.79234972678"
substanceUnits="MWBUILTINUNIT_molecule" hasOnlySubstanceUnits="false"
boundaryCondition="false" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Amount of MHC per
area on the cell surface</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
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compartment="mwc9c2eea0_d90b_4a89_901f_6f5f9de09f35"
initialConcentration="1e-06" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Antigen-MHC
complex</body>
        </notes>
        <annotation>
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          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
      </species>
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compartment="mwc9c2eea0_d90b_4a89_901f_6f5f9de09f35"
initialConcentration="1e-06" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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complex</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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        </annotation>
      </species>
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compartment="mwa56ed94a_0a50_45aa_b713_70c4c2665228"
initialConcentration="1e-06" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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          </SimBiology>
        </annotation>
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compartment="mwa56ed94a_0a50_45aa_b713_70c4c2665228"
initialConcentration="1e-06" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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complex</body>
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compartment="mwa56ed94a_0a50_45aa_b713_70c4c2665228"
initialConcentration="1e-06" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
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complex</body>
        </notes>
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name="PD1_PDL1" compartment="mw9a8fe99b_34f3_48b8_9432_7de459c65052"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
PD1-PDL1 complex</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
      </species>
      <species id="mw80d2fce8_7bcd_47a0_8857_df9df2037ea4"
name="PD1_PDL2" compartment="mw9a8fe99b_34f3_48b8_9432_7de459c65052"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PD1-PDL2 complex</body>
        </notes>
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          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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        </annotation>
      </species>
      <species id="mw895d97df_cb0d_44c8_9785_11b1d6282d01" name="PD1"
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PD1 in synapse</body>
        </notes>
        <annotation>
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        </annotation>
      </species>
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PDL1 in synapse</body>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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      <species id="mw46e10e70_4f89_41d2_98d3_04c055feaf2d" name="PDL2"
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PDL2 in synapse</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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        </annotation>
      </species>
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name="PD1_aPD1" compartment="mw9a8fe99b_34f3_48b8_9432_7de459c65052"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
PD1-nivolumab complex</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
      </species>
      <species id="mw0e147b6c_09cf_484f_9819_87470663749d"
name="PD1_aPD1_PD1"
compartment="mw9a8fe99b_34f3_48b8_9432_7de459c65052"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
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hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PD1-nivolumab-PD1 complex</body>
        </notes>
        <annotation>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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        </annotation>
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name="PDL1_aPDL1" compartment="mw9a8fe99b_34f3_48b8_9432_7de459c65052"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
PDL1-durvalumab complex</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
      </species>
      <species id="mwfc64755e_b1aa_411d_a1f7_8bad9fe66a96"
name="PDL1_aPDL1_PDL1"
compartment="mw9a8fe99b_34f3_48b8_9432_7de459c65052"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
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PDL1-durvalumab-PDL1 complex</body>
        </notes>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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name="PD1_PDL1" compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
PD1-PDL1 complex</body>
        </notes>
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        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
      </species>
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name="PD1_PDL2" compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PD1-PDL2 complex</body>
        </notes>
        <annotation>
          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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        </annotation>
      </species>
      <species id="mw4d33db81_6628_421d_8c61_5ef4a4a647ad" name="PD1"
compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
PD1 in synapse</body>
        </notes>
        <annotation>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
      </species>
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compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PDL1 in synapse</body>
        </notes>
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          <SimBiology xmlns="http://www.mathworks.com">
            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
      </species>
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compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PDL2 in synapse</body>
        </notes>
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name="PD1_aPD1" compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
PD1-nivolumab complex</body>
        </notes>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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        </annotation>
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name="PD1_aPD1_PD1"
compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
PD1-nivolumab-PD1 complex</body>
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name="PDL1_aPDL1" compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
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          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
PDL1-durvalumab complex</body>
        </notes>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
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name="PDL1_aPDL1_PDL1"
compartment="mwaad74090_4b37_47eb_b845_2f28d96c0e82"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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PDL1-durvalumab-PDL1 complex</body>
        </notes>
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name="CEA_cibis_CEA_CD3"
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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CEA-cibis-CEA_CD3 complex</body>
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
CEA-cibis-CEA complex</body>
        </notes>
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          <SimBiology xmlns="http://www.mathworks.com">
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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CEA-cibis-CD3 complex</body>
        </notes>
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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CD3-cibis complex</body>
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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CEA-cibis complex</body>
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
CEA in synapse</body>
        </notes>
        <annotation>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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compartment="mw0305c0ed_ac99_469b_8d32_3127d022edf9"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
CD3 in synapse</body>
        </notes>
        <annotation>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
          </SimBiology>
        </annotation>
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name="CEA_cibis_CEA_CD3"
compartment="mwfc416eeb_b169_4568_9e44_cab5996f5ee2"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
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CEA-cibis-CEA_CD3 complex</body>
        </notes>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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name="CEA_cibis_CEA"
compartment="mwfc416eeb_b169_4568_9e44_cab5996f5ee2"
initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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CEA-cibis-CEA complex</body>
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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CEA-cibis-CD3 complex</body>
        </notes>
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          <SimBiology xmlns="http://www.mathworks.com">
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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CD3-cibis complex</body>
        </notes>
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
CEA-cibis complex</body>
        </notes>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
CEA in synapse</body>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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        </annotation>
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      <species id="mw16bdbdfb_62b5_45b6_987d_fae9a564f93e" name="CD3"
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initialConcentration="0" substanceUnits="MWBUILTINUNIT_molecule"
hasOnlySubstanceUnits="false" boundaryCondition="false"
constant="false">
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          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
CD3 in synapse</body>
        </notes>
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            <Unit Numerator="molecule" Denominator="micrometer^2"/>
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name="k_cell_clear" value="0.1" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of dead cell
clearance from tumour compartment Rate of clearence of dead cancer
cells</body>
        </notes>
      </parameter>
      <parameter id="mw5c6752bd_6029_486c_b439_45f7ca1b3111"
name="cell" value="1" units="MWUSERUNIT_cell" constant="true"/>
      <parameter id="mwbdd9014c_961d_4199_a03d_419699e06107"
name="day" value="1" units="MWBUILTINUNIT_day" constant="true"/>
      <parameter id="mwe3f6b99e_81aa_4e82_b8e1_a3ae820e4aa5"
name="vol_cell" value="2527.31128244685"
units="MWDERIVEDUNIT_micrometer___3__cell" constant="true">
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        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Average volume of
cancer cell Volume of a single cancer cell</body>
        </notes>
      </parameter>
      <parameter id="mw2eb1dcb4_cb03_4de1_ae0e_ba7d9c54f167"
name="vol_Tcell" value="176"
units="MWDERIVEDUNIT_micrometer___3__cell" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Average volume of
T cells Volume of a single T cell</body>
        </notes>
      </parameter>
      <parameter id="mwa01f7b00_e009_4ea1_a621_7e3a90ebf97a"
name="V_Tmin" value="0.001"
units="MWBUILTINPREFIX_micro_MWBUILTINUNIT_liter" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Cancer-Free
Tumour compartment volumeCancer-free Tumour compartment volume</body>
        </notes>
      </parameter>
      <parameter id="mw1e7cee5a_6fd5_4375_9ff9_96509d2f0af7"
name="C_total" value="0" units="MWUSERUNIT_cell" constant="false"/>
      <parameter id="mw0782fa64_c077_445f_9358_fbb0e8cc0a7e"
name="T_total" value="0" units="MWUSERUNIT_cell" constant="false"/>
      <parameter id="mw5e8348dc_3969_4032_bf93_6f838d1e9121"
name="T_total_LN" value="0" units="MWUSERUNIT_cell" constant="false"/>
      <parameter id="mwcc034ae1_f0c4_4edf_b337_d36183873773"
name="R_Tcell" value="1" units="MWDERIVEDUNIT_cell__day"
constant="false"/>
      <parameter id="mwebb3353d_0237_474f_8045_a75656c37891"
name="Tregs_" value="0" units="MWUSERUNIT_cell" constant="false"/>
      <parameter id="mw38ea07af_24e1_43bd_b07b_ec2a1371f4d4"
name="H_APC" value="0.5" units="dimensionless" constant="false"/>
      <parameter id="mw154bd5ac_230a_4d71_be6f_5ab6ed5abe16"
name="H_mAPC" value="1" units="dimensionless" constant="false"/>
      <parameter id="mwffa3495a_26ce_48b7_bee5_50af90fed75f"
name="H_PD1_C1" value="1" units="dimensionless" constant="false"/>
      <parameter id="mw5fab6ae8_fb41_4c3a_818e_ce71aaaac5d9"
name="H_PD1_APC" value="1" units="dimensionless" constant="false"/>
      <parameter id="mw487f1739_cea4_4ce1_a649_f1ee4097f5aa"
name="H_CEA_C1_T1" value="0" units="dimensionless" constant="false"/>
      <parameter id="mwe4443c20_248a_4264_a3dc_ddda03ad2c04"
name="H_CEA_C1_T0" value="0" units="dimensionless" constant="false"/>
      <parameter id="mw79e9ce52_7313_4287_ad50_9c9cf1274898"
name="k_C1_growth" value="0.005" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Cancer cell
growth rate Cancer cell growth rate</body>
        </notes>
      </parameter>
```

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      <parameter id="mwedddfe92_4421_4f29_8a47_d1b8a6db2304"
name="C_max" value="418879020478639" units="MWUSERUNIT_cell"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Cancer cell
capacity Cancer cell capacity</body>
        </notes>
      </parameter>
      <parameter id="mw92cb2786_b098_48c2_a8dd_18d26e65a0d6"
name="k_C1_death" value="1e-05" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Cancer cell death
rate from innate immune cells Cancer cell death rate</body>
        </notes>
      </parameter>
      <parameter id="mw47b25c11_9847_4587_8215_ed3f3ef66f20"
name="k_C1_therapy" value="0" units="MWDERIVEDUNIT_1__day"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of C1
killing by therapy</body>
        </notes>
      </parameter>
      <parameter id="mwfbc673b2_613b_40e9_80e2_a3d56e48ab56"
name="initial_tumour_diameter" value="0.1"
units="MWBUILTINPREFIX_centi_MWBUILTINUNIT_meter" constant="true"/>
      <parameter id="mw98c1f539_f992_42f9_b09c_d98aa315dd63"
name="n_T1_clones" value="80" units="dimensionless" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of T cell
clones (estimated)</body>
        </notes>
      </parameter>
      <parameter id="mw6bb44ac8_1770_41f1_ab1d_0d1a00772b9a"
name="Q_T1_in" value="218.858981455742"
units="MWDERIVEDUNIT_cell__day" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of naive T
cell transport into the lLN calculated based on naive T cell entry
rate estimated based on 12-hr dwell time of T cells in the LN (Germian
2012) and assuming 600 LN in the body (Ferrer 1998), T cell density in
the blood (Autissier 2010) and T cell diversity (Robins 2009)</body>
        </notes>
      </parameter>
      <parameter id="mwe7749870_048b_4ac0_844b_ef279fe1561f"
name="Q_T1_out" value="1.13" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of naive T
cell transport out of the LN (Germain 2012)</body>
        </notes>
```

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      </parameter>
      <parameter id="mwbebade6f_8329_4441_8a17_da5f70d2cb42"
name="k_T1_act" value="20" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">T1 activation
rate</body>
        </notes>
      </parameter>
      <parameter id="mw2c17a42d_4cb1_43ab_90b6_6d1dbadc56de"
name="k_T1_pro" value="1" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">T1 proliferation
rate</body>
        </notes>
      </parameter>
      <parameter id="mw9bcacce9_c511_4740_973e_f50fb674fd80"
name="k_T1_death" value="0.01" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">T1 death
rate</body>
        </notes>
      </parameter>
      <parameter id="mw73b6655b_bc81_420b_bef6_4a23b4c57207"
name="q_T1_P_in" value="0.201" units="MWDERIVEDUNIT_1__minute"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of T1
tranport into the peripheral compartment</body>
        </notes>
      </parameter>
      <parameter id="mwdc728989_1d46_4fe0_bc40_67ec5556584c"
name="q_T1_P_out" value="1" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
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tranport out of the peripheral compartment</body>
        </notes>
      </parameter>
      <parameter id="mw2fc20c96_b91f_40c9_b552_5aae17078d51"
name="q_T1_T_in" value="3.35e-06"
units="MWDERIVEDUNIT_1__centimeter___3_minute" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of T1
tranport into the tumour compartment</body>
        </notes>
      </parameter>
      <parameter id="mwecabb6dc_07d2_452b_b559_7a5a9c36e194"
name="q_T1_LN_out" value="24" units="MWDERIVEDUNIT_1__day"
constant="true">
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        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of T1
tranport out of the LN compartment</body>
        </notes>
      </parameter>
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name="k_C_BTcell" value="1" units="MWDERIVEDUNIT_1__day"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of cancer
cell death by T cells (assumed)</body>
        </notes>
      </parameter>
      <parameter id="mw5c913adf_4222_49ab_bf00_936c2cac430d"
name="k_Treg_TCE" value="2" units="MWDERIVEDUNIT_1__day"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of cancer
cell death by T cells (guess)</body>
        </notes>
      </parameter>
      <parameter id="mwcd6f2806_c6ac_486c_b680_913fb6fc077b"
name="k_C_BTreg" value="1" units="MWDERIVEDUNIT_1__day"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of cancer
cell death by Tregs (assumed)</body>
        </notes>
      </parameter>
      <parameter id="mw8f2a737b_6631_4e62_834c_0e2ad84cb12a"
name="k_IL2_deg" value="0.2" units="MWDERIVEDUNIT_1__minute"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of IL2
degradation (Lotze 1985)</body>
        </notes>
      </parameter>
      <parameter id="mw4db95ce7_153f_4c52_b346_bb639b69966e"
name="k_IL2_cons" value="6e-06"
units="MWDERIVEDUNIT_nanomole__cell__hour" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of IL2
consumption by T cells (Lotze 1985)</body>
        </notes>
      </parameter>
      <parameter id="mwa77be588_4158_477f_b088_450a8a14647d"
name="k_IL2_sec" value="3e-05"
units="MWDERIVEDUNIT_nanomole__cell__hour" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of IL2
secretion from T cells (Han 2012, Thurley 2015, Liu 2001)</body>
        </notes>
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      </parameter>
      <parameter id="mwc266a39c_cd93_4ee9_a52b_c032c6a118f6"
name="IL2_50" value="0.32"
units="MWBUILTINPREFIX_nano_MWBUILTINUNIT_molarity" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">T cell activation
half-maximal IL2 concentration (Marchingo 2014)</body>
        </notes>
      </parameter>
      <parameter id="mw470a2f94_f39a_45d1_bd57_2f506e768b0b"
name="IL2_50_Treg" value="0.0032"
units="MWBUILTINPREFIX_nano_MWBUILTINUNIT_molarity" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Treg activation
half-maximal IL2 concentration (Wang Smith 1987)</body>
        </notes>
      </parameter>
      <parameter id="mwb3dbb26b_dc9b_4dae_b56b_52700f65e4e5" name="N0"
value="5" units="dimensionless" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">numer of
activated T cell generation with no IL2 (Marchingo 2014)</body>
        </notes>
      </parameter>
      <parameter id="mwcc68ed97_1448_4aa0_bf3e_a3ce54ccaca8"
name="N_IL2" value="11" units="dimensionless" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">maximum number of
activated T cell generations due to IL2 (Marchingo 2014)</body>
        </notes>
      </parameter>
      <parameter id="mw7dd2d096_125c_43c8_8c6d_462231267034"
name="k_T1" value="0.1" units="MWDERIVEDUNIT_1__day" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of T cell
exhaustion by cancer cells (estimated)</body>
        </notes>
      </parameter>
      <parameter id="mw4b836c57_546e_445b_b43d_95ce959cc91a"
name="k_C_T1" value="3" units="MWDERIVEDUNIT_1__day" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of cancer
cell death by T cells (assumed)</body>
        </notes>
      </parameter>
      <parameter id="mw8108013c_5caa_4887_9636_3b1da28004b8"
name="k_Treg" value="2" units="MWDERIVEDUNIT_1__day" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of T cell
death by Tregs (estimated)</body>
        </notes>
      </parameter>
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      <parameter id="mw10ec1765_75ce_4474_94ca_6439ea9ef6cd"
name="H_P1" value="1" units="dimensionless" constant="false"/>
      <parameter id="mwc101eabc_ad45_48bb_b7ba_0a56d51fed98" name="a0"
value="0.692556926727918" units="dimensionless" constant="true"/>
      <parameter id="mw4c1ac185_3067_4da9_8869_b8094ae780f1" name="a1"
value="-0.096114835729841" units="dimensionless" constant="true"/>
      <parameter id="mw1ba3fe10_7bb4_4be9_9efa_e0e29c841c5b" name="a2"
value="0.00863812431352" units="dimensionless" constant="true"/>
      <parameter id="mwabc5258e_86ee_4684_ad1b_022fdf9808b2" name="a3"
value="-0.000403990701606" units="dimensionless" constant="true"/>
      <parameter id="mwc8e58a9d_94fd_46ae_88ea_d64803f582e1" name="a4"
value="7.59161205e-06" units="dimensionless" constant="true"/>
      <parameter id="mw71812882_d83d_43aa_a957_2dcfc26f16cb" name="m"
value="0" units="dimensionless" constant="false"/>
      <parameter id="mwf0b385a0_3c19_4518_9d9f_e58cad44b2ea" name="k"
value="0" units="dimensionless" constant="false"/>
      <parameter id="mw36a1fdc2_d829_49d9_8d94_a489fcce2a08"
name="k_ratio_1" value="0" units="dimensionless" constant="true"/>
      <parameter id="mwc87bd752_46f1_49c2_b111_e7505fd74ca8"
name="F_T1_act" value="0" units="MWUSERUNIT_cell" constant="false"/>
      <parameter id="mw41e31e9a_6f80_41a3_a437_bfaa6e8baed9"
name="N_aT" value="1" units="dimensionless" constant="false"/>
      <parameter id="mwcdf3bb71_6afa_48e7_b780_2d7ee5f9b5db"
name="n_T0_clones" value="100" units="dimensionless" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of T cell
clones (estimated)</body>
        </notes>
      </parameter>
      <parameter id="mw43bc1fbc_527c_4caa_b5f0_dacb9c792a18"
name="Q_T0_in" value="356.645243594488"
units="MWDERIVEDUNIT_cell__day" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of naive T
cell transport into the lLN calculated based on naive T cell entry
rate estimated based on 12-hr dwell time of T cells in the LN (Germian
2012) and assuming 600 LN in the body (Ferrer 1998), T cell density in
the blood (Autissier 2010) and T cell diversity (Robins 2009)</body>
        </notes>
      </parameter>
      <parameter id="mw6657d584_3305_4159_9028_0fd387db86bc"
name="Q_T0_out" value="1.13" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of naive T
cell transport out of the LN (Germain 2012)</body>
        </notes>
      </parameter>
      <parameter id="mwddb6a8f0_b347_4faa_9536_294915a489ea"
name="k_T0_act" value="20" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
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          <body xmlns="http://www.w3.org/1999/xhtml">T0 activation
rate</body>
        </notes>
      </parameter>
      <parameter id="mw1f6f8208_3f72_4671_8286_8e080906848d"
name="k_T0_pro" value="1" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">T0 proliferation
rate</body>
        </notes>
      </parameter>
      <parameter id="mw33b5d408_7337_4983_b330_cfcb3f4357af"
name="k_T0_death" value="0.01" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">T0 death
rate</body>
        </notes>
      </parameter>
      <parameter id="mwddf444aa_74ff_4ba5_81a2_b30b34dc661e"
name="q_T0_P_in" value="0.201" units="MWDERIVEDUNIT_1__minute"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of T0
tranport into the peripheral compartment</body>
        </notes>
      </parameter>
      <parameter id="mw6b8e638c_f28a_4c66_9b9c_c58ded48ccc0"
name="q_T0_P_out" value="0.015" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of T0
tranport out of the peripheral compartment</body>
        </notes>
      </parameter>
      <parameter id="mw302fac6a_5a44_40e3_a0dc_31785767fc4f"
name="q_T0_T_in" value="3.35e-06"
units="MWDERIVEDUNIT_1__centimeter___3_minute" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of T0
tranport into the tumour compartment</body>
        </notes>
      </parameter>
      <parameter id="mwbc88286a_79e7_4c26_a3ec_720caf764025"
name="q_T0_LN_out" value="24" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">rate of T0
tranport out of the LN compartment</body>
        </notes>
      </parameter>
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      <parameter id="mw1e889781_12c4_4172_91b6_546e3a00bfb4"
name="H_P0" value="1" units="dimensionless" constant="false"/>
      <parameter id="mwbb1a101c_bd5e_4dd7_b529_54e77169a609"
name="k_ratio_0" value="0" units="dimensionless" constant="true"/>
      <parameter id="mwdbdc3427_4618_4a63_be76_98a56e309b17"
name="F_T0_act" value="0" units="MWUSERUNIT_cell" constant="false"/>
      <parameter id="mw53fa75fa_b009_489f_9a91_2299c40b06e7"
name="k_APC_mat" value="1.5" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Maximum rate of
APC maturation</body>
        </notes>
      </parameter>
      <parameter id="mwa25696c4_7c1f_493f_9fcf_dfe77a664fda"
name="k_APC_mig" value="4" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of APC
migration</body>
        </notes>
      </parameter>
      <parameter id="mwd682106f_de26_4639_8b62_e17205f22c2a"
name="k_APC_death" value="0.01" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of APC
death</body>
        </notes>
      </parameter>
      <parameter id="mwb5663a72_7385_40b3_b101_1a11d4351ffb"
name="k_mAPC_death" value="0.02" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of mAPC
death</body>
        </notes>
      </parameter>
      <parameter id="mw02c23a69_3001_4dcc_a56a_92c6ed513d09"
name="APC0_T" value="400000" units="MWDERIVEDUNIT_cell__milliliter"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">APC density in
the tumour</body>
        </notes>
      </parameter>
      <parameter id="mwf5121bef_af1c_473c_a722_fa4c65155afb"
name="APC0_LN" value="1200000" units="MWDERIVEDUNIT_cell__milliliter"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">APC density in
the LN</body>
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        </notes>
      </parameter>
      <parameter id="mw7d571cef_3602_4299_9ec8_f9d570e17881"
name="k_c" value="2" units="MWDERIVEDUNIT_1__day" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Cytokine rate
constant</body>
        </notes>
      </parameter>
      <parameter id="mw5ccd755d_506a_494a_8e09_94b0a330e418" name="c0"
value="1e-09" units="MWBUILTINUNIT_molarity" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Baseline cytokine
concentration</body>
        </notes>
      </parameter>
      <parameter id="mwf7577d46_55a5_459f_86f6_36b2f0c1829b"
name="c50" value="1e-09" units="MWBUILTINUNIT_molarity"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Cytokine
concentration for half-maximal APC maturation</body>
        </notes>
      </parameter>
      <parameter id="mwcb716e87_b63f_40df_a44f_1002c7d61986"
name="DAMPs" value="1.34e-14" units="MWDERIVEDUNIT_mole__cell"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
cytokines released per dying cancer cell Concentration of Cytokines
Released by Cancer Cell Death</body>
        </notes>
      </parameter>
      <parameter id="mw6d000fc0_ba86_41a7_beee_8cafe05139ce"
name="n_sites_APC" value="10" units="dimensionless" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Maxium number of
T Cells an APC can interact with Maximum Number of T Cells an APC can
Interact with</body>
        </notes>
      </parameter>
      <parameter id="mw3852f618_204c_448a_b245_9df43b665635"
name="kin" value="14.4" units="MWDERIVEDUNIT_1__day" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of MHC
internalization Rate of MHC Internalization</body>
        </notes>
      </parameter>
      <parameter id="mw188d8839_a857_4645_a216_9e090aa6baad"
name="kout" value="28.8" units="MWDERIVEDUNIT_1__day" constant="true">
        <notes>
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          <body xmlns="http://www.w3.org/1999/xhtml">Rate of MHC
externalization Rate of MHC Externalization</body>
        </notes>
      </parameter>
      <parameter id="mw6b11c414_a69b_4efd_8a07_d1173fa59a87"
name="k_P0_up" value="14.4" units="MWDERIVEDUNIT_1__day__cell"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of antigen
uptake by APCs Rate of Antigen Uptake</body>
        </notes>
      </parameter>
      <parameter id="mwc17972bb_efbb_4c99_ab02_61201c886f8d"
name="k_xP0_deg" value="2" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of
extracellular antigen degradation Rate of Antigen Degradation in the
Extracellular Space</body>
        </notes>
      </parameter>
      <parameter id="mw3cf8aee1_8eb9_4ee4_93a7_61eb9f20252f"
name="k_P0_deg" value="17.28" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of endosomal
antigen degradation Rate of Antigen Degradation in Endosomes</body>
        </notes>
      </parameter>
      <parameter id="mw08e80428_100e_4181_8dff_866054ccd158"
name="k_p0_deg" value="144" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of endosomal
epitope degradation Rate of Epitope Degradation</body>
        </notes>
      </parameter>
      <parameter id="mw33d69d64_f4f9_4384_9195_c2233607df55"
name="k_P0_on" value="144000" units="MWDERIVEDUNIT_1__day__molarity"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of antigen-
MHC binding Antigen Association Constant</body>
        </notes>
      </parameter>
      <parameter id="mw8cb23925_0616_4ba0_b05f_b7c310055464"
name="k_P0_d1" value="1e-07" units="MWBUILTINUNIT_molarity"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Antigen-MHC
kd</body>
        </notes>
```

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      </parameter>
      <parameter id="mw45d28c78_e295_422a_93e8_63fd5c065117"
name="p0_50" value="2.64550264550265e-05"
units="MWDERIVEDUNIT_molecule__micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">MHC-Epitope-TCR
Concentration for Half-Maximal T Cell Activation</body>
        </notes>
      </parameter>
      <parameter id="mw62203837_dd40_4baa_8b94_89d3fc6cc634"
name="P0_C1" value="1e-08" units="MWDERIVEDUNIT_molarity__cell"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
P0 in C1</body>
        </notes>
      </parameter>
      <parameter id="mw91c9d65f_4e18_48ad_a863_b4572ca1bc2e"
name="A_syn" value="37.8" units="MWDERIVEDUNIT_micrometer___2"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Surface area of
the synapse Synapse Surface Area</body>
        </notes>
      </parameter>
      <parameter id="mw1968e71e_f5e7_4518_bf96_58e98a32246f"
name="A_Tcell" value="151.310411930437"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Surface area of
the T cell T Cell Surface Area</body>
        </notes>
      </parameter>
      <parameter id="mwf55bfe7a_0ad3_448f_b02b_5d85aca0aae5"
name="A_cell" value="897.270277791781"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Surface area of
the Cancer cell Cancer Cell Surface Area</body>
        </notes>
      </parameter>
      <parameter id="mw3a89a2a1_413a_48ba_b39d_abce742943a1"
name="A_APC" value="900" units="MWDERIVEDUNIT_micrometer___2"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Surface area of
the APC APC Surface Area</body>
        </notes>
      </parameter>
      <parameter id="mw1bdcde86_7239_49ff_a50c_244b38426b19"
name="k_M1p0_TCR_on" value="1"
```

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units="MWDERIVEDUNIT_1__second_molecule__micrometer___2"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of TCR
binding to MHC-peptide complex Rate of TCR Binding</body>
        </notes>
      </parameter>
      <parameter id="mwe1d5301d_65a6_4805_a0c4_b9488461ccc8"
name="k_M1p0_TCR_off" value="1" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of TCR
unbinding from MHC-peptide complex Rate of TCR Unbinding</body>
        </notes>
      </parameter>
      <parameter id="mw1390963b_ac2e_43bf_9068_18e15a3f8933"
name="TCR_p0_tot" value="103.813080670361"
units="MWDERIVEDUNIT_molecule__micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Total number of
TCR molecules per naive T cell Number of TCR Molecules on Naive T
Cells per Unit Area</body>
        </notes>
      </parameter>
      <parameter id="mwb2d4fc83_566f_4b7d_9037_c52ec0a459af"
name="pTCR_p0_MHC_tot" value="0"
units="MWDERIVEDUNIT_molecule__micrometer___2" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Total number of
MHC-p0-TCR complexes of all different activation levels</body>
        </notes>
      </parameter>
      <parameter id="mw96f9fe99_e334_402d_b28a_00dbdf7c575f"
name="k_P1_up" value="14.4" units="MWDERIVEDUNIT_1__day__cell"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of antigen
uptake by APCs Rate of Antigen Uptake</body>
        </notes>
      </parameter>
      <parameter id="mw853e9708_350e_4ea7_8907_ea58cfa95380"
name="k_xP1_deg" value="2" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of
extracellular antigen degradation Rate of Antigen Degradation in the
Extracellular Space</body>
        </notes>
      </parameter>
      <parameter id="mwf862cc85_c33f_4654_a561_ae76fa81bb97"
name="k_P1_deg" value="17.28" units="MWDERIVEDUNIT_1__day"
constant="true">
```

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        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of endosomal
antigen degradation Rate of Antigen Degradation in Endosomes</body>
        </notes>
      </parameter>
      <parameter id="mwfc10a527_910a_4ef1_8947_e37acf0cf148"
name="k_p1_deg" value="144" units="MWDERIVEDUNIT_1__day"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of endosomal
epitope degradation Rate of Epitope Degradation</body>
        </notes>
      </parameter>
      <parameter id="mwddabbddc_09d9_4688_97e3_0ec72d15abaf"
name="k_P1_on" value="144000" units="MWDERIVEDUNIT_1__day__molarity"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of antigen-
MHC binding Antigen Association Constant</body>
        </notes>
      </parameter>
      <parameter id="mw0c9670f6_ecd6_4631_90cc_30463073a545"
name="k_P1_d1" value="4e-08" units="MWBUILTINUNIT_molarity"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Antigen-MHC
kd</body>
        </notes>
      </parameter>
      <parameter id="mw382b7a70_e63f_4a14_b5ae_03012ce36574"
name="p1_50" value="2.64550264550265e-05"
units="MWDERIVEDUNIT_molecule__micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">MHC-Epitope-TCR
Concentration for Half-Maximal T Cell Activation</body>
        </notes>
      </parameter>
      <parameter id="mw09a78ea1_f99a_49fb_8f57_f79df3425689"
name="P1_C1" value="1e-08" units="MWDERIVEDUNIT_molarity__cell"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
P1 in C1</body>
        </notes>
      </parameter>
      <parameter id="mwe857ab2a_b73e_41db_9689_4fce13b4c5f9"
name="k_M1p1_TCR_on" value="1"
units="MWDERIVEDUNIT_1__second_molecule__micrometer___2"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of TCR
binding to MHC-peptide complex Rate of TCR Binding</body>
```

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        </notes>
      </parameter>
      <parameter id="mw3e998fd3_0e21_483b_a0dc_f9717401fc48"
name="k_M1p1_TCR_off" value="1" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of TCR
unbinding from MHC-peptide complex Rate of TCR Unbinding</body>
        </notes>
      </parameter>
      <parameter id="mw0231f6de_2302_4910_aa44_dbb729a3e732"
name="k_M1p1_TCR_p" value="1" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of MHC-
peptide-TCR complex modification Rate of TCR Modification</body>
        </notes>
      </parameter>
      <parameter id="mw0fc88c2e_4d0b_4fc9_ad59_3b84599698f7"
name="phi_M1p1_TCR" value="0.09" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Rate of MHC-
peptide-TCR complex with maximal modification that leads to non-
signalingRate of TCR Modification Leading to Non-Signaling</body>
        </notes>
      </parameter>
      <parameter id="mwf5abafbe_c4ea_43d1_917a_1e0f82adcb97"
name="N_M1p1_TCR" value="10" units="dimensionless" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of
modifcation steps for MHC-peptide-TCR complex Number of Intermediate
Steps</body>
        </notes>
      </parameter>
      <parameter id="mw3edb1bd6_42e5_4c85_bd91_3427b4480151"
name="TCR_p1_tot" value="103.813080670361"
units="MWDERIVEDUNIT_molecule__micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Total number of
TCR molecules per naive T cell Number of TCR Molecules on Naive T
Cells per Unit Area</body>
        </notes>
      </parameter>
      <parameter id="mw0bcc5b8c_3735_4aa8_be25_eeed6fb095d1"
name="pTCR_p1_MHC_tot" value="0"
units="MWDERIVEDUNIT_molecule__micrometer___2" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Total number of
MHC-p1-TCR complexes of all different activation levels</body>
        </notes>
      </parameter>
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      <parameter id="mwe8d5d721_005f_49f7_ada6_e82cd8ca00c6"
name="kon_PD1_PDL1" value="0.0583333333333333"
units="MWDERIVEDUNIT_1__micromolarity_nanometer_second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">kon of PD1-PDL1
binding PD1-PDL1 Binding Rate</body>
        </notes>
      </parameter>
      <parameter id="mw75ebeaf4_1dd4_4b61_bdf7_0611af968ca8"
name="aPD1" value="0" units="MWBUILTINUNIT_molarity" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
PD1 antibody</body>
        </notes>
      </parameter>
      <parameter id="mw140e5cc4_b897_4719_aa3d_0b30f25bc4dd"
name="aPDL1" value="0" units="MWBUILTINUNIT_molarity"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
PDL1 antibody</body>
        </notes>
      </parameter>
      <parameter id="mw01026970_e68e_4663_a8f4_3c89fbb89a28"
name="q_P_atezolizumab" value="6.97743585e-08"
units="MWDERIVEDUNIT_milliliter__second" constant="true"/>
      <parameter id="mwb04099fe_184d_408f_b64a_5211b48295fa"
name="q_T_atezolizumab" value="8.52e-06"
units="MWDERIVEDUNIT_1__second" constant="true"/>
      <parameter id="mwbfae92a6_4484_4c8d_954b_821e213acb8f"
name="q_LN_atezolizumab" value="6.97743585e-08"
units="MWDERIVEDUNIT_milliliter__second" constant="true"/>
      <parameter id="mw4478efbf_cc05_4bfb_a0f1_51d7236455dd"
name="q_LD_atezolizumab" value="0.0015"
units="MWDERIVEDUNIT_1__minute" constant="true"/>
      <parameter id="mwb815e7ef_6822_4c31_ad87_3283f2e76ec4"
name="k_cl_atezolizumab" value="0.003" units="MWDERIVEDUNIT_1__hour"
constant="true"/>
      <parameter id="mwa5c3d9de_dbc4_4f10_a373_24389f61938a"
name="gamma_C_atezolizumab" value="0.3643" units="dimensionless"
constant="true"/>
      <parameter id="mw81e3f6ab_7c90_45d2_828d_5d9e8d54f20c"
name="gamma_P_atezolizumab" value="0.0405" units="dimensionless"
constant="true"/>
      <parameter id="mwe8121890_8596_4287_b3ee_50b05edf5540"
name="gamma_T_atezolizumab" value="0.522" units="dimensionless"
constant="true"/>
      <parameter id="mw3901f164_3d95_4e77_ad0b_2d4452a9d976"
name="gamma_LN_atezolizumab" value="0.2" units="dimensionless"
constant="true"/>
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      <parameter id="mw4cfa47a0_69d4_4eec_aa6c_e4470eeeb266"
name="kon_PD1_PDL2" value="0.0766666666666667"
units="MWDERIVEDUNIT_1__micromolarity_nanometer_second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">kon of PD1-PDL2
binding PD1-PDL2 Binding Rate</body>
        </notes>
      </parameter>
      <parameter id="mw8db9064f_6e42_49c7_8a0b_a47da71a3758"
name="kon_PD1_aPD1" value="1300000"
units="MWDERIVEDUNIT_1__molarity_second" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">kon of PD1-
antiPD1 binding PD1-nivolumab Binding Rate Constant</body>
        </notes>
      </parameter>
      <parameter id="mwe0f00ed8_dcf4_4859_9755_bb24cd7f35c9"
name="kon_PDL1_aPDL1" value="430000"
units="MWDERIVEDUNIT_1__molarity_second" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">kon of PDL1-
antiPDL1 binding PDL1-durvalumab Binding Rate Constant</body>
        </notes>
      </parameter>
      <parameter id="mw75aefaf3_1856_43cf_8511_2fa3e0451e0b"
name="koff_PD1_PDL1" value="1.435" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">koff of PD1-PDL1
binding PD1-PDL1 Unbinding Rate</body>
        </notes>
      </parameter>
      <parameter id="mw93bf4558_6b97_4f12_bc08_c258a1086db9"
name="koff_PD1_PDL2" value="0.529" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">koff of PD1-PDL2
binding PD1-PDL2 Unbinding Rate</body>
        </notes>
      </parameter>
      <parameter id="mw991ab93b_f5ef_47e4_8661_9588c62249e4"
name="koff_PD1_aPD1" value="0.00338" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">koff of PD1-
nivolumab binding PD1-aPD1 Unbinding Rate</body>
        </notes>
      </parameter>
      <parameter id="mwe82cc259_fdc8_4239_a6e1_1f0fea41ca6d"
name="koff_PDL1_aPDL1" value="0.000172"
units="MWDERIVEDUNIT_1__second" constant="true">
```

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        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">koff of PDL1-
durvalumab binding PDL1-aPDL1 Unbinding Rate</body>
        </notes>
      </parameter>
      <parameter id="mw614c8d32_2578_4c5c_ba98_2300e829174f"
name="Chi_PD1" value="3.33333333333333"
units="MWDERIVEDUNIT_1__nanometer" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Antibody cross-
arm binding efficiency PD1 Antibody Cross-Arm Binding Strength
Corrected for 2D</body>
        </notes>
      </parameter>
      <parameter id="mw3e179651_289c_42d8_bfe9_a4412cee4d9c"
name="Chi_PDL1" value="33.3333333333333"
units="MWDERIVEDUNIT_1__nanometer" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Antibody cross-
arm binding efficiency PDL1 Antibody Cross-Arm Binding Strength
Corrected for 2D</body>
        </notes>
      </parameter>
      <parameter id="mwe2df21f5_c609_4db4_800f_b318a4cd9ebd"
name="PD1_50" value="6" units="MWDERIVEDUNIT_molecule__micrometer___2"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">PD1/PDL1
concentration for half-maximal T cell inactivation PD1-PDL1
Concentration for Half-Maximal PD1-Induced Reduction of T Cell
Killing</body>
        </notes>
      </parameter>
      <parameter id="mw8cda36fb_5234_46ed_bdb8_520a142b8826"
name="n_PD1" value="2" units="dimensionless" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Hill coefficient
for PD1/PDL1 half-maximal T cell inactivation Hill Coefficient for
PD1-Induced Reduction of T Cell Killing</body>
        </notes>
      </parameter>
      <parameter id="mw27d20453_a8b4_4947_bc96_a82d24a92d58"
name="T_PD1_total" value="60000" units="MWBUILTINUNIT_molecule"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Concentration of
PD1 on T cells Total number of PD1 Molecules on T Cells</body>
        </notes>
      </parameter>
      <parameter id="mwdf582c9f_98b3_4fd2_a1b2_9c10ed295a43"
name="C_PDL1_total" value="400000" units="MWBUILTINUNIT_molecule"
constant="false">
```

```
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of PDL1
molecules per cancer cell Total number of PDL1 Molecules on Cancer
Cells</body>
        </notes>
      </parameter>
      <parameter id="mwad42c5a9_e21f_4100_add0_623b9a89169c"
name="APC_PDL1_total" value="1600000" units="MWBUILTINUNIT_molecule"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of PDL1
molecules per APC Total number of PDL1 Molecules on Cancer
Cells</body>
        </notes>
      </parameter>
      <parameter id="mwcb443c9f_9d14_4279_aa40_7513a4dd8f48"
name="r_PDL2C" value="0.05" units="dimensionless" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of PDL1
molecules per APC estimated</body>
        </notes>
      </parameter>
      <parameter id="mwe3d9a595_a61c_479a_9ef5_e5a6aa984d65"
name="r_PDL2APC" value="0.05" units="dimensionless" constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Number of PDL2
molecules per APC estimated</body>
        </notes>
      </parameter>
      <parameter id="mw4e644bb6_5cf2_4286_ad23_2992c5369649"
name="T_syn" value="75.6" units="MWDERIVEDUNIT_micrometer___2"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Surface area of
the synapse (Janssen 2007)</body>
        </notes>
      </parameter>
      <parameter id="mw36366027_1d43_45e4_a407_edd118db612a"
name="q_P_cibis" value="2.755e-07"
units="MWDERIVEDUNIT_milliliter__second" constant="true"/>
      <parameter id="mw7ca21d14_d8be_4151_a1ca_04e2bfeabb57"
name="q_T_cibis" value="8.52e-06" units="MWDERIVEDUNIT_1__second"
constant="true"/>
      <parameter id="mwe6152cdd_350a_4c16_81ca_1e481e6c0a64"
name="q_LN_cibis" value="2.755e-07"
units="MWDERIVEDUNIT_milliliter__second" constant="true"/>
      <parameter id="mw874a6840_c8e2_4455_888c_3f46f6b9f513"
name="q_LD_cibis" value="0.0015" units="MWDERIVEDUNIT_1__minute"
constant="true"/>
      <parameter id="mw41dce75f_74ae_4cf2_8cf1_4733ddbc9d1a"
name="k_cl_cibis" value="0.025" units="MWDERIVEDUNIT_1__hour"
constant="true"/>
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      <parameter id="mw8b890aa4_5a8d_494f_a9dc_94dd9102747d"
name="gamma_C_cibis" value="0.46" units="dimensionless"
constant="true"/>
      <parameter id="mw0a99753d_641d_4691_8979_ff41ab8c42c4"
name="gamma_P_cibis" value="0.067" units="dimensionless"
constant="true"/>
      <parameter id="mw9d3532da_0dcb_480c_9ec6_05144794ed9e"
name="gamma_T_cibis" value="0.522" units="dimensionless"
constant="true"/>
      <parameter id="mw035bd865_eaf6_4933_a20e_09f1ca241df0"
name="gamma_LN_cibis" value="0.2" units="dimensionless"
constant="true"/>
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name="dT_syn" value="3"
units="MWBUILTINPREFIX_nano_MWBUILTINUNIT_meter" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Distance between
two cells in the synapse (Janssen 2007)</body>
        </notes>
      </parameter>
      <parameter id="mw6014386a_19d2_4a74_bb82_c32db3ebe899"
name="SA_Tcell" value="151.310411930437"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Surface area of
the T cell calculated based on the average T cell diameter (Chapman
1981)</body>
        </notes>
      </parameter>
      <parameter id="mwd676f62b_ea64_4770_b805_03a42fe744f5"
name="SA_cell" value="1063.61760879936"
units="MWDERIVEDUNIT_micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Surface area of
the Cancer cell calculated based on the average Cancer cell diameter
(Hosokawa 2013; stage IV NSCLC)</body>
        </notes>
      </parameter>
      <parameter id="mwbb6b5fad_79fc_4c1e_8c28_716ef8102b7f"
name="SA_APC" value="900" units="MWDERIVEDUNIT_micrometer___2"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Surface area of
the APC (Agrawal 1996)</body>
        </notes>
      </parameter>
      <parameter id="mw15df1616_97ed_4ca4_b30e_ebb077cf4325"
name="kon_CD3_cibis" value="10000"
units="MWDERIVEDUNIT_1__molarity_second" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">kon of CD3-cibis
binding kon for CD3-cibis (Steffi Lehmann 2016)</body>
```

```
        </notes>
      </parameter>
      <parameter id="mw9cf96b22_1a33_4f87_afcd_68dba7e3c4a6"
name="kon_CEA_cibis" value="1000"
units="MWDERIVEDUNIT_1__molarity_second" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">kon of CEA-cibis
binding kon for CD3-cibis (Steffi Lehmann 2016)</body>
        </notes>
      </parameter>
      <parameter id="mw65b50fa7_efcb_4017_9c8e_0221fab22f43"
name="kon_CD3_cibis2" value="3333.33333333333"
units="MWDERIVEDUNIT_1__molarity_nanometer_second" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">kon of CD3-cibis
binding kon for CD3-cibis (Steffi Lehmann 2016)</body>
        </notes>
      </parameter>
      <parameter id="mw7d525f58_1dbe_4e8b_95e9_c1716c018ebd"
name="kon_CEA_cibis2" value="333.333333333333"
units="MWDERIVEDUNIT_1__molarity_nanometer_second" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">kon of CEA-cibis
binding kon for CD3-cibis (Steffi Lehmann 2016)</body>
        </notes>
      </parameter>
      <parameter id="mwf8e07c6f_de10_40ed_8fed_c4b415ac88ff"
name="koff_CD3_cibis" value="0.00075" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">koff of CD3-cibis
binding calculated based on the measured kd and kon (Steffi Lehmann
2016)</body>
        </notes>
      </parameter>
      <parameter id="mw254b6741_04ff_476a_86b0_e18f1f7448a6"
name="koff_CEA_cibis" value="0.00013" units="MWDERIVEDUNIT_1__second"
constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">koff of CEA-cibis
binding calculated based on the measured kd and kon (Steffi Lehmann
2016)</body>
        </notes>
      </parameter>
      <parameter id="mwc205da12_9624_4676_ba4c_e1d6d6b18abd"
name="Chi_CEA_cibis" value="0.333333330953227"
units="MWDERIVEDUNIT_1__nanometer" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Antibody cross-
arm binding efficiency  that also includes the conversion of kon from
3D to 2D(Estimated based on Wang 2014)</body>
        </notes>
```

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      </parameter>
      <parameter id="mwaecb4a00_67ae_4818_8f41_195a5060534e"
name="CEA_CD3_50" value="8"
units="MWDERIVEDUNIT_molecule__micrometer___2" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">CEA/CD3
concentration for half-maximal T cell inactivation (Jonathan
2016)</body>
        </notes>
      </parameter>
      <parameter id="mwdbca445b_0370_40eb_9cb0_41018b8b2740"
name="n_CEA_CD3" value="3" units="dimensionless" constant="true">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">Hill coefficient
for CEA/CD3 half-maximal T cell inactivation (estimated?)</body>
        </notes>
      </parameter>
      <parameter id="mwb002721a_80c2_4e13_ab14_bc346c326535"
name="T1_CD3_total" value="62000" units="MWBUILTINUNIT_molecule"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
CD3 on T1 cells (guess)</body>
        </notes>
      </parameter>
      <parameter id="mw9da4d78b_cfec_4e11_b021_8e57ba26a901"
name="C1_CEA_total" value="20000" units="MWBUILTINUNIT_molecule"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">number of CEA
molecules per C1 cell (guess)</body>
        </notes>
      </parameter>
      <parameter id="mw8947be8c_bc84_4748_bf0e_d682b86f2ec4"
name="T0_CD3_total" value="62000" units="MWBUILTINUNIT_molecule"
constant="false">
        <notes>
          <body xmlns="http://www.w3.org/1999/xhtml">concentration of
CD3 on T0 cells (guess)</body>
        </notes>
      </parameter>
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symbol="mw48d27efc_8ace_4319_b906_4465d77a46fa">
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          </apply>
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        <math xmlns="http://www.w3.org/1998/Math/MathML">
          <apply>
            <divide/>
            <ci> mw9da4d78b_cfec_4e11_b021_8e57ba26a901 </ci>
            <ci> mwd676f62b_ea64_4770_b805_03a42fe744f5 </ci>
          </apply>
        </math>
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            <ci> mwa01f7b00_e009_4ea1_a621_7e3a90ebf97a </ci>
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cancer</body>
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