$$\frac{d([IC]\cdot V_{Intestine})}{dt} = +(1\cdot[DC])$$
$$+V_{Intestine}\cdot\left(\frac{\text{"Rate Law for Intestinal Cholesterol Synthesis""}(100,[IC],3120,5)}{V_{Intestine}}\right)$$
$$-(0.0005286\cdot[IC]\cdot[IBS])$$
$$-(0.0005286\cdot[IC]\cdot[IBS])$$
$$+\left(\frac{2000}{\left(1+\left(\frac{55326}{[HFC]}\right)^{5}\right)}\right)$$

$$\frac{d([HBS]\cdot V_{HepaticTissue})}{dt} = -(6\cdot[HBS])$$
$$+(4.29\cdot[IBS])$$
$$+V_{HepaticTissue}\cdot\left(\frac{\text{"Rate Law for Bile Salt Synthesis""}(2.66,[HFC],[HBS])}{V_{HepaticTissue}}\right)$$

$$\frac{d([IBS]\cdot V_{Intestine})}{dt} = +(6\cdot[HBS])$$
$$-(4.29\cdot[IBS])$$
$$-(0.856\cdot[IBS])$$

$$\frac{d([HFC]\cdot V_{HepaticTissue})}{dt} = +V_{HepaticTissue}\cdot\left(\frac{\text{"Rate Law for Hepatic Cholesterol Synthesis""}(500,[HFC],93925,5)}{V_{HepaticTissue}}\right)$$
$$-V_{HepaticTissue}\cdot\left(\frac{\text{"Rate Law for Hepatic Cholesterol Storage_1""}(1,[ACAT],[HFC])}{V_{HepaticTissue}}\right)$$
$$+V_{HepaticTissue}\cdot\left(\frac{\text{"Rate Law for Release of Stored Cholesterol""}(5.998,[CEH],[HCE])}{V_{HepaticTissue}}\right)$$
$$-(0.016\cdot[HFC])$$
$$+(0.0496\cdot[VLDLC])$$
$$+(0.054\cdot[IDLC])$$
$$+(0.068\cdot[LDLC]\cdot[HLDLRs])$$
$$+(0.005\cdot[LDLC])$$
$$+(0.05\cdot[HDLC]\cdot[SRB1])$$
$$-V_{HepaticTissue}\cdot\left(\frac{\text{"Rate Law for Bile Salt Synthesis""}(2.66,[HFC],[HBS])}{V_{HepaticTissue}}\right)$$
$$+(0.0005286\cdot[IC]\cdot[IBS])$$
$$-\left(\frac{2000}{\left(1+\left(\frac{55326}{[HFC]}\right)^{5}\right)}\right)$$

$$\frac{d([NHDL]\cdot V_{Plasma})}{dt} = +(0.005\cdot[PFC])$$
$$-(1.5e\text{-}05\cdot[PFC]\cdot[NHDL]\cdot[LCAT])$$
$$+(0.0005\cdot[PFC])$$

$$\frac{d([PFC]\cdot V_{PeripheralTissue})}{dt} = +(0.00675\cdot[PLDLRs]\cdot[LDLC])$$
$$+(5e\text{-}06\cdot[LDLC])$$
$$-(0.017386\cdot[ACAT]\cdot[PFC])$$
$$+(0.1068\cdot[CEH]\cdot[PCE])$$
$$-V_{PeripheralTissue}\cdot\left(\frac{0.0005\cdot[PFC]}{V_{PeripheralTissue}}\right)$$
$$-(1.5e\text{-}05\cdot[PFC]\cdot[NHDL]\cdot[LCAT])$$
$$+V_{PeripheralTissue}\cdot\left(\frac{\text{"Rate Law for Peripheral Cholesterol Synthesis""}(500,[PFC],80342,5)}{V_{PeripheralTissue}}\right)$$

$$\frac{d([HCE]\cdot V_{HepaticTissue})}{dt} = +V_{HepaticTissue}\cdot\left(\frac{\text{"Rate Law for Hepatic Cholesterol Storage_1""}(1,[ACAT],[HFC])}{V_{HepaticTissue}}\right)$$
$$-V_{HepaticTissue}\cdot\left(\frac{\text{"Rate Law for Release of Stored Cholesterol""}(5.998,[CEH],[HCE])}{V_{HepaticTissue}}\right)$$

$$\frac{d([VLDLC]\cdot V_{Plasma})}{dt} = +(0.016\cdot[HFC])$$
$$-(0.0496\cdot[VLDLC])$$
$$-V_{Plasma}\cdot\left(\frac{\text{"Rate Law for IDL Cholesterol Formation""}(0.43,[VLDLC],[LPL])}{V_{Plasma}}\right)$$
$$+V_{Plasma}\cdot\left(\frac{\text{"Rate Law for CETP Mediated Transfer To VLDL""}(0.01,[HDLC],[CETP])}{V_{Plasma}}\right)$$

$$\frac{d([HLDLRs]\cdot V_{HepaticTissue})}{dt} = +V_{HepaticTissue}\cdot\left(\frac{\text{"Rate Law for Hepatic LDLR Synthesis""}(100,[HLDLRsS],[HFC])}{V_{HepaticTissue}}\right)$$
$$-V_{HepaticTissue}\cdot\left(\frac{0.01\cdot[HLDLRs]}{V_{HepaticTissue}}\right)$$

$$\frac{d([IDLC]\cdot V_{Plasma})}{dt} = +V_{Plasma}\cdot\left(\frac{\text{"Rate Law for IDL Cholesterol Formation""}(0.43,[VLDLC],[LPL])}{V_{Plasma}}\right)$$
$$-(0.054\cdot[IDLC])$$
$$-V_{Plasma}\cdot\left(\frac{\text{"Rate Law for LDL Cholesterol Formation""}(0.38,[IDLC],[HSL])}{V_{Plasma}}\right)$$

$$\frac{d([LDLC]\cdot V_{Plasma})}{dt} = +V_{Plasma}\cdot\left(\frac{\text{"Rate Law for LDL Cholesterol Formation""}(0.38,[IDLC],[HSL])}{V_{Plasma}}\right)$$
$$-(0.068\cdot[LDLC]\cdot[HLDLRs])$$
$$-(0.005\cdot[LDLC])$$
$$-(0.00675\cdot[PLDLRs]\cdot[LDLC])$$
$$-(5e\text{-}06\cdot[LDLC])$$
$$+V_{Plasma}\cdot\left(\frac{\text{"Rate Law for CETP Mediated TransferTo LDL""}(0.001,[HDLC],[CETP])}{V_{Plasma}}\right)$$
$$-V_{Endothelium}\cdot(KinLDL\cdot[LDLC]\cdot M)$$

$$\frac{d([PLDLRs]\cdot V_{PeripheralTissue})}{dt} = +V_{PeripheralTissue}\cdot\left(\frac{\text{"Rate Law for Peripheral LDLR Synthesis""}(100,[PLDLRsS],[PFC])}{V_{PeripheralTissue}}\right)$$
$$-V_{PeripheralTissue}\cdot\left(\frac{0.01\cdot[PLDLRs]}{V_{PeripheralTissue}}\right)$$

$$\frac{d([PCE]\cdot V_{PeripheralTissue})}{dt} = +(0.017386\cdot[ACAT]\cdot[PFC])$$
$$-(0.1068\cdot[CEH]\cdot[PCE])$$

$$\frac{d([HDLC]\cdot V_{Plasma})}{dt} = +(1.5e\text{-}05\cdot[PFC]\cdot[NHDL]\cdot[LCAT])$$
$$-V_{Plasma}\cdot\left(\frac{\text{"Rate Law for CETP Mediated Transfer To VLDL""}(0.01,[HDLC],[CETP])}{V_{Plasma}}\right)$$
$$-V_{Plasma}\cdot\left(\frac{\text{"Rate Law for CETP Mediated TransferTo LDL""}(0.001,[HDLC],[CETP])}{V_{Plasma}}\right)$$
$$-(0.05\cdot[HDLC]\cdot[SRB1])$$
$$-V_{Endothelium}\cdot(KinHDL\cdot[HDLC]\cdot M)$$

$$\frac{d([LDL]\cdot V_{Endothelium})}{dt} = +V_{Endothelium}\cdot(KinHDL\cdot[LDLC]\cdot M)$$
$$-V_{Endothelium}\cdot(KoutLDL\cdot[LDL])$$
$$-V_{Endothelium}\cdot\left(\text{oxLDLConstant}\cdot\left(\text{oxLDLstim\_a}+\frac{1-\text{oxLDLstim\_a}}{1+\left(\frac{-4\cdot\text{oxLDLstim\_b}}{\text{oxLDLstim\_c}}\right)^{e}\cdot([SUMoxidLDL]-\text{oxLDLstim\_c})}\right)\cdot\left(1-\text{oxLDLinh\_a}-\frac{1-\text{oxLDLinh\_a}}{1+\left(\frac{-4\cdot\text{oxLDLinh\_b}}{\text{oxLDLinh\_c}}\right)^{e}\cdot([HDL]-\text{oxLDLinh\_c})}\right)\cdot[LDL]\right)$$

$$\frac{d([oxLDL]\cdot V_{Endothelium})}{dt} = +V_{Endothelium}\cdot\left(\text{oxLDLConstant}\cdot\left(\text{oxLDLstim\_a}+\frac{1-\text{oxLDLstim\_a}}{1+\left(\frac{-4\cdot\text{oxLDLstim\_b}}{\text{oxLDLstim\_c}}\right)^{e}\cdot([SUMoxidLDL]-\text{oxLDLstim\_c})}\right)\cdot\left(1-\text{oxLDLinh\_a}-\frac{1-\text{oxLDLinh\_a}}{1+\left(\frac{-4\cdot\text{oxLDLinh\_b}}{\text{oxLDLinh\_c}}\right)^{e}\cdot([HDL]-\text{oxLDLinh\_c})}\right)\cdot[LDL]\right)$$
$$-V_{Endothelium}\cdot(KBcleanoxLDL\cdot[Bcells]\cdot[oxLDL])$$
$$-V_{Endothelium}\cdot\left(\text{ForFoamConstant}\cdot\left(\text{ForFoamstim\_a}+\frac{1-\text{ForFoamstim\_a}}{1+\left(\frac{-4\cdot\text{ForFoamstim\_b}}{\text{ForFoamstim\_c}}\right)^{e}\cdot([SUMForFoam]-\text{ForFoamstim\_c})}\right)\cdot\left(1-\text{ForFoaminh\_a}\cdot\frac{1-\text{ForFoaminh\_a}}{1+\left(\frac{-4\cdot\text{ForFoaminh\_b}}{\text{ForFoaminh\_c}}\right)^{e}\cdot([TAINF]-\text{ForFoaminh\_c})}\right)\cdot[MP]\cdot[oxLDL]\right)$$

$$\frac{d([TINF]\cdot V_{Endothelium})}{dt} = -V_{Endothelium}\cdot(Kdeg\_TINF\cdot[TINF])$$
$$+V_{Endothelium}\cdot\left(\text{RecTINFConstant}\cdot\left(\text{RecTINFstim\_a}+\frac{1-\text{RecTINFstim\_a}}{1+\left(\frac{-4\cdot\text{RecTINFstim\_b}}{\text{RecTINFstim\_c}}\right)^{e}\cdot([SUMRecTINF]-\text{RecTINFstim\_c})}\right)\cdot\left(1-\text{RecTINFinh\_a}\cdot\frac{1-\text{RecTINFinh\_a}}{1+\left(\frac{-4\cdot\text{RecTINFinh\_b}}{\text{RecTINFinh\_c}}\right)^{e}\cdot([TAINF]-\text{RecTINFinh\_c})}\right)\right)$$

$$[SUMRecTAINF] = [TAINF]+\text{alfa7}\cdot[MP]$$

$$\frac{d([TAINF]\cdot V_{Endothelium})}{dt} = -V_{Endothelium}\cdot(Kdeg\_TAINF\cdot[TAINF])$$
$$+V_{Endothelium}\cdot\left(\text{RecTAINFConstant}\cdot\left(\text{RecTAINFstim\_a}+\frac{1-\text{RecTAINFstim\_a}}{1+\left(\frac{-4\cdot\text{RecTAINFstim\_b}}{\text{RecTAINFstim\_c}}\right)^{e}\cdot([SUMRecTAINF]-\text{RecTAINFstim\_c})}\right)\cdot\left(1-\text{RecTAINFinh\_a}\cdot\frac{1-\text{RecTAINFinh\_a}}{1+\left(\frac{-4\cdot\text{RecTAINFinh\_b}}{\text{RecTAINFinh\_c}}\right)^{e}\cdot([TAINF]-\text{RecTAINFinh\_c})}\right)\right)$$

$$\frac{d([MP]\cdot V_{Endothelium})}{dt} = -V_{Endothelium}\cdot(Kdeg\_MP\cdot[MP])$$
$$+V_{Endothelium}\cdot(KRCT\cdot[HDL]\cdot[PLAQUE])$$
$$+V_{Endothelium}\cdot\left(\text{ActEndConstant}\cdot\left(\text{ActEndstim\_a}+\frac{1-\text{ActEndstim\_a}}{1+\left(\frac{-4\cdot\text{ActEndstim\_b}}{\text{ActEndstim\_c}}\right)^{e}\cdot([SUMACT\_END]-\text{ActEndstim\_c})}\right)\cdot\left(1-\text{ActEndinh\_a}\cdot\frac{1-\text{ActEndinh\_a}}{1+\left(\frac{-4\cdot\text{ActEndinh\_b}}{\text{ActEndinh\_c}}\right)^{e}\cdot([TAINF]-\text{ActEndinh\_c})}\right)\right)$$
$$-V_{Endothelium}\cdot\left(\text{ForFoamConstant}\cdot\left(\text{ForFoamstim\_a}+\frac{1-\text{ForFoamstim\_a}}{1+\left(\frac{-4\cdot\text{ForFoamstim\_b}}{\text{ForFoamstim\_c}}\right)^{e}\cdot([SUMForFoam]-\text{ForFoamstim\_c})}\right)\cdot\left(1-\text{ForFoaminh\_a}\cdot\frac{1-\text{ForFoaminh\_a}}{1+\left(\frac{-4\cdot\text{ForFoaminh\_b}}{\text{ForFoaminh\_c}}\right)^{e}\cdot([TAINF]-\text{ForFoaminh\_c})}\right)\cdot[MP]\cdot[oxLDL]\right)$$

$$[SIGMOID\_ACTENDstim] = \text{ActEndstim\_a}+\frac{1-\text{ActEndstim\_a}}{1+\left(\frac{-4\cdot\text{ActEndstim\_b}}{\text{ActEndstim\_c}}\right)^{e}\cdot([SUMACT\_END]-\text{ActEndstim\_c})}$$

$$[SUMACT\_END] = [MP]+\text{alfa11}\cdot[oxLDL]+\text{alfa12}\cdot[TINF]+\text{alfa13}\cdot[PLAQUE]$$

$$\frac{d([PLAQUE]\cdot V_{Endothelium})}{dt} = +V_{Endothelium}\cdot(Kdeg\_MP\cdot[MP])$$
$$+V_{Endothelium}\cdot(Kdeg\_TINF\cdot[TINF])$$
$$-V_{Endothelium}\cdot(KBcleanPLAQUE\cdot[Bcells]\cdot[PLAQUE])$$
$$-V_{Endothelium}\cdot(KRCT\cdot[HDL]\cdot[PLAQUE])$$
$$+V_{Endothelium}\cdot\left(\text{ForFoamConstant}\cdot\left(\text{ForFoamstim\_a}+\frac{1-\text{ForFoamstim\_a}}{1+\left(\frac{-4\cdot\text{ForFoamstim\_b}}{\text{ForFoamstim\_c}}\right)^{e}\cdot([SUMForFoam]-\text{ForFoamstim\_c})}\right)\cdot\left(1-\text{ForFoaminh\_a}\cdot\frac{1-\text{ForFoaminh\_a}}{1+\left(\frac{-4\cdot\text{ForFoaminh\_b}}{\text{ForFoaminh\_c}}\right)^{e}\cdot([TAINF]-\text{ForFoaminh\_c})}\right)\cdot[MP]\cdot[oxLDL]\right)$$

$$[SIGMOID\_ACTENDinh] = \text{ActEndinh\_a}+\frac{1-\text{ActEndinh\_a}}{1+\left(\frac{-4\cdot\text{ActEndinh\_b}}{\text{ActEndinh\_c}}\right)^{e}\cdot([TAINF]-\text{ActEndinh\_c})}$$

$$\frac{d([Bcells]\cdot V_{Endothelium})}{dt} = -V_{Endothelium}\cdot(Kdeg\_Bcells\cdot[Bcells])$$
$$-V_{Endothelium}\cdot(KBcleanoxLDL\cdot[Bcells]\cdot[oxLDL])$$
$$-V_{Endothelium}\cdot(KBcleanPLAQUE\cdot[Bcells]\cdot[PLAQUE])$$
$$+V_{Endothelium}\cdot\left(\text{RecBcellsConstant}\cdot\left(\text{RecBcellsstim\_a}+\frac{1-\text{RecBcellsstim\_a}}{1+\left(\frac{-4\cdot\text{RecBcellsstim\_b}}{\text{RecBcellsstim\_c}}\right)^{e}\cdot([SUMRecBcells]-\text{RecBcellsstim\_c})}\right)\right)$$

$$[SUMRecBcells] = [MP]+\text{alfa8}\cdot[TAINF]+\text{alfa9}\cdot[ACT\_END]+\text{alfa10}\cdot[PLAQUE]$$
$$[ACT\_END] = \text{ActEndConstant}\cdot[SIGMOID\_ACTENDstim]\cdot(1-[SIGMOID\_ACTENDinh])$$
$$[SUMoxidLDL] = [MP]+\text{alfa1}\cdot[ACT\_END]$$
$$[SUMForFoam] = [MP]+\text{alfa2}\cdot[TINF]+\text{alfa3}\cdot[ACT\_END]$$
$$[SUMRecTINF] = [MP]+\text{alfa4}\cdot[TINF]+\text{alfa5}\cdot[ACT\_END]+\text{alfa6}\cdot[oxLDL]$$

$$\frac{d([HDL]\cdot V_{Endothelium})}{dt} = -V_{Endothelium}\cdot(KoutHDL\cdot[HDL])$$
$$+V_{Endothelium}\cdot(KinHDL\cdot[HDLC]\cdot M)$$
$$-V_{Endothelium}\cdot(KRCT\cdot[HDL]\cdot[PLAQUE])$$