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|  | Name | Description |
| R1 | activation of quiescent stem cells | constant rate in the model |
| R2 | quiescence of active stem cells | constant rate in the model |
| R3 | transition into mitotic state of active stem cells | occurs to cells not experiencing senescence or apoptosis in the cycle, inhibited by crowding |
| R4 | active stem cell renewal through mitosis | a constant percentage of daughter cells remain as stem cells. of these, those that does not immediately undergo replicative senescence contributes towards renewal of active stem cells |
| R5 | replicative senescence of active stem cell immediately after mitosis | a constant percentage of daughter cells remain as stem cells. of these, some immediately undergoes replicative senescnece. rates of replicative senescence depends on generation number of cell, ROS concentration, external geonotic agents and rate of DNA damage repair. |
| R6 | differentiation of active stem cell through mitosis | a constant percentage of daughter cells differentiates. of these, those that does not immediately undergo replicative senescence contributes towards renewal of active stem cells |
| R7 | differentiation of active stem cell through mitosis followed by immediate replicative senescence | a constant percentage of daughter cells differentiates. of these, some immediately undergoes replicative senescnece. rates of replicative senescence depends on generation number of cell, ROS concentration, external geonotic agents and rate of DNA damage repair. |
| R8 | transition into mitotic state of differentiated cells | occurs to cells not experiencing senescence or apoptosis in the cycle, inhibited by crowding |
| R9 | differentiated cell renewal through mitosis | daughter cells which do not immediately undergo replicative senescence after mitosis contributes towards renewal of differentiated cells |
| R10 | replicative senescence of differentiated cells immediately after mitosis | some daughter cells immediately undergoes replicative senescnece. rates of replicative senescence depends on generation number of cell, ROS concentration, external geonotic agents and rate of DNA damage repair. |
| R11 | senescence of quiescent stem cells | quiescent cells only experiences DNA damage induced senescence, which depends on ROS concentration, external geonotic agents and rate of DNA damage repair. |
| R12 | senescence of active stem cells during interphase | active stem cells experiences DNA damage induced senescence and SASP induced senescence. Rate of DNA damage induced senescence depends on ROS concentration, external geonotic agents and rate of DNA damage repair. Rate of SASP induced senescence depends on ratio between total senescent cells and total cells. |
| R13 | senescence of differentiated cells during interphase | differentiated cells experiences DNA damage induced senescence and SASP induced senescence. Rate of DNA damage induced senescence depends on ROS concentration, external geonotic agents and rate of DNA damage repair. Rate of SASP induced senescence depends on ratio between total senescent cells and total cells. |
| R14 | cell death of active stem cells | crowding and unrepaired DNA damage could stimulate apoptosis in active stem cells. rate of unrepaired DNA damage is determined by ROS concentration, external geonotic agents and rate of DNA damage repair. |
| R15 | cell death of senescent stem cells | crowding and unrepaired DNA damage could stimulate apoptosis, and immunosurveillance also contribute to clearing of senescent stem cells |
| R16 | cell death of differentiated cells | crowding and unrepaired DNA damage could stimulate apoptosis in differentiated cells. rate of unrepaired DNA damage is determined by ROS concentration, external geonotic agents and rate of DNA damage repair. |
| R17 | cell death of senescent differentiated cells | crowding and unrepaired DNA damage could stimulate apoptosis, and immunosurveillance also contribute to clearing of senescent differentiated cells |

