Supplementary Material

Parameters values

Maximal growth rate of tumor, "r". The least squares method is used for Castillo-Montiel et. al [2] to adjust the maximal growth rate to a Gompertz function, obtaining a growth rate of $0.001h^{-1}$ with an error of 4.95%.

For its estimation, measurements of average tumor diameters was used in control mice immunotherapy; a spherical shape is assumed for the measured tumors, then the average population is obtained on tumor cells.

Tumor carrying capacity, "K". The maximum population size of tumor cells can be limited by the environment and represented by the tumor carrying capacity which is calculated using the same procedure as Castillo-Montiel et. al [2]. The value determined was $6.75 * 10^{15}$ cells.

In the other hand, Kronik et. al [5] the determined the value of tumor carring capacity "K" in 10^{11} cells and this value is used in some of our numerical experiments.

Maximal efficiency of citotoxic cells, "a_T". This parameter represents the efficiency at which the cytotoxic cells kill the tumor cells. This value was taken from the values proposed by Arciero et. al [1] and Kronik et. al [4] and set at $0.12h^{-1}$.

Saturation efficiency of CTLs to a large tumor size, "h_T". Using the results obtained by Kronik et. al [4], the value of the parameter was set at $5 * 10^8$ cells.

Maximal reduction effect of "$TGF - \beta$" on CTLS efficiency, "$a_{T,\beta}$". Using the results, about the CTL efficacy, obtained by Kronik et al., [5], the value of $0.69h^{-1}$ in the model was used.

Dependence of CTLs efficiency on $TGF - \beta$, "$e_{T,\beta}$". We used the estimation of Peterson et. al [8] and set the value of "$e_{T,\beta}$" at $10^4 pg$.

Expansion rate of activated CTL, "r_e". The value of "r_e" parameter was set at $3.5416h^{-1}$ but it was found in a interval search between $10h^{-1}$ and $300h^{-1}$ taking into account the models proposed by Ludwing et al. [7].

Threshold in DC density for half-maximal proliferation rate of CTLs, "θ_D". we set on 212 cells this parameter and using the values determined by De Pillis et al. [3].

Activation rate of CTLs, "r_a". The data used in the model was proposed by Ludewing et al. [7], in this model $0.00004(cells * h)^{-1}$ is used

Death rate of activated CTLs in tumor compartment, "μ_{C_a}" The value "μ_{C_a}" is calculated at $0.01925h^{-1}$ by De Pillis et al. [3] based on the later.

Production rate of $TGF-\beta$ by a single tumor cell, "$r_{T,\beta}$". We used the estimation value obtained by Kronik et. al [5] and set the parameter at $5.57 * 10^{-6}$ $pg(cell * h)^{-1}$ value.

Degradation rate $TGF-\beta$, "$\mu\beta$". The model uses the value obtained by Kronik et al., [5] and we set at $7h^{-1}$ the value of the degradation rate of $TGF-\beta$.

Natural death rate of DCs, "μ_D". We used values obtained by Ludewing et al. [7] in order to determinate the value of "μ_D", obtaining the following value $0.009625h^{-1}$.

References

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Table 1: Parameters used in the model

Parameter	Name	Value	Observations
r_T	Maximum rate of tumor growth	0.001 h^{-1}	Kronik et. al [5] and Castillo-Montiel E. et. al [2].
K	carrying capacity of tumor	$6.754X10^{15}$ $cell$ 10^{11} $cell$	Observing the biological results, the mice is sacrified when the tumor reached a diameter of 4.3 cm Castillo-Montiel E. et. al [2]; Kronik et. al [5]
a_T	Maximum efficiency of cytotoxic cells	0.12 h^{-1}	[1] and [4]
h_T	Saturation efficiency of CTLs to a large tumor size	$5 \times 10^8 cell$	[6] and [4]
$a_{T\beta}$	Maximum effect of reduction of the cytokine $TGF - \beta$ in the efficiency of CTLs	0.69 none	[9] and [5]
$e_{T\beta}$	Dependence of CTLs the efficiency in the efficiency of $TGF - \beta$	10^4 pg	[8] and [5]
r_e	Rate of expansion of CTLs by CD	3.5416 h^{-1}	[7]
θ_D	Limit the density of the CD by the maximum rate of proliferation of CTLs	212 $cells$	[7]
r_a	Activation rate of CTLs by CD	0.00004 $(cell * h)^{-1}$	[7]
μ_{C_a}	Death rate of CLTs activated at the tumor site	0.01925 h^{-1}	[3]
$r_{T\beta}$	Production rate TGF $TGF - \beta$ by a single tumor cell	5.57×10^{-6} $pg(cell \times h)^{-1}$	[5]
μ_β	Degradation rate of $TGF - \beta$	$7h^{-1}$	[5]
C_{naive}	Number of naive CTL cells contributing to primary clonal expansion	370 $cells$	[3] $(ah\ doc)$
μ_D	Rate death of D cells	0.009625 h^{-1}	[7]$(ah\ doc)$