

# A multiscale model of complex endothelial cell dynamics in early angiogenesis

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Parameter	Units	Description	Value used in simulations	Ref.
$R_s$	$\mu m$	Interaction radius.	15	estim., [1, 2]
$b_N$	$molec \cdot time^{-1}$	Baseline Notch receptor expression.	500	[3, 4]
$b_D$	$molec \cdot time^{-1}$	Baseline Delta ligand expression.	800	[3, 4]
$b_{R2}$	$molec \cdot time^{-1}$	Baseline VEGFR2 expression.	800	[4]
$I_0$	$molec$	Activation threshold for NICD.	100	[4]
$R2_0^*$	$molec$	Activation threshold for activated VEGFR2.	200	[4]
$\lambda_{I,N}$	<i>dimensionless</i>	Weight factor characterising fold change of the production rate of Notch receptor depending on the NICD concentration.	4.0	[3, 4]
$\lambda_{R2^*,D}$	<i>dimensionless</i>	Weight factor characterising fold change of the production rate of Delta ligand depending on the activated VEGFR2 concentration.	2.0	[4]
$\lambda_{I,R2}$	<i>dimensionless</i>	Weight factor characterising fold change of the production rate of VEGFR2 depending on the NICD concentration.	0.0	[4]
$n_N$	<i>dimensionless</i>	Cooperativity parameter for Hill function for NICD-dependent Notch up-regulation.	2	[5]
$n_D$	<i>dimensionless</i>	Cooperativity parameter for Hill function for activated VEGF-dependent Delta up-regulation.	1	[5]
$n_{R2}$	<i>dimensionless</i>	Cooperativity parameter for Hill function for NICD-dependent VEGFR2 repression.	1	[5]
$V$	$molec$	External VEGF.	2500 (Fig 3E); 0 – 2500 (Fig 3F); {0, 2500, 25000} (in the rest of the simulations)	[3, 4]
$D_{ext}$	$molec$	External Delta ligand.	0 – 3000 (Fig 3E and 3F); calculated from adjacent cells (in the rest of the simulations)	[3, 4]
$N_{ext}$	$molec$	External Notch receptor.	1000 (Fig 3E and 3F); calculated from adjacent cells (in the rest of the simulations)	[3, 4]
$k_t$	$molec^{-1} \cdot time^{-1}$	Trans-binding rate for Notch receptor and Delta ligand.	$5.0e - 5$	[5]
$k_c$	$molec^{-1} \cdot time^{-1}$	Cis-interaction rate for Notch receptor and Delta ligand.	$6.0e - 4$	[5]
$k_v$	$molec^{-1} \cdot time^{-1}$	Binding rate for VEGFR2 and external VEGF.	$5.0e - 5$	[4]
$\eta$	<i>dimensionless</i>	Endocytic regulation of Notch signalling.	0.5	estim., [6]
$\gamma$	$time^{-1}$	Degradation rate of proteins.	0.1	[4]
$\gamma_e$	$time^{-1}$	Degradation rate of activated receptors.	0.5	[4]

**S1 Table. Baseline parameter values for the VEGF-Delta-Notch subcellular model.** Description and reference values used in simulations of the subcellular VEGF-Delta-Notch signalling.

## References

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