

Table S3. Estimated parameter values

Parameter	Range	Units	Justification
r_{on}	$[10^0, 10^2]$	$\mu\text{M}^{-1} \text{sec}^{-1}$	Assume to be in a similar range as BPs
r_{off}	$r_{on} * [10^{-5}, 10^{-3}]$	sec^{-1}	(Allenby et al., 1994) The receptor dissociation constant is in the order of 0.1 nM (another measurement was 10 nM)
m_{on}	$[10^0, 10^2]$	$\mu\text{M}^{-1} \text{sec}^{-1}$	$5.1 * 10^1 \mu\text{M}^{-1} \text{sec}^{-1}$ (Dong et al., 1999)
m_{off}	$m_{on} * [10^{-5}, 10^{-3}]$	sec^{-1}	Binding proteins have less affinity with RA (greater K_d) than receptors. The K_d for binding proteins is measured between 0.06 and 0.13 nM (Dong et al., 1999)
j_α	$[10^{-2}, 10^3]$	$\mu\text{M}^{-1} \text{sec}^{-1}$	Unknown. A large range is used
j_β	$[10^{-2}, 10^3]$	$\mu\text{M}^{-1} \text{sec}^{-1}$	Unknown. A large range is used
r_{deg1}	$[10^{-6}, 10^{-4}]$	sec^{-1}	Half-life of receptors is ~4 hours
r_{deg2}	$r_{deg1} * [10^{-1}, 10^1]$	sec^{-1}	Unknown, assumed to be within range of r_{deg1}
bp_{deg1}	$[10^{-6}, 10^{-4}]$	sec^{-1}	Same assumption as for receptor degradation
bp_{deg2}	$bp_{deg2} * [10^{-1}, 10^1]$	sec^{-1}	Same assumption as for receptor degradation
ra_{deg}	$[1, 10^4]$	sec^{-1}	500sec^{-1} was used by White et al. (White et al., 2007). Here we consider a large range
$rabp_{deg}$	$[1, 10^4]$	sec^{-1}	Assume maximum degradation at the anterior region due to high Cyp26a1 concentration
V_R	$\text{Min}(r_{deg1}, r_{deg2}) * [10^{-4}, 10^0]$	$\mu\text{M} \text{sec}^{-1}$	Receptor synthesis is assumed to be in the same range as V_{BP}
V_{BP}	$\text{Min}(bp_{deg1}, bp_{deg2}) * [10^{-4}, 10^0]$	$\mu\text{M} \text{sec}^{-1}$	The concentration of BP is $\sim 10^{-2} \mu\text{M}$ (Napoli, 1996). We use a wide range, from 10^{-4} to $10^0 \mu\text{M}$