

Table S1. Summary of the model's parameters

Variable	Description	Units
$C_{DI,n}^h$	Concentration of unbound DI in nucleus of compartment 'h'	mol/[l] ³
$C_{DI,c}^h$	Concentration of free Dorsal in compartment 'h' in cytoplasm	mol/[l] ³
$C_{DI-Cact,c}^h$	Concentration of DI-Cact complex in compartment 'h' in cytoplasm	mol/[l] ³
$C_{Cact,c}^h$	Concentration of free Cact in compartment 'h' in cytoplasm	mol/[l] ³
C_{DI}^o	Concentration of DI-Cact complex at beginning of cycle 10	mol/[l] ³
C_{Cact}^o	Concentration of Cact at beginning of cycle 10	mol/[l] ³
A_n	Area of a nucleus	[l] ²
A_n^{14}	Area of a nucleus at the end of cycle 14	[l] ²
V_n	Volume of a nucleus	[l] ³
V_n^{14}	Volume of a nucleus at the end of cycle 14	[l] ³
A_m	Surface area between adjacent compartments	[l] ²
A_m^{14}	Surface area between adjacent compartments at cycle 14	[l] ²
V_C	Volume of excluded cytoplasmic region in a compartment	[l] ³
k_i	Surface reaction rate constant for nuclear import	[l]/[t]
k_e	Surface reaction rate constant for nuclear export	[l]/[t]
Γ	Transport coefficient per unit area of the compartment boundary	[l]/[t]
k_D	Reaction rate constant for dissociation of the DI-Cact complex	1/[t]
k_b	Reaction rate constant for association of DI and Cact to form DI-Cact complex	[l] ³ / mol.[t]
k_{Deg}	Reaction rate constant for first order degradation of free Cactus	1/[t]
P	Rate of production of Cactus	mol/[t].[l] ³
T	Total time from cycle 10 to cycle 14	[t]
T_{int}	Time interval of interphase of cycle 'int'	
L	Length of the system from the ventral to the dorsal end (half circumference of the DV cross-section)	[l]