

Table S1. Variables and parameters

parameters and variables	definition
COOP	co-orientational order parameter
OOP	orientational order parameter
P	construct P, the first construct
$\vec{q}_i$	a set of pseudo vectors for construct P
$p_{i,x}$	a set of pseudo vectors for construct P for the x component
$p_{i,y}$	a set of pseudo vectors for construct P for the y component
Q	construct Q, the second construct
$\vec{q}_i$	a set of pseudo vectors for construct Q
$q_{i,x}$	a set of pseudo vectors for construct Q for x
$q_{i,y}$	a set of pseudo vectors for construct Q for y
$\mathbb{T}_K$	mean order tensor
$OOP_K$	orientational order construct of K
K	either construct P or construct Q
$\vec{k}_i$	either a set of pseudo vectors for either construct P or construct Q
$k_{i,x}$	the x component of the pseudo vector
$k_{i,y}$	the y component of the pseudo vector
F	new field that represents the angle ( $\theta$ ) between the two constructs P and Q
$\theta$	angle between $\vec{p}_i$ and $\vec{q}_i$ or random noise
$\vec{f}_i$	a set of pseudo vectors for the COOP
$f_{i,x}$	the x position of the pseudo vector
$f_{i,y}$	the y position of the pseudo vector
$\mathbb{T}_{PQ}$	mean order tensor of the system
$COOP_{PQ}$	co-orientational order parameter of P and Q
$\hat{n}$	the director
$f'_{i,x}$	the x position of the pseudo vector with the switch of P and Q
$f'_{i,y}$	the y position of the pseudo vector with the switch of P and Q
$COOP_{QP}$	co-orientational order parameter of Q and P
$\nu$	angle used to rotated field
$Q_{rot}$	rotated construct Q
$\vec{q}_{i,rot}$	a rotated set of pseudo vectors for construct $Q_{rot}$
$F_{rot}$	rotated field F
$\vec{f}_{i,rot}$	rotated vectors $\vec{f}_i$
$\langle f_{i,rot,x} \rangle$	the mean of the rotated vectors in the x position
$\langle f_{i,rot,y} \rangle$	the mean of the rotated vectors in the y position
$COOP_{rot}$	the rotated COOP
$\hat{n}_p$	the director of construct P
$\hat{n}_q$	the director of construct Q
$\theta_0$	the mean angle between P and Q
$\alpha$	angle of the vector $\vec{p}$
$\beta$	angle of the vector $\vec{q}$
$COOP_u$	uncorrelated COOP
COOP anti-cor	anti-correlated COOP
$n$	$\{1, 2, \dots\}$
$COOP_c$	correlated COOP
COOP ultra-cor	ultra-correlated COOP
$\alpha_i$	angles of vectors
$\theta_i$	angles of vectors
$i$	$\{1, \dots, n\}$
Normalized COOP	the normalized COOP value
$\sigma_{COOP_u}$	standard deviation of the uncorrelated COOP
$\sigma_{COOP_c}$	standard deviation of the correlated COOP
$\sigma_{OOP}$	the OOP error
N	sample size
p	p-value
$W_i$	weight
$\rho$	density
$COOP_{sarc}$	the COOP of Z-lines for each cell wise comparison
$COOP_{actin}$	the COOP of actin for each cell wise comparison