A mechanochemical model for embryonic pattern formation: Coupling tissue mechanics and morphogen expression

SUPPORTING INFORMATION

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TABLE 1: Notations and definitions

For the convenience of the reader, let us shortly repeat the general notations and definitions used in this paper. For more details we refer to [1].

$\partial_i[.]$	partial derivative with respect to u_i.
$\partial_i\vec{X}$	basis vector of the tangential space, i.e. $\partial_i\vec{X} = \partial_i[\vec{X}]$
$d_t\left[.\right]$	total time derivative,
$(g_{ij})_{i,j}$	first fundamental tensor, $g_{ij} = \partial_i\vec{X} \cdot \partial_j\vec{X}$, where $ds = \sqrt{g}\, d^2u$, and g is its determinant.
$(b_{ij})_{i,j}$	second fundamental tensor, $b_{ij} = -\partial_i\vec{X} \cdot \partial_j\vec{n}$.
g^{ij}	component of the inverse first fundamental tensor,
$\int \ldots ds$	surface integral on a manifold, $ds = \sqrt{g}\, d^2u$.
$\nabla^\Gamma[.]$	first surface gradient: $\nabla^\Gamma\left[f\right] = \sum_{i,j} g^{ij}\partial_j\left[f\right]\partial_i\vec{X}$,
$\Delta^\Gamma\left[.\right]$	first surface Laplacian: $\Delta^\Gamma\left[f\right] = \frac{1}{\sqrt{g}}\sum_{i,j}\partial_i\left[\sqrt{g}g^{ij}\partial_j[f]\right]$.
$\delta^\alpha\left[F\right]$	Fréchet-derivative or variation with respect to α,
$\delta F/\delta\vec{X}(\vec{u})$	strong formulation of $\delta^{\vec{X}}\left[F\right]$ in $\vec{X}(\vec{u})$,
H	mean curvature, $H = \mathrm{trace}(\sum_k g^{jk}b_{ij})$,

References

1. Mercker M, Marciniak-Czochra A, Hartmann D (2013) Modeling and computing of deformation dynamics of inhomogeneous biological surfaces. SIAM J Appl Math 73(5): 1768-1792.