Erratum: Comparison of cellular oscillations driven by noise or deterministic mechanisms under cell-size scaling [Phys. Rev. E **94, 042425 (2016)]**

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In an earlier draft of our paper, we had considered elementary biochemical reactions, such as the binding of two different molecules to form a dimer or the dissociation of a dimer into two separate molecules where each reaction instance only changed the molecule number of the reactants by one at most. While we eventually shifted our attention to composite reactions, we did not update our earlier draft on this aspect. Thus a mistake incurred in the printed version of our paper. The following are the corrections to this mistake. Note that all the changes made in this Erratum do not affect the conclusions of the original paper.

The first correction involves replacing Eq. (1) and the paragraph before it with:

“Our study is presented within the framework of stochastic differential equations. In this framework, a biochemical network is expressed via a tuple: $(\vec{x}, \vec{u}(\vec{x}))$, where $\vec{x}$ is a vector representing the amount of each type of reactant; $\vec{u}(\vec{x})$ is a vector with element u_j representing the reaction rate of reaction j . In addition, a_{ji} is the change in the number of molecules of reactant i after the occurrence of one instance of reaction j . With the system denoted this way, its dynamics can be fully expressed as follows:

$$dx_i = \sum_{j=1}^r a_{ji} u_j(\vec{x}) dt + \sum_{j=1}^r a_{ji} \sqrt{u_j(\vec{x})} dB_{ij}.”$$

Because this error propagates to the other equations, we have to make the following series of replacements:

(a) Change Eqs. (4) and (5) to

$$v_i \equiv \sum_{j=1}^r a_{ji} u_j(\vec{x}), \quad L_i \equiv \sum_{j=1}^r a_{ji} \sqrt{u_j(\vec{x})} dB_{ij},$$

(b) change Eq. (7) to

$$dx_i = \sum_j a_{ji} u_j(\vec{x}) dt,$$

(c) change Eq. (8) to

$$\hat{\eta}_c(\vec{x}, \vec{u}(\vec{x})) = (\eta_c \vec{x}, \eta_c \vec{u}(\vec{x})).$$

(d) Change the text and equations that are located eight lines below Eq. (8) to “Denoting the system postoperation as $(\vec{x}_c, \vec{u}_c(\vec{x}_c))$ in the reaction chamber of size V_c , we have

$$V_c = \eta_c V, \quad x_{ci} = \eta_c x_i, \quad u_{cj}(\vec{x}_c) = \eta_c u_j(\vec{x}).”$$

(e) Change Eqs. (9) and (10) to

$$dx_{ci} = \sum_j \left(a_{ji} u_{cj}(\vec{x}_c) dt + a_{ji} \sqrt{u_{cj}(\vec{x}_c)} dB_{ij} \right) \iff dx_i = \sum_j \left(a_{ji} u_j(\vec{x}) dt + \eta_c^{-1/2} a_{ji} \sqrt{u_j(\vec{x})} dB_{ij} \right).$$

(f) Change Eq. (12) to

$$\xi \equiv \frac{\sum_j a_{ji} \sqrt{u_{cj}(\vec{x}_c)}}{\sum_j a_{ji} u_{cj}(\vec{x}_c)} = \eta_c^{-1/2}.$$

(g) Change the set of equations after Eq. (25) to

$$y_i \equiv x_i - x_{oi}, \quad M_{ij} \equiv \frac{\partial}{\partial x_j} \left(\sum_{k=1}^r a_{ki} u_k \right) \bigg|_{\vec{x}=\vec{x}_o}, \quad \sigma_{ik} \equiv a_{ki} \sqrt{u_k(\vec{x}_o)},$$

Finally, we replace Eq. (B2) by the following equations for the purpose of defining y_{ci} and u_i :

$$y_{ci} \equiv x_{ci} \eta_c^{-1/2} \Gamma_i^{-1}, \quad u_i \equiv v_i \eta_c^{1/2} \Gamma_i^{-1}.$$