CORRECTION

Correction to: Resolving molecular contributions of ion channel noise to interspike interval variability through stochastic shielding

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Correction to: Biological Cybernetics

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Due to a miscommunication, uncorrected page proofs were published that contained several minor errors. A corrected version of the article is available online. We provide the following corrigendum to clarify the correct forms of the mathematical expressions that were incorrectly typed. These corrections do not alter the argument, conclusions, or correctness of the theorems and other results given in the original paper.

1. Figure 1 compares voltage traces recorded from Purkinje cells from a wild-type and a *leaner* mutant mouse. The caption for panel 1(b) incorrectly states that the variability of the mutant (CV=30%) is “twice” the variability of the wild-type (CV=3.9%). The correct statement is simply that the mutant shows *greater* variability than the wild-type.

2. In §2.5 (Small-noise expansions), equation (27) is written with unbalanced parentheses. The correct expression should read

$$\mathbb{E}^{\mathbf{x}} [\phi(\mathbf{X}(\tau))] = \phi(\mathbf{x}) + \mathbb{E}^{\mathbf{x}} \left[\int_0^\tau \mathcal{L}^\dagger [\phi(\mathbf{X}(s))] ds \right].$$

3. In §3.1 (Assumptions for decomposition of the full noise model), in stating assumption A2, the text refers to channel state occupancy $q_{i(t)}$. It should instead refer to $q_{i(k)}$, namely, the fractional occupancy of the channel state $i(k)$ which is the source node for the k th transition.

4. In §E.1 (Comparison with Giacomini et al. (2018)), we state an approximation of the form “ $d\tilde{\theta} \approx 1 + \varepsilon^2 b + \varepsilon \sigma dW_t$, for some constants a and $b...$ ”. The correct expression should be “ $d\tilde{\theta} \approx (1 + \varepsilon^2 b) dt + \varepsilon \sigma dW_t$, for some constants σ and $b...$ ”. There is no constant a associated with the relevant equation.

5. In §B (Diffusion matrix of the 14D model), the matrices S_K and S_{Na} were typed incorrectly. The correct expressions are as follows:

$$S_K = \frac{1}{\sqrt{N_{\text{ref}}}} \begin{bmatrix} -\sqrt{4\alpha_n n_0} & \sqrt{\beta_n n_1} & 0 & 0 \\ \sqrt{4\alpha_n n_0} & -\sqrt{\beta_n n_1} & -\sqrt{3\alpha_n n_1} & \sqrt{2\beta_n n_2} \\ 0 & 0 & \sqrt{3\alpha_n n_1} & -\sqrt{2\beta_n n_2} \dots \\ 0 & 0 & 0 & 0 \\ \dots & -\sqrt{2\alpha_n n_2} & \sqrt{3\beta_n n_3} & 0 & 0 \\ \sqrt{2\alpha_n n_2} & -\sqrt{3\beta_n n_3} & -\sqrt{\alpha_n n_3} & \sqrt{4\beta_n n_4} \\ 0 & 0 & \sqrt{\alpha_n n_3} & -\sqrt{4\beta_n n_4} \end{bmatrix},$$

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$$\begin{aligned}
S_{\text{Na}}^{(1:5)} &= \frac{1}{\sqrt{M_{\text{ref}}}} \begin{bmatrix} -\sqrt{\alpha_h m_{00}} & \sqrt{\beta_h m_{01}} & -\sqrt{3\alpha_m m_{00}} & \sqrt{\beta_m m_{10}} & 0 \\ 0 & 0 & \sqrt{3\alpha_m m_{00}} & -\sqrt{\beta_m m_{10}} & -\sqrt{\alpha_h m_{10}} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ \sqrt{\alpha_h m_{00}} & -\sqrt{\beta_h m_{01}} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \sqrt{\alpha_h m_{10}} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \\
S_{\text{Na}}^{(6:10)} &= \frac{1}{\sqrt{M_{\text{ref}}}} \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ \sqrt{\beta_h m_{11}} & -\sqrt{2\alpha_m m_{10}} & \sqrt{2\beta_m m_{20}} & 0 & 0 \\ 0 & \sqrt{2\alpha_m m_{10}} & -\sqrt{2\beta_m m_{20}} & -\sqrt{\alpha_h m_{20}} & \sqrt{\beta_h m_{21}} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ -\sqrt{\beta_h m_{11}} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \sqrt{\alpha_h m_{20}} & -\sqrt{\beta_h m_{21}} \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \\
S_{\text{Na}}^{(11:15)} &= \frac{1}{\sqrt{M_{\text{ref}}}} \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ -\sqrt{\alpha_m m_{20}} & \sqrt{3\beta_m m_{30}} & 0 & 0 & 0 \\ \sqrt{\alpha_m m_{20}} & -\sqrt{3\beta_m m_{30}} & -\sqrt{\alpha_h m_{30}} & \sqrt{\beta_h m_{31}} & 0 \\ 0 & 0 & 0 & 0 & -\sqrt{3\alpha_m m_{01}} \\ 0 & 0 & 0 & 0 & \sqrt{3\alpha_m m_{01}} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \sqrt{\alpha_h m_{30}} & -\sqrt{\beta_h m_{31}} & 0 \end{bmatrix} \\
S_{\text{Na}}^{(16:20)} &= \frac{1}{\sqrt{M_{\text{ref}}}} \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ \sqrt{\beta_m m_{11}} & 0 & 0 & 0 & 0 \\ -\sqrt{\beta_m m_{11}} & -\sqrt{2\alpha_m m_{11}} & \sqrt{2\beta_m m_{21}} & 0 & 0 \\ 0 & \sqrt{2\alpha_m m_{11}} & -\sqrt{2\beta_m m_{21}} & -\sqrt{\alpha_m m_{21}} & \sqrt{3\beta_m m_{31}} \\ 0 & 0 & 0 & \sqrt{\alpha_m m_{21}} & -\sqrt{3\beta_m m_{31}} \end{bmatrix},
\end{aligned}$$

where $S_{\text{Na}}^{(i:j)}$ is the i^{th} - j^{th} column of S_{Na} .

The original article has been updated.

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