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Correction

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A New Computational Method for Membrane Compressibility: Bilayer Mechanical Thickness Revisited

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Eq. 7 in the original publication mistakenly included an inter-leaflet coupling term $W = \sum_{i,j} \sigma^2(a_{xi}, a_{yj})$ about which we asserted that it must be equal to 0. In fact, this term should not have been included at all in that equation. The correct form of the equation is:

$$\sigma^2(A) = \frac{\sum_i \sigma^2(a_{xi}) + \sum_i \sigma^2(a_{yi})}{2} + \frac{\sum_{i \neq j} \sigma^2(a_{xi}, a_{xj}) + \sum_{i \neq j} \sigma^2(a_{yi}, a_{yj})}{2} \tag{7}$$

That W is not 0, but rather equal to $\sigma^2(A)$, is demonstrated below in relation to the correct form of Eq. 7.

We note that this correction to Eq. 7 does not affect the derivation that follows from it, and the original results of the publication are unchanged. We thank Prof John Nagle for pointing out the original inconsistency and initiating the discussion about the W term.

Quantification of W: Subject to the constraint $A = A_x = A_y$ (where A denotes the bilayer area, and A_x and A_y represent the areas of the two leaflets),

$$\sigma^2(A) = \sigma^2(A_x) = \sigma^2(A_y) = \frac{\sigma^2(A_x) + \sigma^2(A_y)}{2}, \tag{1}$$

which after expansion becomes:

$$\sigma^2(A) = \frac{\sum_i \sigma^2(a_{xi}) + \sum_{i \neq j} \sigma^2(a_{xi}, a_{xj}) + \sum_i \sigma^2(a_{yi}) + \sum_{i \neq j} \sigma^2(a_{yi}, a_{yj})}{2}. \tag{2}$$

Eq. 2 is the same as Eq. 7 above and it does not include W. An alternative way to express $\sigma^2(A)$ is as:

$$\sigma^2(A) = \sigma^2\left(\frac{A_x + A_y}{2}\right) = \frac{\sum_i \sigma^2(a_{xi}) + \sum_{i \neq j} \sigma^2(a_{xi}, a_{xj}) + \sum_i \sigma^2(a_{yi}) + \sum_{i \neq j} \sigma^2(a_{yi}, a_{yj}) + 2W}{4} \tag{3}$$

where $W = \sum_{ij} \sigma^2(a_{xi}, a_{yj})$ represents inter-leaflet coupling. However, since Eq. (2) and Eq. (3) are equal, it must be the case that:

$$W = \sigma^2(A) \neq 0. \tag{4}$$

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