Comments and Corrections

Corrections to “Enhanced Ultraviolet Spectroscopy by Optical Clearing for Biomedical Applications”

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Recently, we found that two of the equations and the corresponding explanation in the paper referred in [1] are not entirely accurate, and would like to correct this by publishing the present errata.

Considering the text in [1] from the paragraph above (7) to the paragraph below (8), and also those two equations, the corrections are as follows.

Then, using (3) and the permeability $P = D/l$ of a two-layered tissue, 1 and 2, as [2]

$$\frac{1}{P} = \frac{1}{P_1} + \frac{1}{P_2}, \quad (7)$$

the total diffusion coefficient can be derived as

$$D = \frac{D_1 D_2 (l_1 + l_2)}{D_1 l_2 + D_2 l_1}, \quad (8)$$

where D_1, D_2 and l_1, l_2 are diffusion coefficients and thicknesses of each layer, respectively.

As an upper limit for estimation of D_1, the diffusion coefficient of water in a lipid membrane $D_1 = D_{\text{lipid}} \cong 3.0\times10^{-7}$ cm^2/s could be appropriate [33], because EP is the epithelial cell structure. To evaluated D_2 for less dense and more permeable LP layer the concept of hindered molecule mobility in tissues relative to diffusion water in water D_{w}, which is quantified by such parameter as tortuosity of tissue σ, can be used [34]:

$$\sigma = \frac{l_d}{L} = \sqrt{\frac{D_w}{D}}, \quad (9)$$

which is the ratio of the path length of the molecular flow between two points l_{d} to the direct distance between these points L. Here D is the effective diffusion coefficient accounting for elongation of diffusion path of water molecules. Tortuosity of tissues is in the range from 1.2 for brain to 3–3.5 for skin dermis [34], [35]. For gingival LP layer $\sigma = 3.9$ should be good, thus for $D_{\text{w}} = 3.0\times10^{-5}$ cm^2/s [33] from (9) $D_2 = 2\times10^{-6}$ cm^2/s. For less permeable EP layer it is also possible to use such an estimation supposing tortuosity as 4.5, thus $D_1 = 1.5\times10^{-6}$ cm^2/s. Finally, from (8), the total diffusion coefficient is calculated as $D = 1.8\times10^{-6}$ cm^2/s, it well corresponds to experimental value $D = (1.78 \pm 0.22)^{-6}$ cm^2/s.

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