LETTER TO THE EDITOR

Permeability Coefficients by the Hemolytic Method: A Correction

Dear Sir:

In our paper (Saari and Beck, 1974) describing a method for determining the probability density function for the permeability coefficient for a particular solute and cell membrane, we made a fundamental error. The representation of Fick's law of diffusion was written:

$$dc/dt = (PA/V)(c_o - c), \tag{1}$$

where c is the time-dependent concentration of the solute in the cell; P is the permeability coefficient for the membrane; A is the membrane area; V is the time-dependent osmotically active volume of the cell; c_o is the constant concentration of solute in the suspending medium. This equation was integrated as if V were time-independent. We applied this analysis to human red blood cells (RBC) and used the hemolytic method to determine hemolysis time. In such a situation V varies with time. Therefore, the equation to be integrated is:

$$d(cV)/dt = PA(c_o - c), \tag{2}$$

Eq. 4 in our paper rather than Eq. 1 above becomes:

$$dc/dt = (PA/c_o^2V_o)(c_o - c)^3 \tag{3}$$

and integration yields:

$$P = (V_o/At_h)[c_h(c_o - c_h/2)/(c_o - c_h)^2] \tag{4}$$

where V_o is the initial osmotically active cell volume; t_h is the hemolysis time; $c_h = c(t_h)$. Then Eq. 8 in the paper should be:

$$P = (1/t_h)(Ad - 8.4\,V_o)(Ad + 3.6\,V_o)/72\,A\,V_o \tag{5}$$

where d is the diameter of the spherical RBC at hemolysis.

The inverse relation between P and t_h remains and the concept and general method of the paper remain valid. We have not computed new means using the procedure described in the paper and the corrected equation, but we wish to point out that use of the uncorrected form results in a value of the permeability coefficient 25% smaller than that resulting from use of the above Eq. 5 when mean values of d, V_o, and A are introduced.

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REFERENCE

SAARI, J. T. and J. S. BECK. 1974. Probability density function of the red cell membrane permeability coefficient. *Biophys. J.* **14**:33.

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