

〈原 著〉

ウサギ赤血球の溶血に及ぼす界面活性剤の影響

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Effect of Surfactants on Hemolysis of Rabbit Red Blood Cells

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Abstract

In order to estimate the effect of surfactants on biological membranes, the effect of 8 anionic, 9 cationic and 12 nonionic surfactants on the membranes of rabbit red blood cells were studied by using their hemolysis. The red blood cells were treated with the several concentrations of surfactant solutions and then their residual percentage were photometrically measured at 740 nm after standing for 20 min at the temperature of 37°C. The linear regression was obtained from the concentrations and the residual percentage of red blood cells and then an effective concentration causing the residual percentage of red blood cells at 50% (EC_{50}) was calculated from the linear regression. The effect of anionic surfactants on red blood cells depended on their alkyl chain length. The hemolysis of red blood cells appeared on the alkyl chain length 12 such as sodium dodecyl sulfate, sodium lauroyl L-glutamate and sodium dodecane sulfonate and the average of $1/EC_{50}$ was 0.21/mM. In the case of the cationic surfactants, the alkyl chain length was 14 such as tetradecyl trimethyl ammonium chloride and benzalkonium chloride. The longer were the alkyl chain lengths, the larger was the increase of $1/EC_{50}$. On comparing the starting point of hemolysis with the remarkably increasing point of the permeation of methylparaben and salicylic acid through the guinea-pig excised skin by using the alkyl chain length of anionic and cationic surfactants, both points were the same tendency. There were no relationship between the hemolysis of red blood cells and HLB of nonionic surfactants.

Key words: red blood cells, hemolysis, surfactants, permeation.