

New possibilities in pharmacological and pharmacokinetic researches

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In pharmacological and pharmacokinetic researches the important role belongs to analyses of substances in blood. Our research revealed that these substances in blood circulation selectively separate into two parts. The first part is well-known - the substances are transported in plasma. The second part (the substances are transported on surface of blood cells) is less known (1).

Among blood cells absolutely prevail erythrocytes. Erythrocytes adsorb different substances on its surface. Adsorption is regulated by neurohumoral affects. Substances "transported" from erythrocytes surface to mural layer of blood capillaries gain a possibility to participate in transcapillary and tissue exchange. We revealed that young and old erythrocytes have essential distinctions in transport of substances on surface of red blood cells. Absorption-transport function of erythrocytes is connected with many physiological processes in an organism (1, 2).

Erythrocytes are natural adsorbents of substances with heightened physico-chemical activity. So with aging and denaturation the adsorbing ability of proteins increases. Adsorbability of atherogenic lipids are higher than non-atherogenic lipids. Proteins and lipids with heightened adsorbability partially displace glucose from erythrocytes surface.

Certain selectiveness of many endogenous and exogenous substances to transport (inflow) in tissues are connected with different ability of these substances to adsorb on erythrocytes surface. We divide these substances by this ability into three groups: weakly (not strong) adsorbing, medium adsorbing and strongly adsorbing.

Glucose has relatively high adsorption ability on erythrocytes surface. In our experiments on narcotized animals under insulin effect a quantity of glucose decreased firstly among substances, adsorbed on erythrocytes, then in plasma, lastly its content decreased in lymph. Adrenalin simultaneously increases content of adsorbed and plasmas glucose.

In special conditions glucose displaces partially native proteins and lipids on the erythrocytes surface. Therefore, the ratio glucose/protein has changed sharper than quantity of glucose. The coefficient "glucose/protein" in the plasma of blood of astronauts on the day of landing increased to 66%. This coefficient among the substances adsorbed on the surface of erythrocytes increased to 1140% (3).

But our data specifies that the increase in the maintenance of glucose in blood conducts to removal of many substances from erythrocytes surface in plasma. Thus there can be a delay of receipt of a medicine in a tissue. At a diabetes 2 types receipt of medicines in a tissue also can be slowed down.

Often there is a recommendation to accept a medicine during meal or before meal. The recommendation is based on the data about higher maintenance of a

medicine in plasma after food intake. But the increase of glucose on the erythrocytes surfaces can delete a part of medicine from the surface of erythrocytes into plasma.

Transport of IgA of rats in plasma and on surface of erythrocytes is 37.8% and 62.8%. This ratio of IgG is 77.8% and 22.2%. This data and many other indicate importance of the analysis of substances transported on the surface of erythrocytes.

In our opinion, in pharmacological and pharmacokinetic researches is important to define in blood substances adsorbed and transported on erythrocytes surface.

Also, in our opinion, the diagnostic of following indicators are very important. 1) Adsorption ability (on surface of red blood cells) tested pharmacological substances in comparison with glucose. 2) Influence of tested pharmacological substances on quantity of glucose and the antibodies transported in blood on erythrocytes surface.

References

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