

TO THE QUESTION ABOUT THE INFLUENCE OF ANTIBIOTICS OF VARIOUS CLASSES ON THE MORPHOFUNCTIONAL STATE OF ERYTHROCYTES

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Annotation: The study of the clinical parameters of erythrocytic cells in the presence of antibiotics of different classes is considered in the article. The dose-dependent effect of changes in main indicators of erythrocytes, determined by duration of the interaction with the modifier has been established. The data obtained indicate a change in the degree of heterogeneity of erythrocyte population (volume of cells), the maximum reduction in anisocytosis to 12.85% was induced by doxycycline.

Keywords: erythrocytes, antibiotics, cell transformation.

Many years of research in the field of antibiotic therapy for inflammatory processes indicate that antibiotics have both therapeutic and side effects, often due to inappropriate use of the latter. It is known that in addition to the direct antibacterial effect aimed at stopping the infectious process, antibiotics are also capable of inducing so-called non-antibacterial effects of various kinds [2-5]. Due to the absence of evolutionarily determined in eukaryotic cells. targets for antibiotics, their action is directed towards a wide variety of cell populations. In this regard, when choosing an antibacterial drug, its immunomodulatory, anti-inflammatory and other properties can be taken into account. According to our previous studies and literature data, antibacterial drugs have a certain affinity for erythrocyte membranes and components of the erythrocyte matrix, inducing heterogeneous changes in HX morphofunctional characteristics [1,2]. Due to the fact that disruption of the functional properties of erythrocyte cells in conditions of the inflammatory process, their permeability to antibiotics can serve as a criterion for the

functioning of biomembranes in the body, it was of interest to study the main general clinical parameters of erythrocytes using the example of a model system "antibiotic -erythrocyte"

The work examined erythrocytes isolated from the blood of donors. Due to differences in the reference intervals for clinical parameters of male and female blood (RBC, HGB, NCT), we tested the blood of female donors as a control group. Antibiotics used to treat mycoplasma infection were used as modifying agents: 1) macrolide class: azithromycin (Sumamed, Croatia) $1.34 \cdot 10^5$ mol/l, $1.34 \cdot 10^5$ mol/l, roxithromycin (Roxithromycin 90%, Sigma -Aldrich) $7.2 \cdot 10^5$ mol/l, $7.2 \cdot 10^5$ mol/l, clarithromycin $1.33 \cdot 10^5$ mol/l, $1.33 \cdot 10^5$ mol/l (Klacid. Abbott S.p.A); josamycin $1.21 \cdot 10^5$ mol/l, $1.21 \cdot 10^5$ mol/l (Josamycin, Sigma-Aldrich); 2) tetracycline class: doxycycline $7.8 \cdot 10^5$ mol/l, $7.8 \cdot 10^5$ mol/l (Doxycycline hyclate 98% (TLC), Sigma-Aldrich); 3) lincosamide class: clindamycin $1.4 \cdot 10^5$ mol/l, $1.4 \cdot 10^5$ mol/l (Clindamycin 98% (HPLC), Sigma-Aldrich); 4) fluoroquinolone class: ciprofloxacin $1.21 \cdot 10^5$ mol/l, $1.21 \cdot 10^5$ mol/l (Ciprofloxacin, $\geq 98.0\%$ (HPLC) Sigma-Aldrich), ofloxacin $1.1 \cdot 10^5$ mol/l, $1.1 \cdot 10^5$ mol/l (Ofloxacin, Sigma-Aldrich), sparfloxacin $1.02 \cdot 10^5$ mol/l, $1.02 \cdot 10^5$ mol/l (Sparfloxacin 98% (HPLC) Sigma-Aldrich).

When performing a general clinical analysis of donor whole blood modified with the studied antibiotics in vitro (incubation time 2 min and 30 min), using the Drew Scientific EX2280 hematological analyzer, a deviation in the main parameters of erythrocyte cells relative to the control was revealed (control: RBC, $4.20 \cdot 10^{12}$ /l; HGB, 124.01 g/l; NCT, 36.84%; MCV, 87.714 fl; MCH, 29.52 pg; MCHC, 336.60 g/l; RDW, 13.60%). According to the data obtained, under the influence of antibiotics there was a change in the average volume of erythrocyte cells (MCV) and their distribution width (RDW) comparable to the control. Pre-incubation of cells with modifiers for 30 minutes revealed a dose-dependent change in the average number of red blood cells (RBC) and the ratio of hemoglobin level in a single cell to its volume (MCHC). The data obtained indicate a change in the degree of heterogeneity

erythrocyte populations (by cell volume), while the maximum decrease in the RDW parameter to 12.85% was induced by doxycycline at a concentration of $7.8 \cdot 10^5$ mol/l. Consequently, when antibiotics interact with erythrocytes, a time-dependent variation in their shape occurs, which confirms our data [1,2] on changes in the ratio of normal and pathological cells in the incubation environment: antibiotics cause dose-dependent heterogeneous changes in the erythrocyte population, leading to a decrease in the number of discocytes and the emergence of more

the number of irreversibly modified cell forms, i.e. to their accelerated aging.

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