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AbstractBook

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### IMBALANCE OF XANTHINE OXIDASE AND XANTHINE DEHYDROGENASE ACTIVITIES IN RED BLOOD CELLS OF SYSTEMIC CONNECTIVE TISSUE DISEASE PATIENTS

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**Objective:** Systemic lupus erythematosus (SLE) and systemic scleroderma (SSc) are prominent representatives of systemic connective tissue diseases. According to modern concepts, systemic manifestations are formed under the influence of both immunopathological mechanisms and metabolic disorders developing at the cellular and subcellular levels. We aim to evaluate the changes in xanthin oxidoreductase (XOR) interconvertible forms (xanthine oxidase and xanthine dehydrogenase) activities in lysed red blood cells (RBC) of SLE and SSc patients.

**Methods:** Diagnosis of SLE was verified using the SLICC criteria (2012), SSc – ACR/EULAR criteria (2013). Activities of xanthine oxidase (XO), EC 1.17.3.2 and xanthine dehydrogenase (XDG), EC 1.17.1.4 were measured in lysed RBC by spectrophotometric method [1]. The enzymatic activities were expressed as nmol/min/ml and normalized to  $1 \times 10^9$  cells/ml. Statistical comparison tests were selected in according to common guidelines. Differences were considered significant when  $p < 0.05$ .

**Results:** 56 adult SLE patients, 51 adult SSc patients and 35 healthy individuals were enrolled in the study. Both diseases accompanied by changes in XO and XDG activities of lysed RBC. In SLE, there was a significant decrease in XDG activity compared to healthy controls ( $p < 0.001$ ). In contrast to the control, lysed RBC from patients with SSc were characterized by an increase in the activity of XO against the background of a decrease in the activity of XDH ( $p < 0.001$  for both enzymes). The XO/XDG coefficient with SSc was higher than with SLE ( $p < 0.001$ ).

**Conclusion:** Significant changes of XOR activity were observed in lysed RBC of SLE and SSc patients. The changes were more expressed with the scleroderma process. According to the literature, it can be assumed that RBC XOR exhibits nitrite reductase activity in systemic connective tissue diseases [2]. Wherein reactive oxygen and nitrogen species are formed, which can have a damaging effect on RBC.

#### Reference:

1. Mozgovaya EE, et al. Siberian Journal of Life Sciences and Agriculture 2021;3:288
2. Ghosh S.M. et al. Randomized Controlled Trial Hypertension 2013;5:1091-1102.

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### ASSOCIATION BETWEEN XANTHIN OXIDOREDUCTASE ACTIVITY AND X-RAY STAGE IN RHEUMATOID ARTHRITIS

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**Objective:** The X-ray stage in rheumatoid arthritis (RA) indicates the severity of destructive processes in the joint structures. Bone erosions are formed most actively at II and III stages. In contrast to them, stage IV, in which multiple erosions are also detected, is characterized by the predominance of sclerotic processes with the formation of fibrous and bone ankylosis. We aim to study the activity of xanthin oxidoreductase (XOR) in plasma and lysed red blood cells (RBC) depending on the X-ray stage of RA.

**Methods:** Diagnosis of RA was verified using the ACR/EULAR criteria (2010). Activities of XOR interconvertible forms (xanthine oxidase (XO), EC 1.17.3.2 and xanthine dehydrogenase (XDG), EC 1.17.1.4) were measured in plasma and lysed RBC by spectrophotometric method [1]. The results were expressed as Me ( $Q_{25}; Q_{75}$ ). Spearman's correlation coefficient and Mann-Whitney U test were used. Differences were considered significant when  $p < 0.05$ .

**Results:** 77 adult RA patients (mean age 45 (37; 49) y; mean disease duration was 8 (6; 10) y) were enrolled in the study. 7 (9.1%) patients had I X-ray stage (by Steinbroker criteria), 39 (50.6%) – II stage, 24 (31.2%) – III stage, 7 (9.1%) – IV stage. Relationship with the stage of joint damage was revealed only for the XDG of lysed RBC ( $\rho = -0.33$ ,  $p = 0.003$ ). At the same time, some tendencies were traced. The XO activity of plasma was lower in I X-ray stage compared with stages II and III. The XDG activity was lower in I stage compared with stage II also. The activity of XO was lower and the activity of XDG was higher in lysed RBC at the I and II stage compared with stage III.

**Conclusion:** The highest oxidase activities of XOR were observed in X-ray stages II and III. The reactive oxygen and nitrogen species formed as a result of the increased enzyme activity, apparently, can take part in the processes of bone resorption and support the progression of the disease.

**Reference:** 1. Mozgovaya EE, et al. Siberian Journal of Life Sciences and Agriculture 2021;3:288