

INFLUENCE OF IONIZING RADIATION IN DOSE OF 1 GY ON CALCIUM TRANSFER IN RATS' PLATELETS

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The object of research was the specific changes in calcium transfer in rats' platelets, which were irradiated in dose of 1 Gy. Ca²⁺ is an essential second messenger in virtually all cells, regulating a wide range of fundamental cellular processes. In platelets, the elevation of endocellular calcium contributes to various steps of cellular activation, such as reorganization of the actin cytoskeleton, degranulation or inside-out activation of integrin αIIbβ3. Therefore, the activation of platelets has to be regulated with high fidelity to ensure that they become activated only under appropriate conditions. Platelets possess various adhesion receptors and sophisticated regulatory machinery in order to adhere in response to a well-defined set of stimuli. Platelet activation is triggered by various agonists, including subendothelial collagens, thromboxane A₂ (TxA₂) and ADP released from activated platelets, and thrombin generated by the coagulation cascade. Although these agonists act on different platelet receptors and trigger different signaling pathways, all lead to an increase in the intracellular Ca²⁺ concentration ([Ca²⁺]_i).

Keywords: calcium, platelet, store-operated calcium entry, radiation, thrombin

Research was made on male rats aged 3–6 months. Animals were irradiated (once and evenly) on IGUR device with γ – quants of ¹³⁷Cs in dosage of 1 Gy (power of dose 0,62 Gy/min, time – 2 minutes). Condition of calcium transfer was investigated on 3rd, 10th, 30th and 90th day. For quantitation of calcium concentration in platelets was used fluorescent probe Fura – 2/AM.

In rats' platelets on 3rd day after irradiation was seen increased level of basal calcium ions in non – calcium – containing and calcium – containing environment. On 10th day it was noted decreased level of calcium ions in cytoplasm and its' normalization in calcium – containing environment. On 30th day after irradiation concentration of calcium in non – calcium – containing and calcium environment almost matched values of control group, and on 90th day was slightly lower than control group's.

	Control	3 rd day after irradiation	10 th day after irradiation	30 th day after irradiation	90 th day after irradiation
Basal calcium level (100 umol/l EDTA), nmol/l	44,2±4,6	85,9±5,2*	31,1±6,2*	49,6±3,2	30,9±3,0
Basal calcium level (1 mmol/ CaCl ₂), nmol/l	74,9±11,8	181,7±0,5*	75,4±8,4	79,1±4,0	53,9±5,1

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