Determination of the effect of 3,3'-bisindole derivatives on rat erythrocyte 6PGD: an in vitro and in silico study

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Abstract— 6-Phosphogluconate dehydrogenase (6PGD; E.C.1.1.1.44) is an enzyme in the pentose phosphate pathway. It is a well-known oxidative carboxylase that catalyses conversion of 6-phosphogluconate into ribulose 5-phosphate [1]. It was reported that suppression of 6PGD decreased lipogenesis and RNA biosynthesis and increased reactive oxygen levels in cancer cells, lessening cell proliferation and tumour growth implying that 6PGD could be an anticancer target [2]. The aim of this study was to investigate whether biologically active organic indole derivatives alters the enzymatic activity 6PGD of rat erythrocytes in vitro. In order to do that, the 3,3′-bisindole derivatives 1 and 2 were synthesized, the enzyme was purified from rat blood and its activity was spectrophotometrically measured. The studies of the effect of these compounds on the activity of rat 6PGD revealed that while the 3,3′-bisindole derivatives 1 inhibited the activity with an IC50 of 115.8 μM, the activity was increased in the presence of 3,3′-bisindole derivative 2. To understand the mechanism of inhibition/activation, in silico docking experiments were performed.

Keywords— erythrocyte, docking, indole.

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