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Short commentary

Tetracyclic Condensed Pyrimidines. New Derivatives of the Benzo [4',5'] Imidazo [2',1':6,1] Pyrido [2,3-D] Pyrimidines

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The biological activity of polycyclic heteroaromatic compounds is due to their ability to interact with DNA, being associated with small and large grooves or intercalation between adjacent bases in a double helix, the interaction mechanism of the latter being considered as the main one. In both cases, the secondary structure of DNA is distorted and its functioning is disrupted, and therefore the connections with this mechanism of action are considered as the most promising in developing new-generation drugs for the treatment of tumor diseases and viral and bacterial [1]. At the same time, many derivatives of these classes of compounds exhibit insufficient selectivity and have toxic effects on healthy cells and tissues [2]; therefore, the search for new active and more selectively acting pharmacological drugs remains an urgent task.

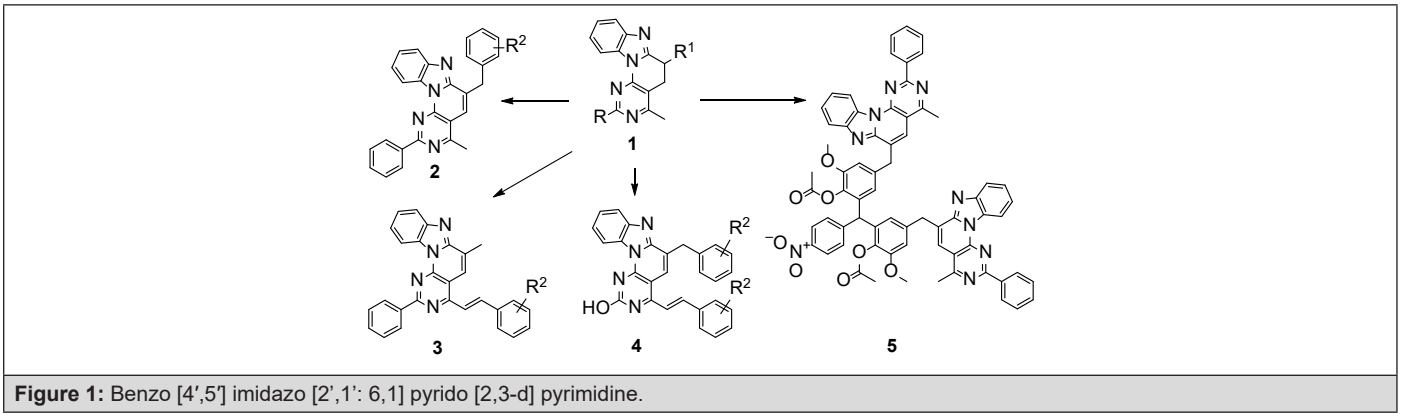

Figure 1: Benzo [4',5'] imidazo [2',1': 6,1] pyrido [2,3-d] pyrimidine.

Among the tetracyclic heteroaromatic compounds, we have drawn attention to the syntheses and biological properties of the derivatives of the heterocyclic system benzo [4',5'] imidazo [2',1':6,1] pyrido [2,3-d] pyrimidine [1], about of which there are a limited number of publications in the literature before our investigations [3-6]. Based on a fundamentally new methodology for constructing a heterocyclic system that expanded the spectrum of their reactivity [7,8], it became possible to synthesize new derivatives [2-4] of the system under discussion with the involvement of methyl and methylene groups in the reaction and study their biological properties [9-13] (Figure 1).

In compound 5 [14] two fragments of the tetracycline are connected through a triarylmethane linker and bulky molecule has a unique three-dimensional shape, which makes it interesting in terms of potential ability for interact with various biomolecules in biomedical investigations. Antibacterial properties of some derivatives of benzo [4',5'] imidazo [2',1': 6,1] pyrido [2,3-d] pyrimidines

have been studied for strains of gram-positive bacteria (*Staphylococcus aureus* 209p and *S. aureus* 1) and gram-negative rods (*Shigella flexneri* 6858, *Escherichia coli* 0-55) by the methods of "diffusion in agar" and "two-fold serial dilutions", the control drug is furazolidone. It has been shown that benzo [4′,5′] imidazo [2′,1′: 6,1] pyrido [2,3-d] pyrimidines 2-4 are completely devoid of activity, because insolubility of designed compounds [15].

The anti-monoaminoxidase properties of compounds were studied by their effect on the deamination of serotonin (5-OT) by the brain Monoamine Oxidase (MAO) in vitro, the control-drug indopan. It has been found that in contrast of antibacterial properties, tetracycles 2-4 show pronounced anti-MAO activity, inhibiting enzyme activity by 60-63% [16]. Thus, in recent years, a fundamentally new small library of previously poorly studied derivatives of benzo [4′,5′] imidazo [2′,1′: 6,1] pyrido [2,3-d] pyrimidines, including with π-conjugation extended chains, has been synthesized, and the biological activity for this class of compounds is described for the first time.

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