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The new dipyridothiazine derivatives- synthesis, properties analysis and anticancer activity

Abstract: In recent years, the scientific world has seen a high level of interest in the search for new phenothiazine derivatives with diverse biological activities. Diazaphenothiazines are modified phenothiazine systems that exhibit a broad spectrum of actions, which include anticancer activity, reversal of multidrug resistance, antibacterial, antiviral or antioxidant activity [1,2]. The aim of the research was to design and obtain a new group of modified dipyridothiazines with a dimeric structure. For this purpose, isomeric 1,6-, 1,8-, 2,7- and 3,6-diazafenothiazines were synthesized and then combined with selected linkers that increased the anticancer potential [3,4]. As a result of the syntheses, 16 new derivatives with dimeric structure were obtained. The structure of the new derivatives was characterized spectroscopically using ^{1}H and ^{13}C NMR, 2D NMR and HR MS techniques. Preliminary in silico tests were conducted to identify molecular targets for all compounds. For all compounds, the lipophilicity parameter was determined, both in a mathematical model and experimentally using a reversed-phase thin-layer chromatography technique (RP TLC). The in vitro cytotoxicity (MTT assay) of the compounds was tested using the following cell lines: breast cancer, colorectal cancer, glioma, lung cancer, and normal skin and muscle cells. Reference drugs doxorubicin and cisplatin were used as controls. The results confirmed the anticancer potential of the new compounds. The new dimers represent promising anticancer heterocyclic derivatives and further studies of their mechanism of action are planned.

Keywords: phenothiazines, dipyridothiazines, derivatives, anticancer potential
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Biography: I am a final-year PhD student in the Silesian Medical University in Katowice. I graduated with a degree in chemistry. In my research, I focus on the synthesis of new dipyridothiazine derivatives. I analyze the newly obtained compounds for their structural, pharmacokinetic and biological properties. Phenothiazine and its derivatives exhibit significant anticancer activity. Therefore my interest in acquiring new substances that may be promising drugs in the fight against cancer. In addition to pursuing my research, I share my passion of chemistry with students during the classes I teach for them.