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Synthesis, antiproliferative activity and molecular docking of new colchicine derivatives

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Colchicine is a plant alkaloid that shows antimitotic effects on a number of cancer cell lines. It binds to tubulin, inhibiting the formation of microtubuli and, thus, blocks mitosis. Herein, we report that colchicine can be functionalized at C-ring by a simple reaction with benzyl amines to yield various active derivatives. These compounds were characterised spectroscopically and their antiproliferative activity against four human tumour cell lines (HL-60, HL-60/vinc, LoVo, LoVo/DX) was evaluated. Additionally, the activity of the studied compounds was theoretically predicted using computational methods involving molecular docking of the colchicine derivatives to β-tubulin. The experimental and computational results are in very good agreement indicating that the antimitotic activity of colchicine derivatives can be readily predicted using computational modeling methods.

Biography

Adam Huczynski graduated from the Adam Mickiewicz University in Poznan with MSc (2004, Physics), MSc (2004, Chemistry) DSc (2008, Chemistry) and DSc habilitation (2013, Chemistry) degrees. Actually he is an Associate Professor at the Faculty of Chemistry, Adam Mickiewicz University. His major research interests are organic and bioorganic chemistry, spectroscopy and medicinal chemistry, mainly ionophore antibiotics and other natural compounds.

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