Synthesis of Zinc(II) Complex of Pemetrexed Anticancer Drug: The Interaction with DNA and Investigation of Anticancer Properties

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Pemetrexed (PMT) is a chemotherapy drug. Its indications are the treatment of pleural mesothelioma and non-small cell lung cancer. Pemetrexed is chemically similar to folic acid and is in the class of chemotherapy drugs called folate antimetabolites. Synthesis of cis-platin in 1965 and started to be used in the treatment of cancer by affecting structure of DNA fully revealed the importance of coordination compounds.

The aims of the study, in the treatment of cancer, try to obtain alternative chemotherapeutic agents. So, [Zn(PMT)(H₂O)₂]H₂O complex was synthesized. Complex structure was characterized using various analytical techniques and instrumentation (Uv-Vis, IR, mass and CHN elemental analysis, electrochemical and thermal behavior).

The electrochemical properties of [Zn(PMT)(H₂O)₂]H₂O complex have been investigated by cyclic voltammetry (CV) using glassy carbon electrode. The interaction of the complex with fish sperm DNA (FS DNA) has been studied with UV spectroscopy and CV in order to investigate the possible binding modes to FS DNA and to calculate the binding constants to FS DNA. The morphology of the FS DNA, Pemetrexed, metal ion and metal complex have been investigated by scanning electron micrographs (SEM). To get the SEM images, the interaction of compounds with FS DNA have been studied by means of differential pulse voltammetry (DPV) at FS DNA modified pencil graphite electrode (PGE). XCELLigence system was used with anticancer activities. XCELLigence system is a real-time cell analyzer which has three components: an analyzer, a device station, and a 16-well or 96-well E-plate.

References:

1) http://en.wikipedia.org/wiki/Pemetrexed