Design and synthesis of metal-based chemotherapeutic agents for targeted DNA interactions or DNA repair pathway modulation

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Propositions

accompanying the thesis

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1. Although multiple platinum-based anticancer derivatives have been tested in clinical trials, only a disappointing few are suitable for clinical practice.
   A. Florea, D. Büsselberg, Cancers ***2011****,* 3*, 1351-1371*

2. The exceptional effectiveness of genomic maintenance systems in detecting and repairing DNA defects renders the exclusive reliance on inducing DNA damage for chemotherapy a fantastical approach.
   D. Hanahan, R.A. Weinberg, Cell ***2011,*** *144, 646*

3. *In vitro* cell culture models can never accurately reflect the multilayered processes taking place in the skin of real living humans.
   N.E. Uzunbajakava, J. Biophotonics, ***2023****, 16, 202200257*

4. Inhibition of DNA repair in cancer cells represents an attractive strategy for potentiating the cytotoxic effects of anticancer chemotherapy and radiation therapy.
   M. Javle, N.J. Curtin, British Journal of Cancer ***2011****, 105,1114*

5. Despite its prevalence in the literature, agarose gel electrophoresis is a surprisingly inadequate method for studying the interactions of small molecules with DNA.
   This thesis, chapter 2

6. In crystallization experiments of metal complexes, the use of fully protonated acidic compounds for counterion screening is a superior method and typically leads to more positive outcomes compared to using their corresponding salt forms.
   This thesis, chapter 2, 3, 4 and 5

7. Using chiral HPLC to separate enantiomers is particularly challenging when dealing with coordinatively labile ruthenium compounds, as solvents used traditionally in HPLC, such as MeCN or H_2O, have good coordinating properties.
   This thesis, chapter 3

8. The light-induced delivery of two distinct inhibitors coordinated to a single molecular scaffold offers unprecedented spatiotemporal control of anticancer treatment.
   This thesis, chapter 5

9. Allocating substantial time to obtain a single crystal structure can be seen as inefficient; however, when the obtained structure would be the last one in a series of 24, the investment of time and resources becomes fully justified.

10. If researchers would receive monetary compensation for all compounds labeled as 'promising' based on *in vitro* cytotoxic effects, they would not have to write many grant proposals.

11. A surprising number of experimental challenges can be solved by trifluoroacetic acid.

12. Similar to whisky, acids show superior qualities when their bottles release smokey vapors upon opening.

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