

# Editorial



Julien Furrer

Almost ten years ago, the special issue 11/2007 'Metals in Medicine' guest-edited by our colleague Prof. Roger Alberto stressed through seven excellent overview articles that much work on bioactive organometallic compounds has been, and is still inspired by the success of cisplatin in chemotherapy. Although the success of cisplatin could not yet be surpassed, the search for novel metal-containing drugs is pursued at many universities, research institutes and companies. Through the seven articles, the reader was made aware of the true interdisciplinarity character of the field.

The disciplines medicinal inorganic chemistry and bioinorganic chemistry involve the application of organometallic chemistry and organic chemistry for the syntheses of the complexes, physical chemistry and spectroscopic methods for the study of kinetic and thermodynamic properties or interaction of the complexes with biological targets (models or real targets), and also biological chemistry for vector–drug conjugations or structure–activity relationships (SAR) and biology or medicine for *in vitro* and *in vivo* testing of the corresponding compounds.

Only fundamental understanding of the biological targets and mechanism(s) of action(s) will lead to new metal-based drugs in the future. Indeed, currently, virtually *all* potential metal-based drugs, including for instance the well-known ruthenium compounds NAMI-A, RAPTA-C and NKP-1339, do not fully comply with the requirements for a new anticancer/antiparasitic/antibacterial agent. New chemicals have to fulfill fundamental properties laid down by regulatory agencies to obtain the best efficacy/safety ratio, including the mechanism of activity and biomarkers for activity and possibly toxicity. They constitute a significant constraint to the large majority of organometallic compounds, since most of them lack conclusive pre-clinical data on target identification and on markers of activity/toxicity.

As such, studies of kinetic and interaction of organometallic compounds with biological targets are not only urgently needed, but also represent a very attractive opportunity, especially for young researchers. In this special issue 'Bioorganometallic Chemistry and Mechanisms', it is only possible to present a small selection of articles. Yet, we think that they accurately reflect the dynamic research and provide a good collection of relevant contributions. Topics covered range from structure–activity relationships and modes of action of gold compounds (A. Casini), the investigation of non-covalent interactions of metal complexes with DNA (A. Erxleben), tandem mass spectrometric investigation of transition metal-based anticancer drugs targeting nucleic acids (S. Schürch), tracking metal-based drugs in cells and tissue using various spectroscopic approaches (A. Renfrew) and the metabolic profiling of cells in response to drug treatment using  $^1\text{H}$  HR-MAS NMR spectroscopy (M. Vermathen).

We sincerely hope that this special issue of CHIMIA will encourage students and act as a motivation for chemistry and biochemistry departments in Switzerland and worldwide to invest more in the analytical sciences, which are in our opinion under-represented compared to the scientific profiles of graduate students currently needed by chemical and pharmaceutical industries.

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The Editorial Board of CHIMIA expresses its warmest thanks to the coordinating guest editor Dr. Julien Furrer for his efforts in planning this issue on 'Bioorganometallic Chemistry and Mechanisms', providing an interesting update in a dynamic interdisciplinary field.