CCR – Impromptu Series

Friday, August 25th 2023, 13:00

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Cu-complexes as anticancer compounds: Insights in the reactivity with thiols, O2 and the production of reactive oxygen species

Copper ions are essential for almost all living organisms and a tight control of copper binding and coordination is important as copper is potentially dangerous, often via its high capacity to activate dioxygen and hence catalyze the production of reactive oxygen species (ROS). Several diseases have been linked to a dyshomeostasis of copper such as Wilson's and Menkes genetic disorders, but also Alzheimer's disease, and cancer. Thus, interfering in copper metabolism via small ligands is of interest as therapeutic approach.

Inorganic copper-ligand complexes (Cu-L) can be applied or formed in situ via chelation by L of endogenous Cu. Biological activity can consist of supplying, sequestering or transporting Cu, or by catalysing targeted chemical reactions often via dioxygen activation. Later is thought to be of high importance in development of anti-cancer drugs or for antimicrobials.

During the last years we worked on the Cu chemistry of several endogenous or exogenous ligands. This included the reactivity of several classical ligand types (thiosemicarbazones, phenanthroline, dithiocarbamate, bleomycin, etc.)[1] used in anticancer and antimicrobial activity. Recent advancements are reported which were made around mechanistic insights in the anticancer activity of Cu-complexes with α-pyridyl thiosemicarbazones [2, 3], with a particular focus on understanding the chemistry of their interaction with thiols (glutathione, cysteine, thioredoxin, metallothionein etc.) and their redox activity to oxidize thiols and produce ROS.

Venue: Lecture Hall B2, Borschkegasse 4a
Time: Friday, August 25th, 2023 at 13:00
Host: Petra Heffeter

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MEDICAL UNIVERSITY OF VIENNA