



Carbon Monoxide Releasing Compounds for Medical Applications

New rhenium based compounds are provided which release carbon monoxide in a controllable fashion, with the possibility to vary the CO release half live and to introduce targeting functions. The compounds are suited for a variety of medical applications.

Keywords Rhenium, CO-Releasing Molecule, Cardiomyocytes, Cytoprotective

Inventors Fabio Zobi, Roger Alberto, Lukas Kromer

Reference in preparation

Background In recent years carbon monoxide (CO) has been acknowledged as a fundamental small molecule messenger in mammals. The endogenous production of CO is associated with the heme metabolic pathway, in particular the action of a family of enzymes known as heme oxygenases. The tissue-specific distribution of heme oxygenases and, thus, the liberated CO have been linked to several physiological effects. For example, CO is a signalling molecule in the inducible defensive system against stressful stimuli; it has a fundamental role in the circulatory system by improving vasorelaxation and cardiac blood supply; it suppresses arteriosclerotic lesions associated with chronic graft rejection; like NO it influences neurotransmission in the hypothalamic-pituitary-adrenal axis.

Invention Re^{II}-based complexes were discovered to release carbon monoxide in a controllable and measurable fashion. The rate of CO release was found to be pH-dependent with half lives ($t_{1/2}$) under physiological conditions varying from ca. 6 to 43 min. In comparison to other CO releasing molecules, these Re^{II}-based complexes include much broader possibility of variations, in particular the introduction of targeting functions. Preliminary experiments have shown that selected complexes exert a cytoprotective effect against hypoxia-reoxygenation in cardiomyocytes.

Fields of Use Cardiovascular diseases, (e.g. cardiac hypoxia, cardiac infarction, cardiac hypertrophy and hypertension); ischemia-reperfusion injury; inflammatory diseases; traumatic injury of the brain, kidney or liver; transplant rejection, platelet aggregation and/or monocyte activation; neuron degeneration of the nervous system and disorders of the circadian rhythm (e.g. jet lag).

Patent Status Patent application filed

Contact *Unitectra, Technology Transfer of University Zurich, Dr. W. Henggeler, Möhrlistrasse 23, CH-8006 Zürich, +41 44 634 44 01, mail@unitectra.ch*