

COLLOQUIA IN MEMBRANE TRANSPORT

Venue: Medical University Vienna, Center for Physiology and Pharmacology,
Institute of Pharmacology, Waehringerstrasse 13a, 1090 Vienna, "**Leseraum**".

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Friday 27.1.2012 14:00 s.t. **Marko D. Mihovilovic** (host: Harald Sitte)
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"Metal Assisted Synthetic Approaches to Small Molecules Modifying Cell Differentiation "

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Abstract.

Regenerative Medicine is understood as one of the most promising therapeutic approaches to alleviate a multitude of diseases. While there is significant progress in the experimental development of this approach related to gene therapeutic intervention often in combination with employing embryonic stem cells, the regulatory implications of such therapies are yet unclear and ethical aspects represent a major obstacle in the further development of such strategies. Hence, small molecules capable to affect cell differentiation towards particular tissues have received significant attention, as the prospect of employing such agents in regenerative medicine seem highly attractive.

Within the past years we have been developing several compounds capable to trigger differentiation of certain progenitor cells towards particular tissues otherwise difficult to regenerate. Case studies will be presented in the area of small molecule induced cardiomyogenesis and neurogenesis, as well as in differentiation acceleration towards skeletal muscle cells. Within a very recent project we have identified lead compounds capable to efficiently induce cardiomyogenesis starting from embryonic or progenitor cells, ultimately leading to independently beating heart cells. Considering the fact, that cardiac infarctation represents one of the major death causes in the developed world, the prospect of tissue regeneration of damaged heart muscle tissue offers a highly innovative perspective of regaining heart function, as this organ is not capable to functional repair on its own.

Synthetic approaches towards the individual target compounds exploited modular strategies based on metal assisted catalysis, in particular sequential coupling strategies (C-C, C-N, and C-H activation). Optimization of functional decorations of the particular heterocyclic scaffolds will be discussed in detail.