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From Gene- and Protein Expression Patterns to Biological Mechanisms: -omics in Pharmacology and Toxicology

**C. GERNER¹, A. SLANY¹, J. DRACH¹,
T. MOHR¹, V. PAULITSCHKE², M. MICKSCHE¹**

¹ Department of Medicine I, Institute of Cancer Research, Medical University of Vienna, Borschkegasse 8a, 1090 Vienna, Austria

² Department of Dermatology, Medical University of Vienna, Währinger Straße 18–20, 1090 Vienna, Austria

E-mail: christopher.gerner@meduniwien.ac.at (C. Gerner)

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Proteins play a fundamental role in controlling multiple functions within a cell organization. At pathologic conditions, specifically expressed proteins may indicate disease states and may thus serve as diagnostic markers. Following disease-associated aberrations of protein expression may lead to a better understanding of the mechanisms of diseases and thereby enable the development of new therapeutic strategies. We established a strategy based on the systematic profiling of primary cells which were forced in vitro to enter specific functional states characteristic for certain diseases. Focusing on secreted proteins, we try to identify marker proteins accessible via the blood. Shotgun proteomics proofed to be the method of choice for the identification of low-abundant marker proteins. On the other hand, two-dimensional gel electrophoresis of metabolically labeled cells proofed to be more sensitive to record subtle drug effects. Currently we focus on tumour-stroma interactions resulting in the induced secretion of tumour-promoting survival factors by the stroma cells. We make use of co-culture model systems for testing drugs specifically interfering with this synergistic cell cooperativity.

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