

INSTITUTE FOCUS:

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Founded in 1945, the Medical University of Gdansk is the largest medical academic institution in Northern Poland. It continues the tradition of the Atheneum Gedanense with its Chair of Anatomy and Medicine, established in 1580.

The Department of Hypertension and Diabetology is located in a newly-opened University Clinical Centre complex.

The department is recognized as an ESH-Centre of Excellence, and includes state-of-the art in-patient and out-patient clinics serving Gdansk region as a

reference centre for both primary and secondary hypertension.

Our centre organized several national and international hypertension events including a first satellite ESH symposium in Central Europe (1995), ESH Summer School in 2001, four congresses of the Polish Society of Hypertension, four editions of the European Forum on Hypertension (2016-2019) and the Nordic-Baltic Regional University Research Course (September 2019), which was generously supported by the ISH.



University Clinical Centre in 2007 and 2019.

Ongoing research activities

First, we continue our efforts to better understand mechanisms underlying the link between sympathetic overactivity and cardiovascular risk. Our studies coordinated by Dagmara Hering are focused not only on hypertension¹, but also on chronic kidney disease², coronary artery disease and cardiovascular risk factors including smoking and alcohol abuse³. We have recently initiated functional magnetic resonance imaging studies. Our findings indicate that compensatory functional reorganization may precede hypertension-related brain damage and cognitive decline⁴.

Second, our centre is involved in search of new approaches for treating difficult-to-manage hypertension. In collaboration with the group of Julian F. R. Paton, we performed the first prospective proof-of-concept, safety and feasibility study of unilateral carotid body excision from a cohort of patients with drug-resistant hypertension⁵. We have shown that the carotid body may be a novel target for treating an identifiable subpopulation of humans with hypertension.

Third, sleep medicine remains our research priority. We have completed several mechanistic and clinical studies assessing impact of obstructive sleep apnea on cardiovascular structure and function, with special emphasis on cerebral flow and intracranial pressure ^[6].



Prof. Alberto Zanchetti and Prof. Peter Sleight attending the ESH satellite symposium "Metabolic disturbances in hypertension" in Gdansk (May 1995).

Fourth, we have gained expertise in the assessment of both large vessels (collaboration with Stephane Laurent, Pierre Boutouyrie and Peter Nilsson) and microcirculation (collaboration with the group of Roland E. Schmieder). Our group contributed to the development of the early vascular aging (EVA) concept. We have shown that pulse wave velocity is independently associated with both short-term and long-term outcome after acute ischemic stroke⁷.



Inaugural meeting of the Translational Medicine Centre initiative.

Fifth, our recent projects incorporate genetics (collaboration with the group of Olle Melander) and metabolomics. We have recently demonstrated that the genetic risk score composed of 13 SNPs related to cardiovascular phenotypes is associated with an increased arterial stiffness in hypertensive patients⁸.

Finally, our centre is involved in population-based studies coordinated by Jan A. Staessen. This collaboration resulted in numerous publications including a recent study published in JAMA⁹. Furthermore, Tomasz Zdrojewski and Piotr Bandosz have initiated several epidemiological studies and contributed to NCD Risk Factor Collaboration¹⁰.

Our University has recently decided to accelerate innovative interdisciplinary projects focused on personalised medicine. MUG has established the Translational Medicine Centre serving as the platform linking several research groups.

As a first step, we opened a cardiovascular imaging core facility gathering the best high-tech equipment



Opening of the Translational Medicine Centre (from left: Prof. Edyta Szurowska, Prof. Anna Dominiczak and Prof. Krzysztof Narkiewicz)

in one place, which clearly boosted the scattered potential of individual research groups. The more effective transfer of knowledge is to be fostered through the proximity of the Technology Transfer Office of MUG in the same location.

The efforts of Translational Medicine Centre will be supported by the Early Clinical Trials Unit, a new structure established by MUG in 2019. The Unit assesses the safety and efficacy of therapies at an early development phase. Phase I/II studies include dose escalation, drug interactions, interactions with food, cardiologic safety, and proof-of-concept. In the close future, the functionalities of the unit will be extended with research that require close monitoring of pharmacokinetics and pharmacodynamics as well as first-in-human research. Our hospital implemented a modern electronic record system in 2016 enabling fast and easy search for suitable patients in a database including records of more than 900 thousand subjects, which should allow fulfilling restrictive admission criteria for trials including those with a molecular or immunological focus.

The Polish Ministry of Science and Higher Education has recently launched the Excellence Program to stimulate a small number of Poland's universities to become on a par with Europe's best research universities. The international panel selected MUG as one of the top 10 Polish universities and awarded the higher level of additional subvention research funding, which should result in further strengthening of Gdansk cardiovascular centre.

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