

Introduction

It is very fortunate, that project BIOCEV benefits from the excellent tradition of Czech macromolecular chemistry. This is clearly visible especially in BIOCEV's program No. 4 - *Biomaterials and Tissue Engineering*, particularly in its following research projects – "[Development of Polymer Therapeutics and Diagnostics for Treatment and Diagnostic of Cancer and Cardiovascular Diseases](#)", "[Materials for Diagnostics and Biotechnological Processes](#)", "[Polymeric Biomaterials for Regenerative Medicine](#)", and "[Application of Stem Cells and Biomaterials in Cell Therapy](#)". This special issue of *Physiological Research* clearly demonstrates such situation.

Today's research in Medicine does not maintain traditional borders between disciplines and current biomedicine is increasingly interdisciplinary not only in its understanding of molecular cause of the starting disease process but also in the diagnosing and monitoring of molecular pathology as well as our attempts to manage or treat diseases, cancer being a prime example. Such interdisciplinary attempts established in recent years have led to emerging fields such as nanotechnology, which is expected to significantly impact the process of therapy. Nanomedicine, one of the fastest-growing sub-disciplines

of nanotechnology, is described by the US National Nanotechnology Initiative as "science, engineering, and technology conducted at the nanoscale..." (*Nanomedicine, Principles of Nanomedicine*. Ge Y, Li S, Wang S, Moore R, (eds), Springer, New York, 2014, Vol. 1).

Using this technology, drug delivery systems are moved from micro to the nanosize scales. At this level, an understanding of the concept of biological self-assembly becomes critical in the design of future therapeutics. Research in the above mentioned area is believed to lead to positive scientific outcomes and therapeutic breakthroughs.

This issue of *Physiological Research* offers one review from the area of nanotherapeutics and eight original articles assembled by guest editors Etrych and Brynda. It showcases how research teams are addressing critical steps of the therapeutic application of chemotherapeutics or drug generally, drug efficacy connected with delivery, intracellular targeting, self-assembly, highly challenging, and very complicated processes.

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