

2022 年度

第 1 回 D D S 研究所 特別講演会

日時 : 11/4 (金) 16:30 ~ 17:30

場所 : D D S 研究所 4 階 大講義室

題目 : 抗がん・抗炎症ポリマーナノメディシン

Polymer nanomedicines with anti-cancer and anti-inflammatory efficacy

講師 : **Tomáš Etrych**

(Institute of macromolecular chemistry, Czech Academy of Sciences, Research Professor, Department Head)

講演要旨

Recently, nanosized drug delivery systems called nanomedicines with various targeting functions and controlled drug release capabilities inside targeted tissues or cells have been intensively studied. Moreover, theranostics, which links therapy and diagnostics, are widely studied for the disease treatment and the generation of diagnostic information using one multi-functional system. Here, polymer platform suitable for efficient stimuli-sensitive therapeutics, diagnostics and even theranostics based on water-soluble and amphiphilic polymer conjugates will be presented. Synthetic nanocarriers based on methacrylamide-based copolymers are highly attractive for in vivo application as they are fully biocompatible, water soluble and non-toxic biomaterials with tailored physico-chemical properties for application in medicine. Their favorable pharmacokinetics altogether with Enhanced Permeability and Retention effect-driven tumor accumulation enable a higher uptake in solid tumors with an enhanced therapeutic outcome. The set of polymer biomaterials differing in their inner structure, molecular weight and functionality was designed, synthesized and evaluated for their therapeutic, diagnostic and even theranostic properties. Their physicochemical, in vitro, and in vivo behavior were investigated and the results indicate that the attachment of the hydrophobic photosensitizer molecule results in the formation of micelles, which protects the active molecules during its transport. The cytotoxicity of developed polymer nanomedicines was remarkably increased when light was irradiated and they showed high tumor targeted accumulation based on the EPR effect, therefore these polymer systems are promising candidates for tumor diagnostics and treatment.



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Present position: Head of department of Biomedical Polymers at the **Institute of macromolecular chemistry AS CR** (Prague, Czech Republic) and Head of research program Biomaterials and tissue engineering, **center BIOCEV** (Vestec, Czech Republic).

Specialization in nanomedicine:

Polymer chemistry, controlled drug delivery, targeting, navigated surgery.

Education:

Degree in Polymer Chemistry: June 1997, Charles University, Prague.

Ph. D. in Polymer chemistry (2002) at Institute of Macromolecular Chemistry AS CR (IMC), Prague

DSc. In polymer chemistry at Czech Academy of Sciences.

Post-doctoral fellowship at Universite Montpellier 1 (C.N.R.S.), Montpellier, France. Post-doc fellowship awarded by French Ministry of Youth, Education and Research.

Current research interest:

Research and development of new types of polymer carriers for targeted therapy of oncological diseases and inflammatory diseases with a potential utilization in human medicine.

The polymer systems are mainly based on water-soluble and supramolecular self-assembly polymer carriers of drugs with varying polymer chain architecture (e.g. hyperbranched, star-shaped, comb-like and micellar structures). The major tasks of his research also include the preparation of polymer systems enabling simultaneous treatment and diagnostic of neoplastic diseases and evaluation of polymer systems in vitro (cytostatic and cytotoxic effect) using a broad range of tumor cell lines of human and mouse origin.

Publications S.C.I.:

More than 180 publications in respected journals such as **Nature Biotechnology, ACS nano, Journal of Controlled Release, Biomaterials, Cancer Res., Nanoscale.**

More than **5000** citations, H=43.