SEMINAR

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"MII-Fralin Scholar in Residence for 2011"

"Drug Delivery Across Biological Barriers: Intestines, Skin and Lung"

Overview

The focus of our research over the past ten years has been on the biological barriers of the gastro-intestinal tract, the skin and the lungs. In a series of three lectures some basic concepts of delivering drugs to each of these three prominent barriers will be addressed first and then further illustrated by some published data and current work in progress in our labs. The two major aspects will be the development of new in-vitro models as well as of new drug carrier systems, for which the nano-size often has turned out to be advantageous.

Lecture 1: "The Gastrointestinal Barrier"

Inflammatory bowel diseases, such as Morbus Crohn or Colitis Ulcerosa, are painful for the patient and moreover difficult to treat due to the increased mucus production and the occurrence of diarrhea. We could demonstrate that the anti-inflammatory drug rolipram, when delivered by nanoparticles made of biodegradable PLGA, led to a prolonged alleviation of colitis syndromes in rats and a reduction of central nervous side effects, compared to the same dose of the drug administered as an aqueous solution [1, 2]. In order to study the mechanisms of this intriguing possibility of mucosal targeting, we have recently developed a 3D co-culture model of the inflamed intestinal mucosa [12] and moreover started the clinical exploration of this concept in colitis patients.

References:

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[8] Tätz S et al., Influence of chitosan content on the delivery efficiency of cationic chitosan/PLGA nanoparticles, Eur.J.Pharm.Biopharm. 72: 358–369 (2009)
[9] Santander-Ortega M et al., Nanoparticles made from novel starch derivatives for transdermal drug delivery, J. Control. Rel. 141: 85-92 (2010).
[10] Beisner, J., et al. (2009), 'Efficient telomerase inhibition in human non-small cell lung cancer cells by liposomal delivery of 2'-O-methyl-RNA', *J.Pharm. Sci* 98 (5), 1765-74.
[11] Beisner, J., et al. (2010), 'Nanoparticle mediated delivery of 2-O-methyl-RNA leads to efficient telomerase inhibition and telomere shortening in human lung cancer cells', *Lung Cancer,* 68 (3), 346-54.
[12] Leonard, Fransisca, Collnot, Eva, and Lehr, Claus-Michael (2010), 'A 3-dimensional co-culture of enterocytes, monocytes and dendritic cells to model the inflamed intestinal mucosa in vitro', *Mol. Pharm.,* 7 (6), 2103-19.

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Date: October 18, 2011
Time: 10:00am-11:00am
Place: 310 ICTAS *(beside Randolph)*