



Miten tutkija hakee tietoa?

Esimerkkinä radiokemian tohtorikoulutettava

Mirkka Sarparanta
Helsingin yliopisto, Kemian laitos
Radiokemian laboratorio
25.11.2011

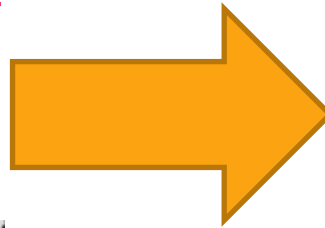
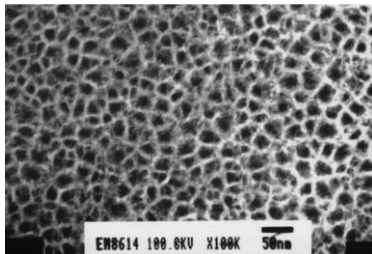
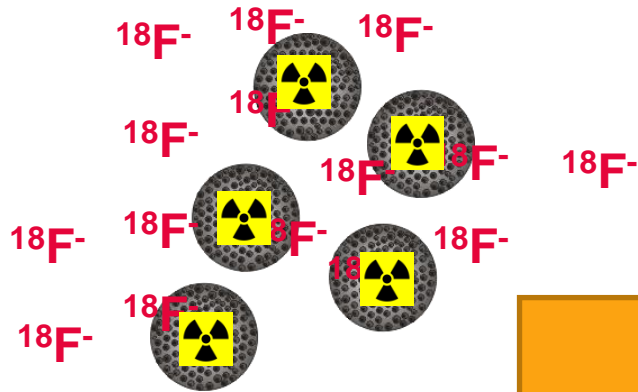


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 - **Kemian tietolähteet –kurssi (2 op) osana perusopintoja**
- **Radiokemian tohtorikoulutettava 1.3.2007 →**
 - ***Huokoisten piipartikkelien radioleimaus ^{18}F -isotoopilla – merkkiaineiden kehitys ja arviointi rotassa***
- **Työn osajulkaisut ovat valmiit, tällä hetkellä kirjoitan yhteenveto-osaa**
- **Väitökseni suunniteltu ajankohta syyskuussa 2012**



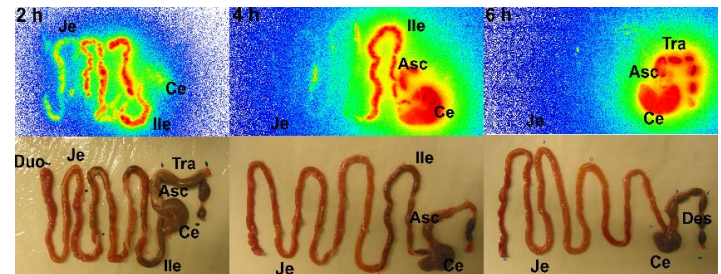
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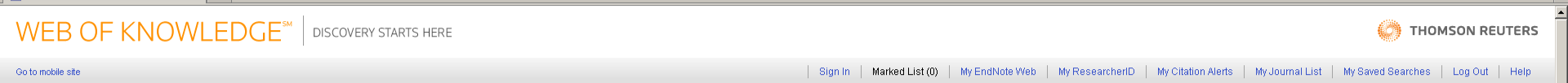
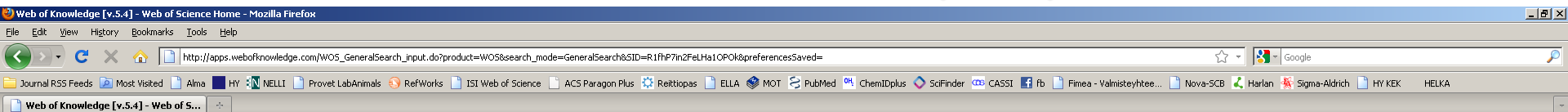
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UniProtKB	Protein knowledgebase, consists of two sections: ★ Swiss-Prot, which is manually annotated and reviewed. ★ TrEMBL, which is automatically annotated and is not reviewed. Includes complete and reference proteome sets .
UniRef	Sequence clusters, used to speed up sequence similarity searches.
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a balanced mind October 2011

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Edited by: Ratner, Buddy D.; Hoffman, Allan S.; Schoen, Frederick J.; Lemons, Jack E. © 2004 Elsevier

Description: This book provides the most up-to-date and in-depth information on biomaterial developments, and also provides a comprehensive coverage of this growing, multidisciplinary field for students of all backgrounds.

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In Vivo Sustained Release of siRNA from Solid Lipid Nanoparticles	Tatsiana Lobovkina, Gunilla B. Jacobson, Emilio Gonzalez-Gonzalez, Robyn P. Hickerson, Devin Leake, Roger L. Kaspar, Christopher H. Contag and Richard N. Zare	18.11.2011 18:29
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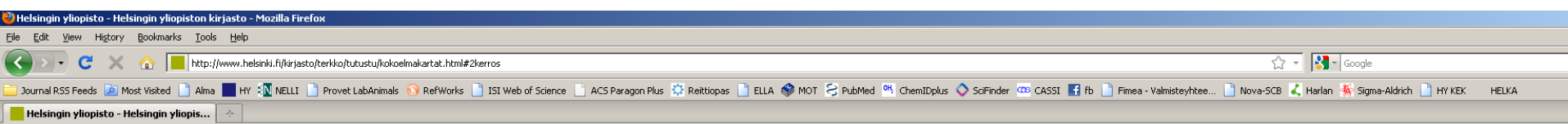
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Biocompatibility of thermally hydrocarbonized porous silicon nanoparticles and their biodistribution in rats.

Bimbo LM, Sarparanta M, Santos HA, Airaksinen AJ, Mäkielä E, Laaksonen T, Pelttonen L, Lehto VP, Hivonen J, Salonen J.
Division of Pharmaceutical Technology, Faculty of Pharmacy, University of Helsinki, FI-00014 Finland.

Abstract

Porous silicon (PSi) particles have been studied for the effects they elicit in Caco-2 and RAW 264.7 macrophage cells in terms of toxicity, oxidative stress, and inflammatory response. The most suitable particles were then functionalized with a novel (18F) label to assess their biodistribution after enteral and parenteral administration in a rat model. The results show that thermally hydrocarbonized porous silicon (THCPSi) nanoparticles did not induce any significant toxicity, oxidative stress, or inflammatory response in Caco-2 and RAW 264.7 macrophage cells. Fluorescently labeled nanoparticles were associated with the cells surface but were not extensively internalized. Biodistribution studies in rats using novel (18F)-labeled THCPSi nanoparticles demonstrated that the particles passed intact through the gastrointestinal tract after oral administration and were also not absorbed from a subcutaneous deposit. After intravenous administration, the particles were found mainly in the liver and spleen, indicating rapid removal from the circulation. Overall, these silicon-based nanosystems exhibit excellent in vivo stability, low cytotoxicity, and nonimmunogenic profiles, ideal for oral drug delivery purposes.

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Biocompatibility of Thermally Hydrocarbonized Porous Silicon Nanoparticles and their Biodistribution in Rats

Luis M. Bimbo,^{†,‡} Mirkka Sarparanta,^{‡,||} Hélder A. Santos,^{†,*} Anu J. Airaksinen,[‡] Ermei Mäkilä,[§] Timo Laaksonen,[†] Leena Peltonen,[†] Vesa-Pekka Lehto,[‡] Jouni Hirvonen,[†] and Jarno Salonen^{§,*}

[†]Division of Pharmaceutical Technology, Faculty of Pharmacy, University of Helsinki, FI-00014 Finland, [‡]Laboratory of Radiochemistry, Department of Chemistry, University of Helsinki, FI-00014 Finland, [§]Laboratory of Industrial Physics, Department of Physics, University of Turku, FI-20014 Finland, and ^{||}Department of Physics, University of Kuopio, FI-70211 Kuopio, Finland. ^{*}These authors contributed equally to this work.

Since the first evidence of the biocompatibility of porous silicon (PSi),¹ there have been a growing number of publications about its numerous applications.^{2–4} While most of the research has been focused on microdevices for therapeutic use,⁵ chemical and biological sensors,⁶ and optoelectronics,⁷ other applications have also emerged, such as intravenous⁸ and ocular drug delivery.^{9,10} Oral delivery still remains the route preferred by patients and thus dominates controlled release research.¹¹ Drug and peptide delivery by PSi particles has already been demonstrated and with promising results.^{12,13} PSi particles can be loaded with diverse payloads, such as small molecule drugs and peptides. In addition, improved solubility of poorly soluble drugs after loading has been reported.^{14–16} The silicon surface can be treated in the gas phase by oxidation, hydrosilylation, and thermal carbonization,³ or it can also be grafted with numerous

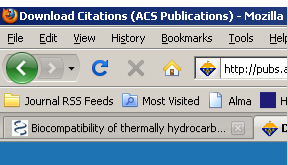
ABSTRACT Porous silicon (PSi) particles have been studied for the effects they elicit in Caco-2 and RAW 264.7 macrophage cells in terms of toxicity, oxidative stress, and inflammatory response. The most suitable particles were then functionalized with a novel ¹⁸F label to assess their biodistribution after enteral and parenteral administration in a rat model. The results show that thermally hydrocarbonized porous silicon (THCPSi) nanoparticles did not induce any significant toxicity, oxidative stress, or inflammatory response in Caco-2 and RAW 264.7 macrophage cells. Fluorescently labeled nanoparticles were associated with the cells surface but were not extensively internalized. Biodistribution studies in rats using novel ¹⁸F-labeled THCPSi nanoparticles demonstrated that the particles passed intact through the gastrointestinal tract after oral administration and were also not absorbed from a subcutaneous deposit. After intravenous administration, the particles were found mainly in the liver and spleen, indicating rapid removal from the circulation. Overall, these silicon-based nanosystems exhibit excellent *in vivo* stability, low cytotoxicity, and nonimmunogenic profiles, ideal for oral drug delivery purposes.

KEYWORDS: porous silicon · nanoparticles · oral delivery · cytotoxicity · biodistribution · Caco-2 cells

benefits in the development of drug delivery carriers can be achieved.⁸ It is known that silicon-based nanomaterials can de-



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