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CBC Talk on Modeling Convection-Enhanced Drug Delivery into Brain Tissue using information from MRI - October 12, 2009


10:25 - 10:45 Modeling Convection-Enhanced Drug Delivery into Brain Tissue using information from MRI

by Karen-Helene Støverud

Total number of participants: 9
 Total number of guests outside of CBC: 3
 Number of different nationalities represented: 2
 Total number of speakers: 1
 Total number of talks: 1

Abstract:

Brain tumors are not among the most frequent forms of cancer, but the prognosis of curing the disease is very low. Intensive research during the last 30 years has not led to satisfactory results since conventional therapies, i.e. surgery, chemotherapy and radiation, all have different drawbacks. To overcome the problems associated with the blood-brain barrier and dilution of the drug, therapeutic agents can be injected under positive pressure directly into brain tissue via catheters. This technique is called convection-enhanced drug delivery (CED). The technique is still on an experimental level, but it is well known that the location of the injection is crucial since the distribution of the agent is heavily dependent on factors such as heterogeneities in brain tissue. In the model the brain are looked upon as an elastic porous medium, with neuron and glial cells as the solid matrix and the interstitial fluid filling up its pore space. A system of equations is developed and solved for the primary variables; pressure, concentration of the therapeutic agent and the solid displacement field. To make the model more realistic magnetic resonance images (MRI) of the brain is used to define the geometry and distinguish between different types of tissue; i.e. white and grey matter. Using diffusion tensor MRI, it is possible to obtain information about fibre tracts orientation within the white matter, and calibrate patient-specific parameters.

What	▪ Talk
When	Oct 12, 2009 from 10:25 AM to 10:45 AM
Where	Bakrommet
Contact Name	Tom Atkinson
Attendees	Fredrik Andersson Are Magnus Bruaset Xing Cai Hannibal Fossum Glenn Lines Harald Osnes Ola Skavhaug Karen H. Støverud Joakim Sundnes
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