Subjects for Break Out

~ A Discussion Primer ~

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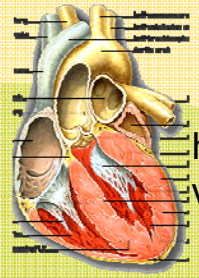
Basic Concept for Simulations in Life Sciences

Meso

Organ



http://info.med.yale.edu/

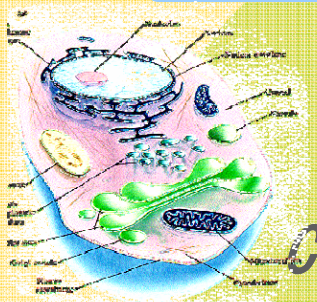
Organism

Vascular System

Micro-machine

Blood Circulation

Macro



http://ridge.icu.ac.jp

Tissue Structure

Multi-physics

HIFU

Cell

Tissue

Catheter

RIKEN

Chemical Process

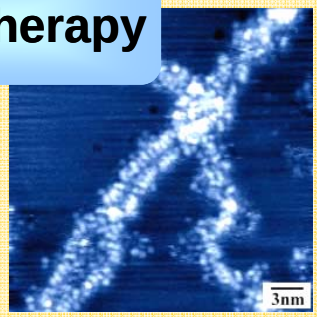
Bio-MD

DDS

Protein

Genome

Gene Therapy



RIKEN

Genes

Micro

Under total combination of simulation physics ...

Subjects to Discuss (1)

1) Extrapolation (extension) of Present Bio Related Simulations
   - Bio materials (proteins, DNA etc), cell, organs (heart, lung, blood flow etc)
   - What are present difficulties to reproduce reality of biological systems?
   - How far can we go with them?
   - Sharing common images of future simulations

2) Unification of Different Level Simulations
   - Connections of bio materials, cell, organs to whole human body
   - Multi scale simulations (multi physics)

3) Program Interface for Multi Scale Simulations
   - Component based programming, data sharing
   - Gird computing, web services
   - Hardware, parallel computing

Subjects to Discuss (2)

4) Collaborations with Experimentalists and Other Areas

How to collaborate simulations with experiments

Bioinformatics, data mining, neural network, systems biology

What are the computational technical issues, both hardware and software, that prevent progress?

5) Final Goal of Life Science Simulations

What is the final goal of bio or life science simulations?

Can we reproduce cell segmentation from numerical simulations?

If not, what is the barrier against that?

What are the computational technical issues, both hardware and software, that prevent progress