Exploiting Microgravity Environment for the Development of Innovative BioMimetic Modular Nanomaterial Structures and Additive Manufacturing Capabilities for Applications in Energy, Defense and Medicine

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CASIS Materials in Space Workshop
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The Three Facets
Towards BioMimetic Modular NanoStructure Library

Mind the Space

Think “Inside” the Box

Innovate and Create

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Mind the Space

Environment, Materials & Materials Behavior

Eskimos: ICE Igloo Homes and ICE Restaurants.

Environmental Adaptation: Solution Development by utilization of widely accessible resources (ex: Just one material: “ICE”, in different forms and macro modular structures to build infrastructure.

Native Americans: TeePee Homes

Development of Infrastructure based on resources found in environment, lifestyle scenarios and circumstances

https://en.wikipedia.org/wiki/Igloo
http://unique-hotel.blogspot.com/2012_02_01_archive.html
https://www.pinterest.com/pin/432908582903910825/
https://www.pinterest.com/pin/323977766914799927/

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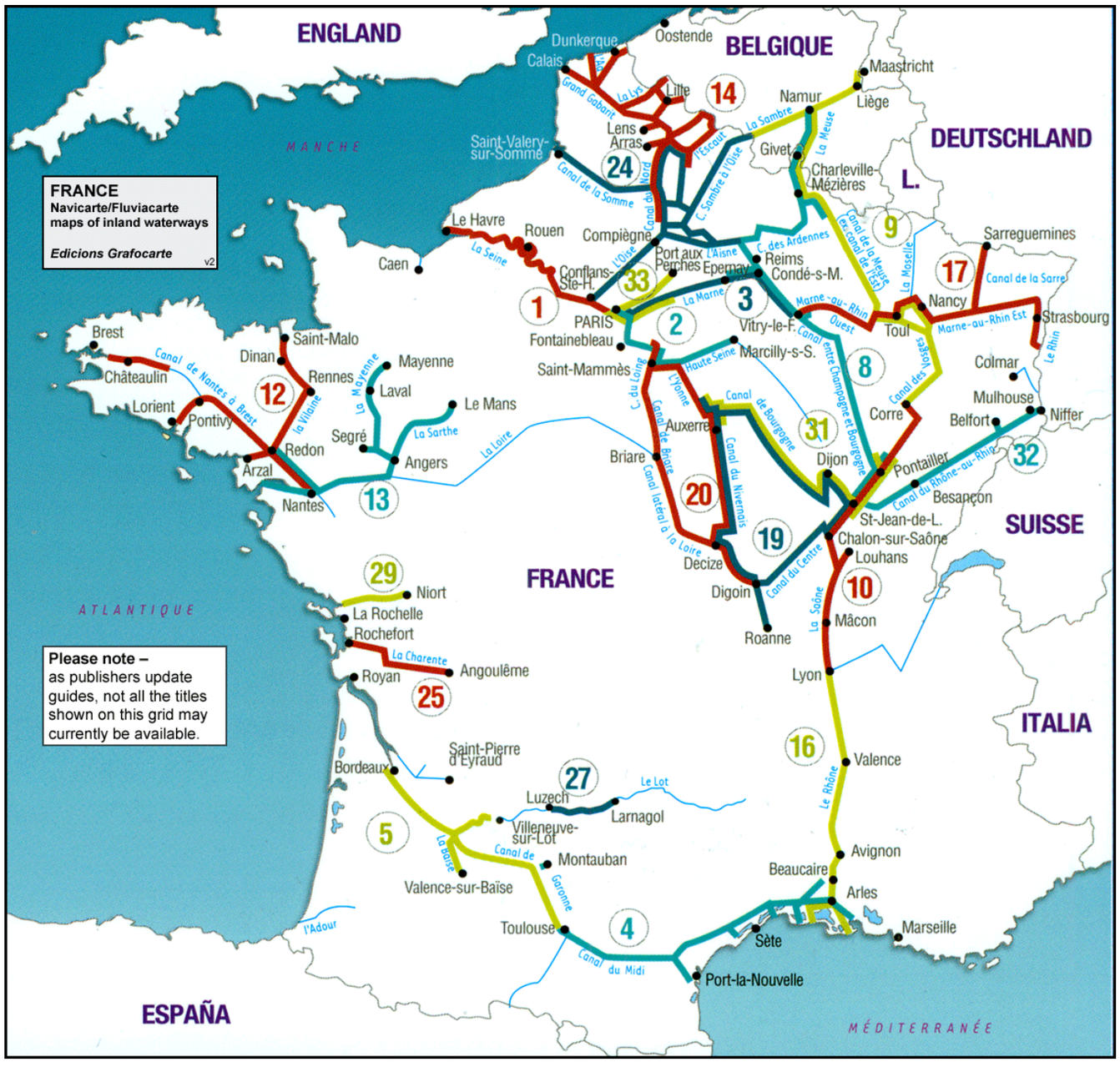
Mind the Space

Environment, Materials & Materials Behavior



WaterWays for Transportation of Goods & People, Energy and Agriculture

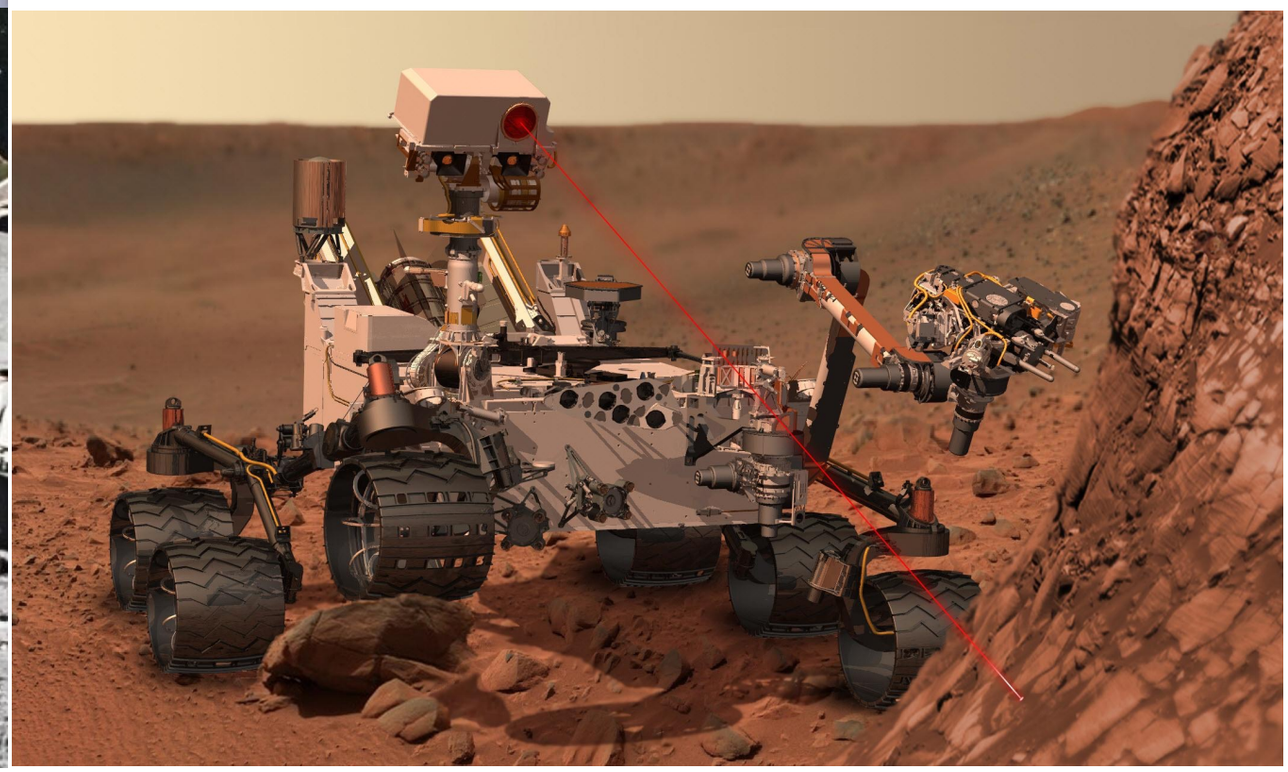
http://www.stanfords.co.uk/France-NavicarteFluviacarte-Guides-to-French-Canals-and-Waterways_SI00000908

Mind the Space

Environment, Materials & Materials Behavior

Evolution by Means of Survivability Followed by Adaptation

Enhancing quality of life by accessorizing with advanced technological capabilities (technological capabilities need to be developed and implemented according to the microgravity environment with “Mind the Space” and not just by replicating what is existing “on Earth in Gravity” for convenience.



https://www.flickr.com/photos/8561740@N08/7612899642/
http://www.dailymail.co.uk/sciencetech/article-2180664/American-flags-planted-Apollo-moon-missions-wave-40-years.html
http://mslcuriosityjournal.blogspot.com/2012_07_01_archive.html

Mind the Space

Environment, Materials & Materials Behavior

- Fluid Dynamics: Fluid movement and the behavior of micro and nano structured materials within fluids.

- Buoyancy: Particle mixture behavior in the absence of buoyancy: particle-particle interactions.

- Surface Tension: Material surface boundaries, phase-phase boundaries,…etc.

- Evolution by means of Survivability followed by Adaptation (ex: For Additive Manufacturing: Bottom up Approach, the use of self organization and self assembling principles, …etc).

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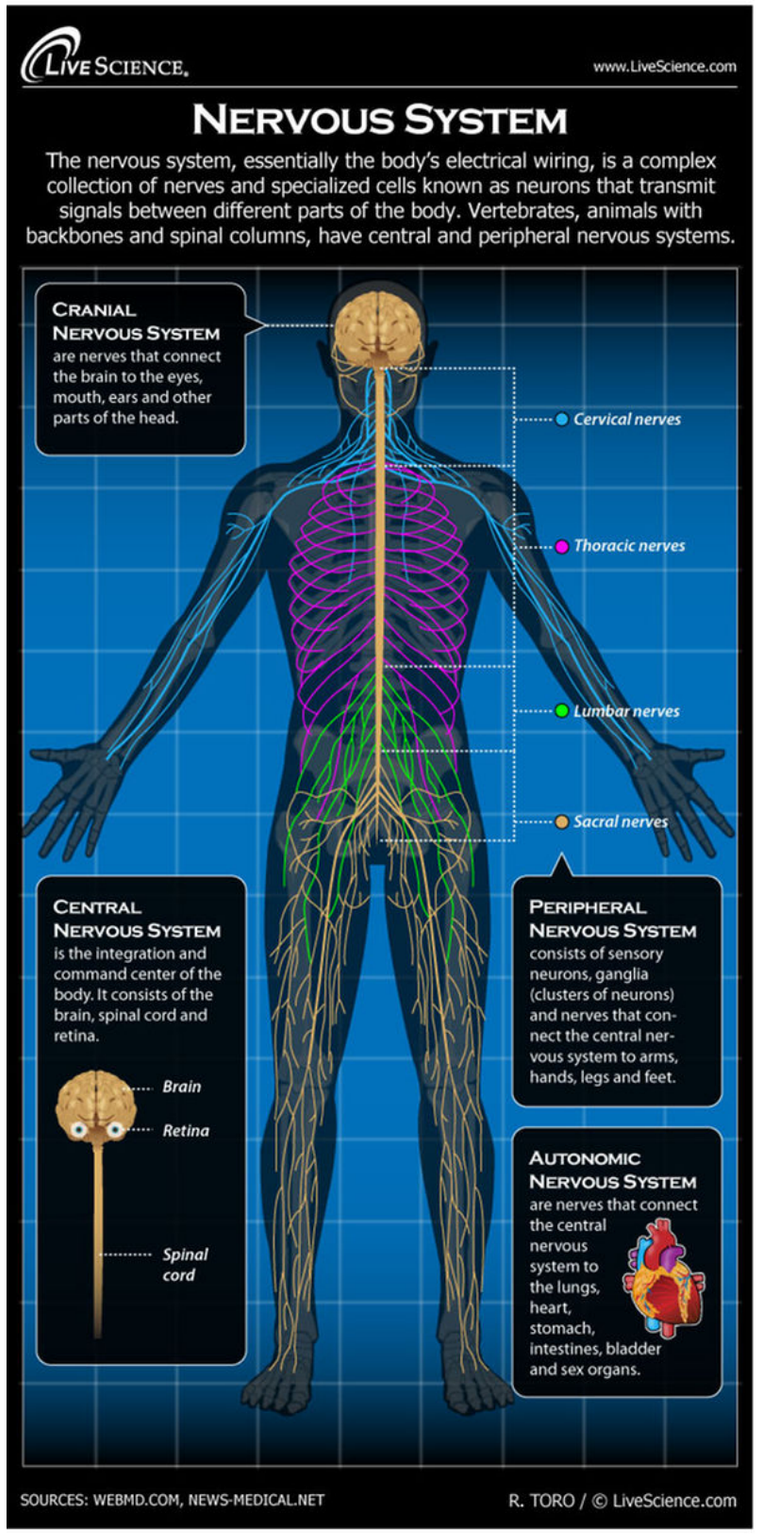
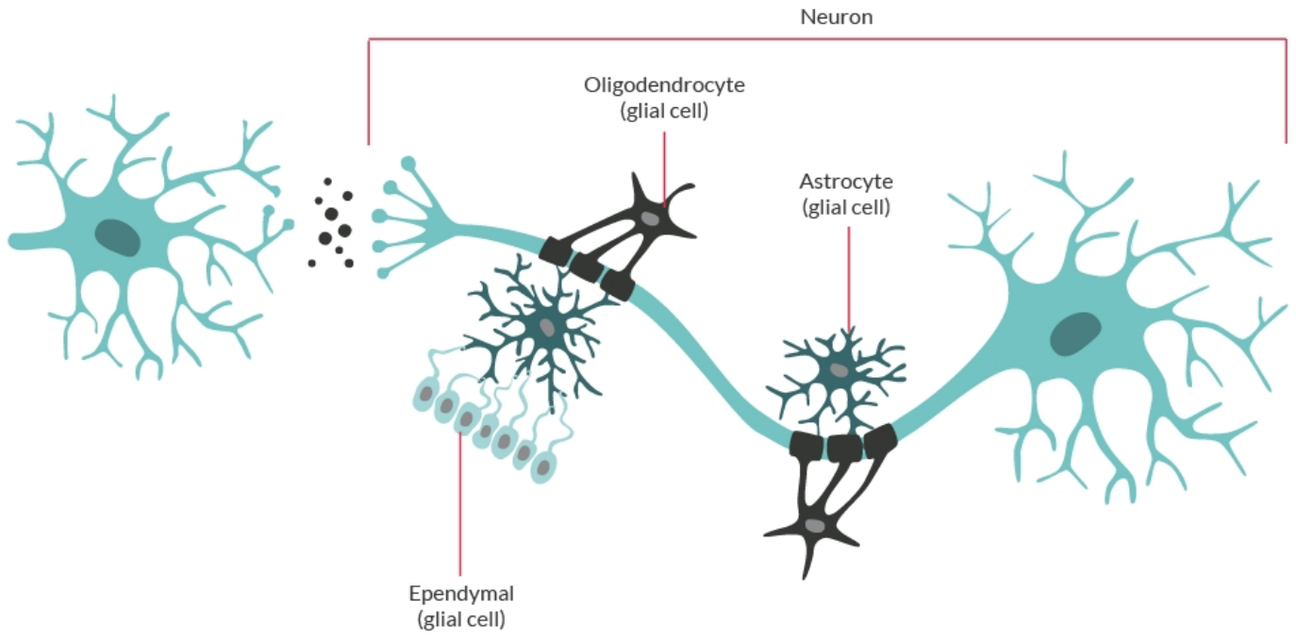
Think “Inside” the Box: Towards BioMimetics Interdependency of Blood Flow and Nervous System

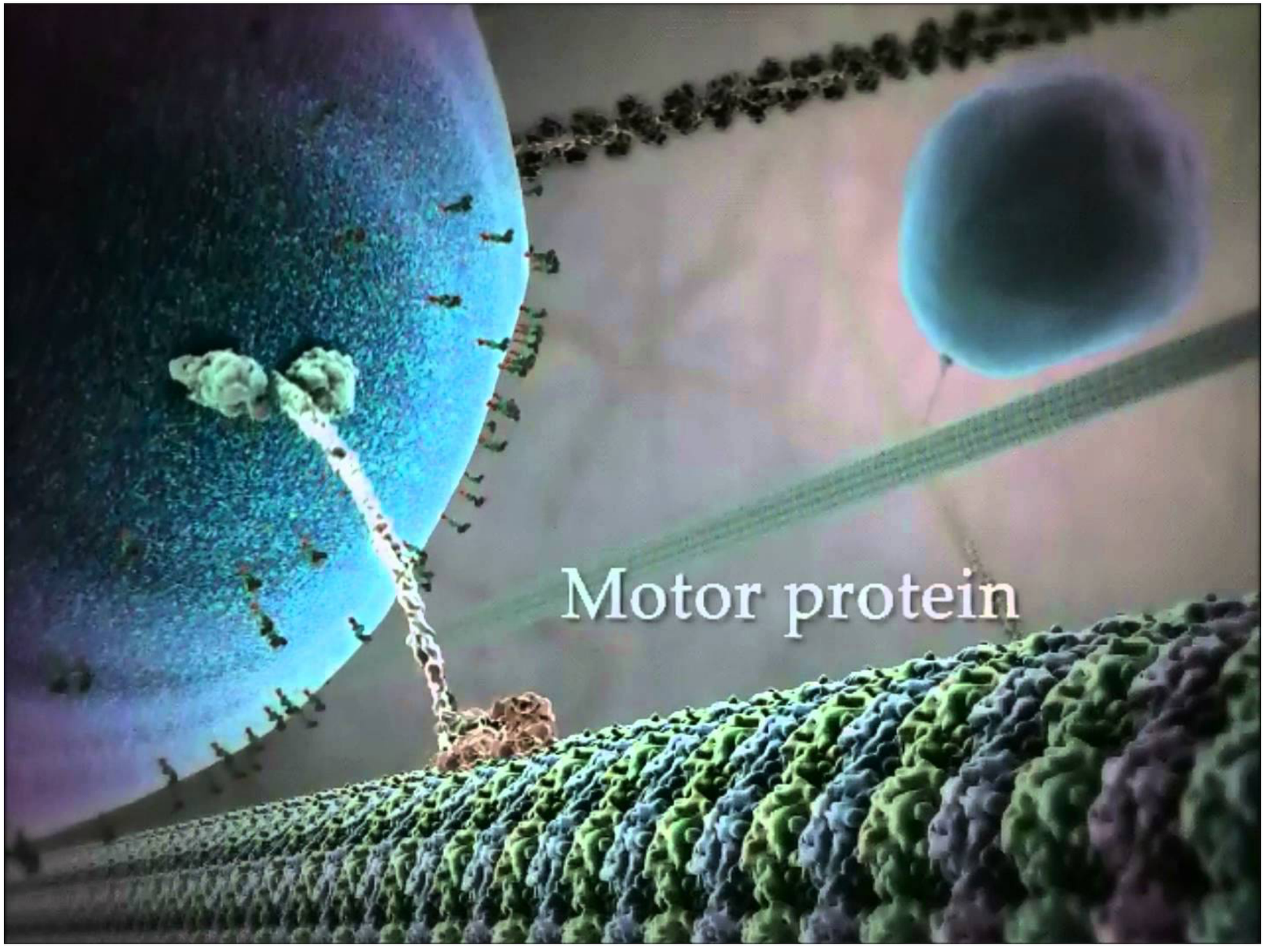


Blood vessels and nerves are interdependent: normal nerve function needed for proper blood flow, and nerves depend on adequate blood flow.



http://www.livescience.com/22665-nervous-system.html
http://www.medicalnewstoday.com/articles/307076.php
https://www.thebraintumourcharity.org/understanding-brain-tumours/symptoms-and-information/brain-cells/

Think “Inside” the Box:
Towards Modular BioMimetic NanoStructure Library

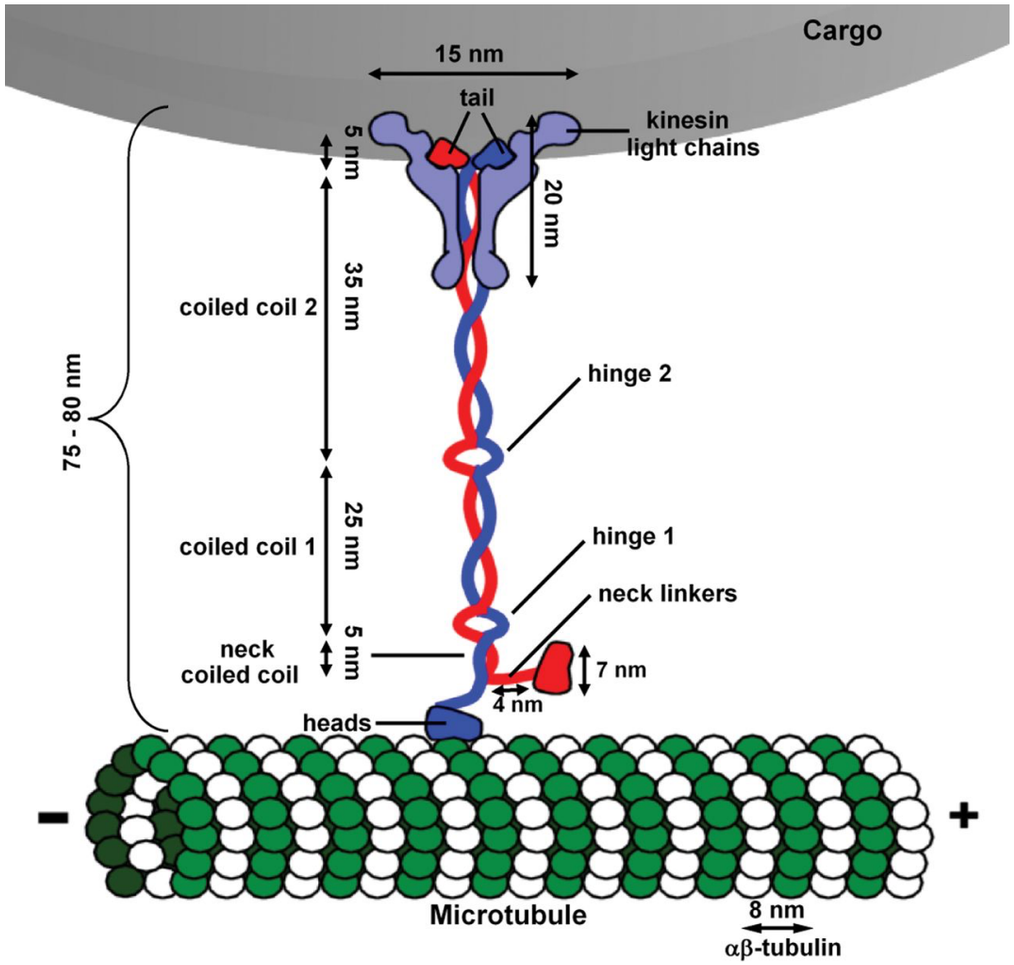


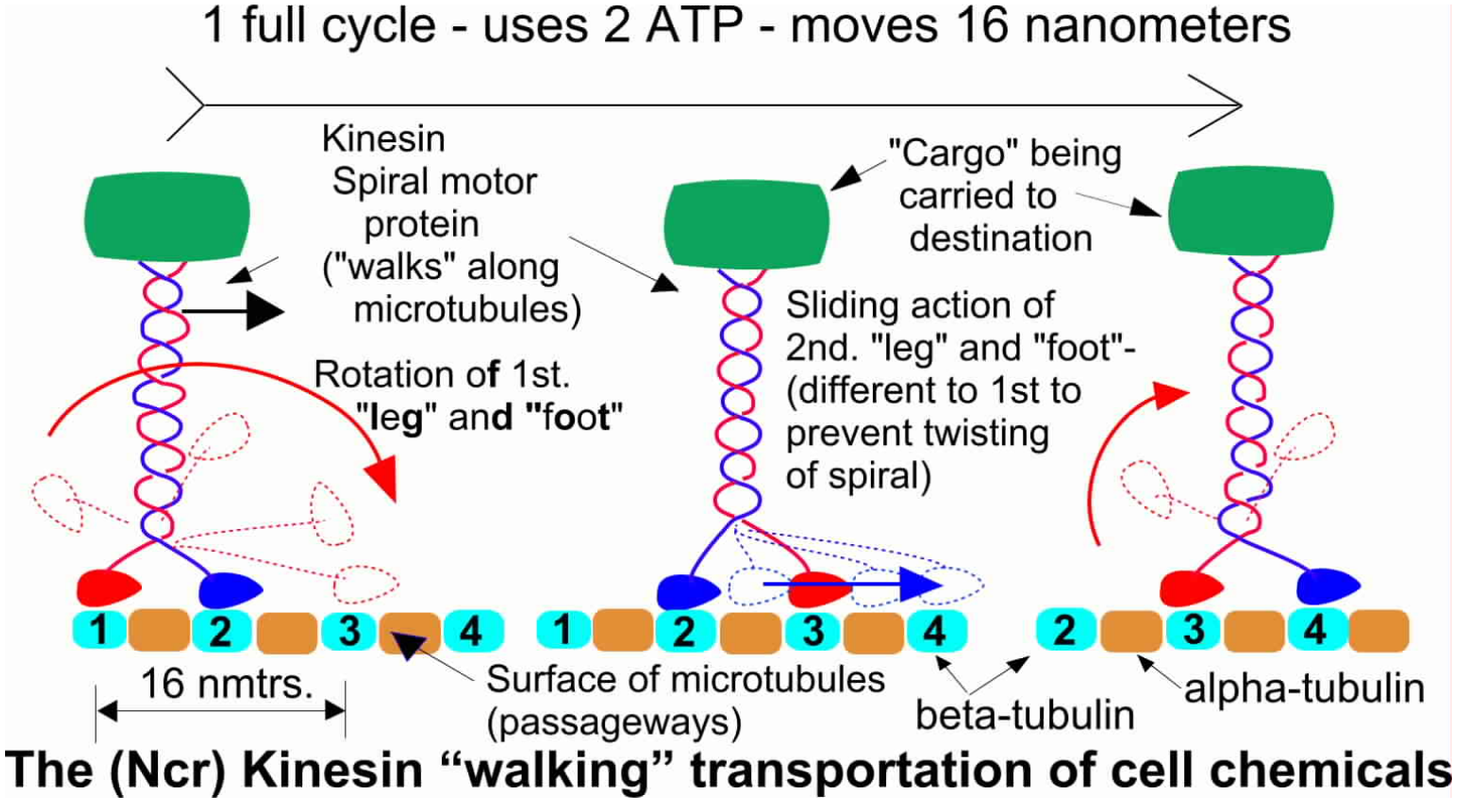
NanoMachinery, NanoRobotics and Automated Processes Inside Living Cells

https://www.youtube.com/watch?v=wJyUtbn0O5Y&t=6s

Intelligent Design of Vesicular Trafficking

Catch/Dock, Traffic/Seize, Release/Delivery





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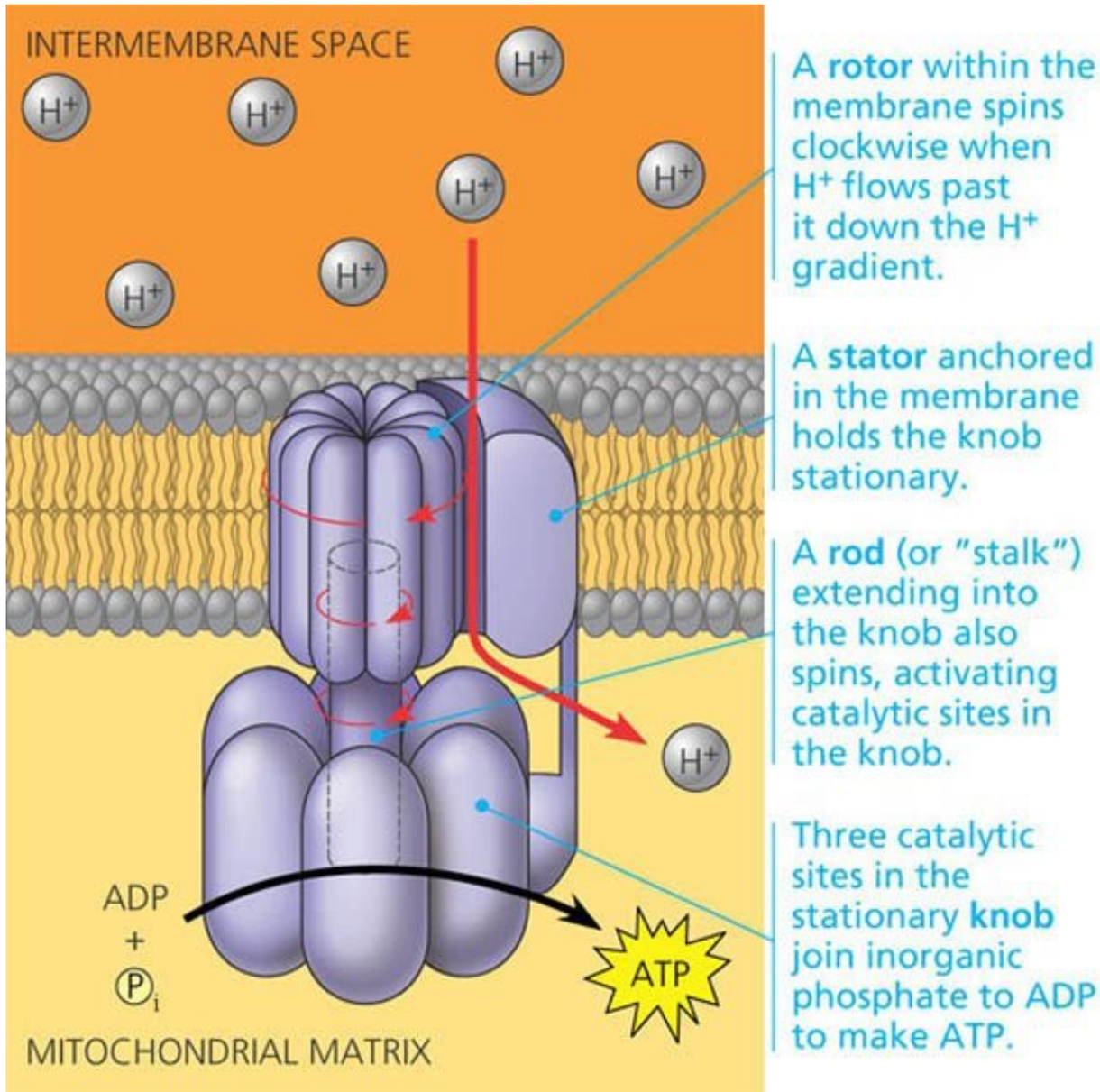
http://www.biochemsoctrans.org/content/40/2/438
http://mbowden.info/kinesin.htm

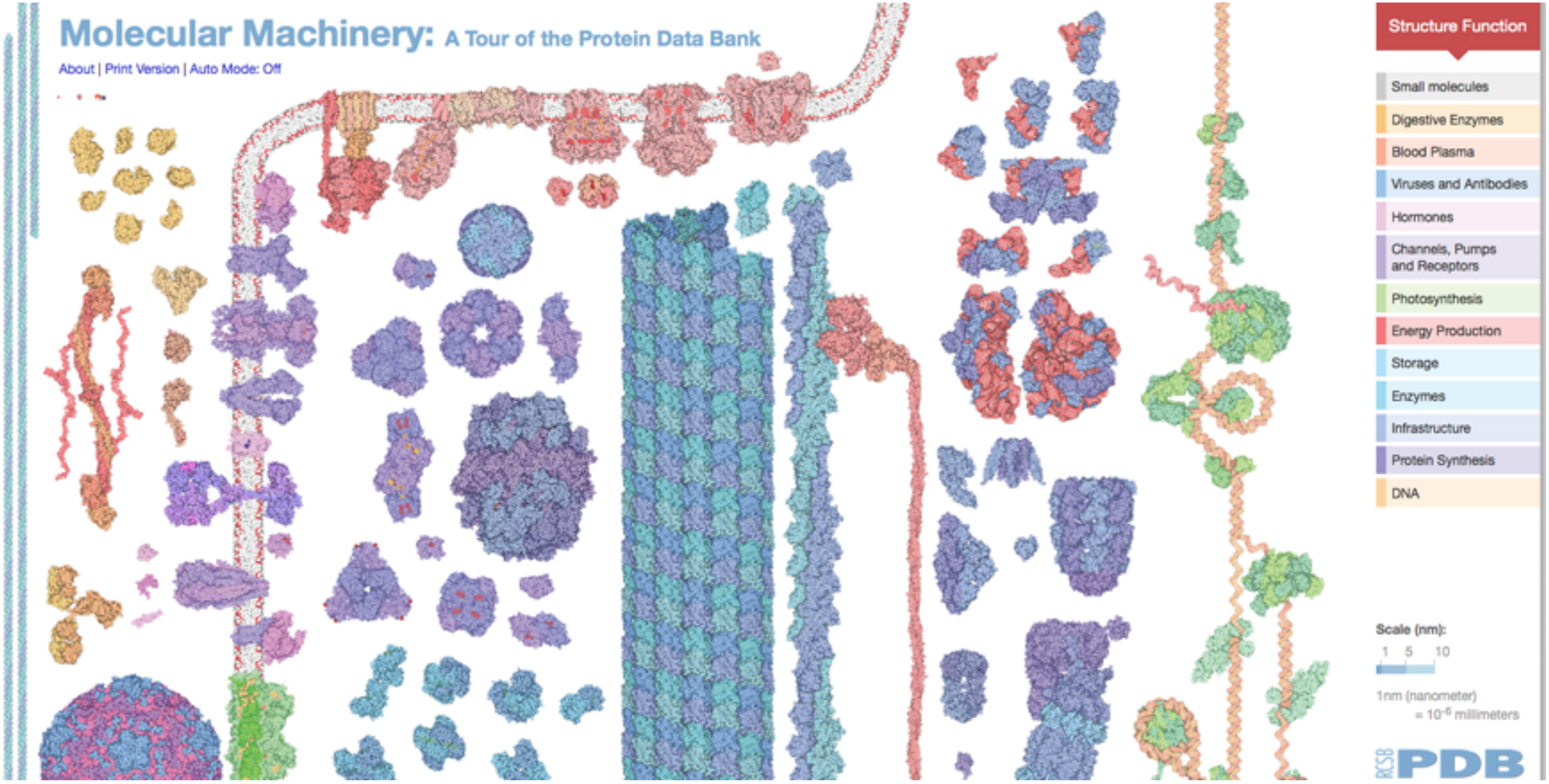
Think “Inside” the Box:
Towards Modular BioMimetic NanoStructure Library



NanoMachinery, NanoRobotics and Automated Processes Inside Living Cells:
https://www.youtube.com/watch?list=PL7Wwl5TzliiG6D3XERntPg_A90z-hETkj&time_continue=190&v=XI8m6o0gXDY

https://i.pinimg.com/originals/01/90/10/019010c6d857156007968a5149a80d68.jpg

Think “Inside” the Box:
Towards Modular BioMimetic NanoStructure Library



Nanostructure Building Blocks for the development of BioMimetics NanoRobotics and NanoMachinery for applications in energy, defense and medicine

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https://www.ejmanager.com/fulltextpdf.php?mno=182404
https://cdn.rcsb.org/pdb101/molecular-machinery/

Why are BioMimetic NanoStructures Important?

- Self Governed once Fueled
- Energy Efficient
- Superior Bio-Sensing Capacity
- Ability to Bio-Defense, Bio-Remedy and Bio-Replicate
- Ability for on demand re-cycling and up-cycling

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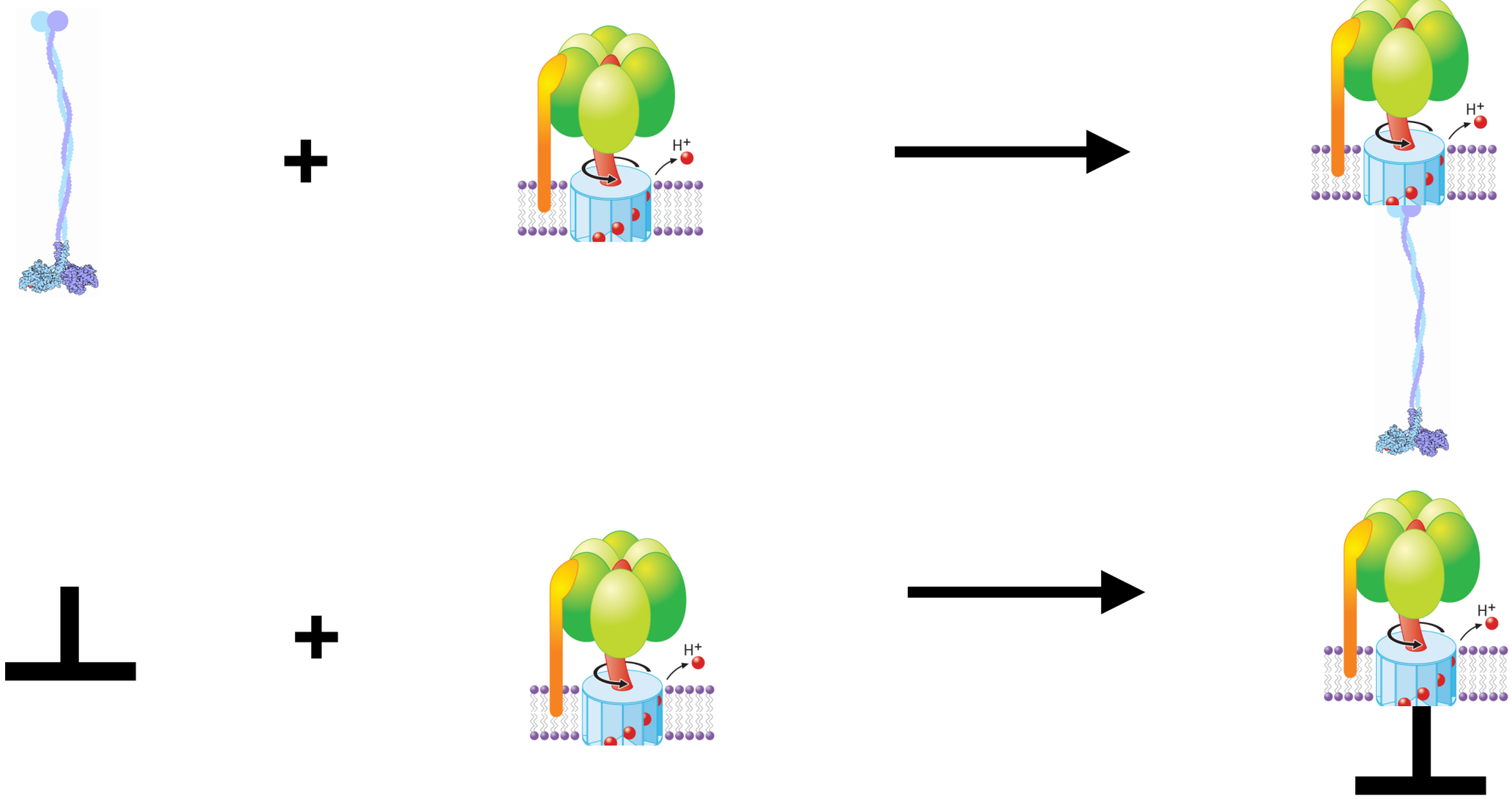
Innovate and Create
Modular BioMimetic NanoStructure Library:
SyntheticBioTechnology Applications in Energy, Defense and Medicine



SyntheticBioTechnology:
The development of innovative NanoRobotics and NanoMachinery. NanoStructure building blocks can be utilized for the development of innovative Additive Manufacturing capabilities in microgravity environment.

Real Time Library Stocking Towards Implementation of a SyntheticBioTechnology Materials Library

Enhancing quality of life by accessorizing with advanced technological capabilities (technological capabilities need to be developed as according to the microgravity environment with “Mind the Space” and not just replicating what is existing “on Earth in Gravity” for convenience).

Towards Creating NanoStructure Library and the Development&Implementation of Innovative Additive Manufacturing Capabilities in Microgravity Environment.

- Human Umbilical Cord and Cord Blood of New Born as well as Adult
- Up Cycling Urine, Feces, Sweat, Saliva, Blood, and Tissue
- Up Cycling of Human Remains (Donor)
- Modification of Bio NanoMachinery and NanoRobotic Structures and Implementation of a SyntheticBioTechnology Materials Library

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Thank You!

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CEO, Director & Founder, Global Entrepreneur

3D PARS ([HQ-MN, FQ-CA, MD, NY]USA), 3D PARS Texas (TX-USA), 3D PARS Limited (GBR) & 3D PARS Tasmania (TAS)

3D PARS: A Virtual Launch Pad, Microgravity Capability Implementor

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