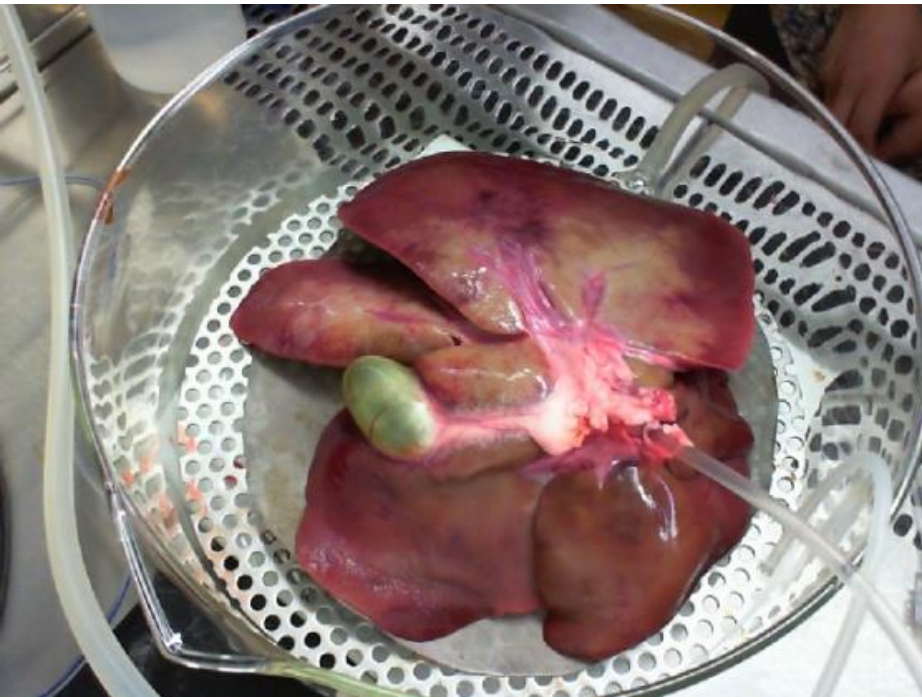
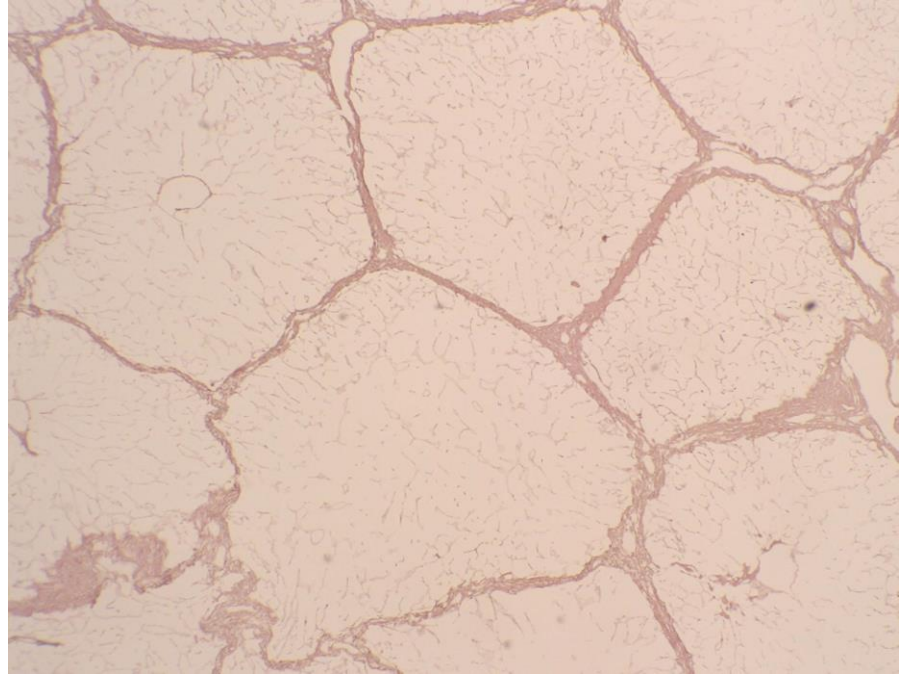
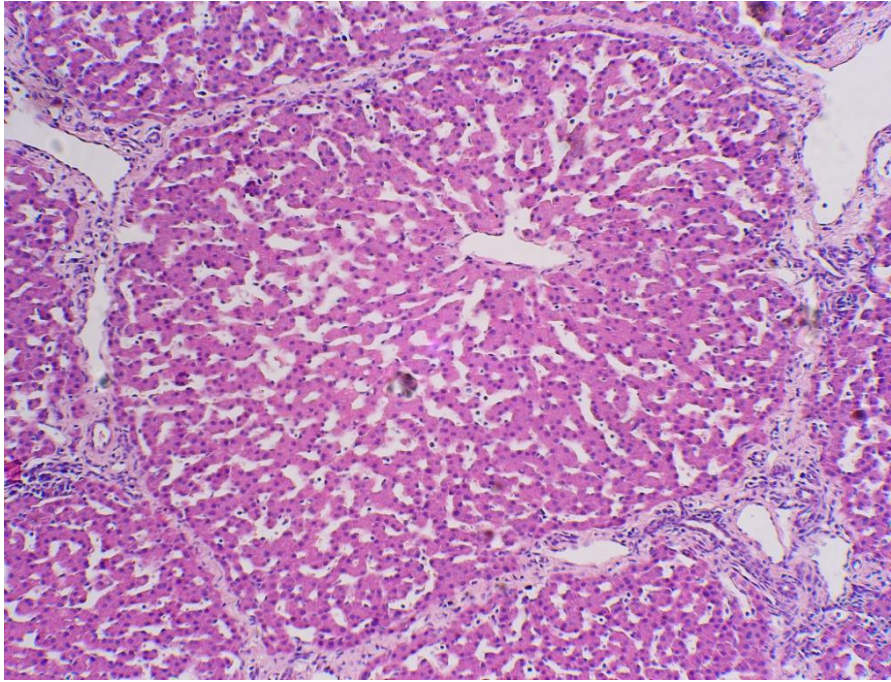


Form and Function in Implantology

PD Dr. Martin Schenk





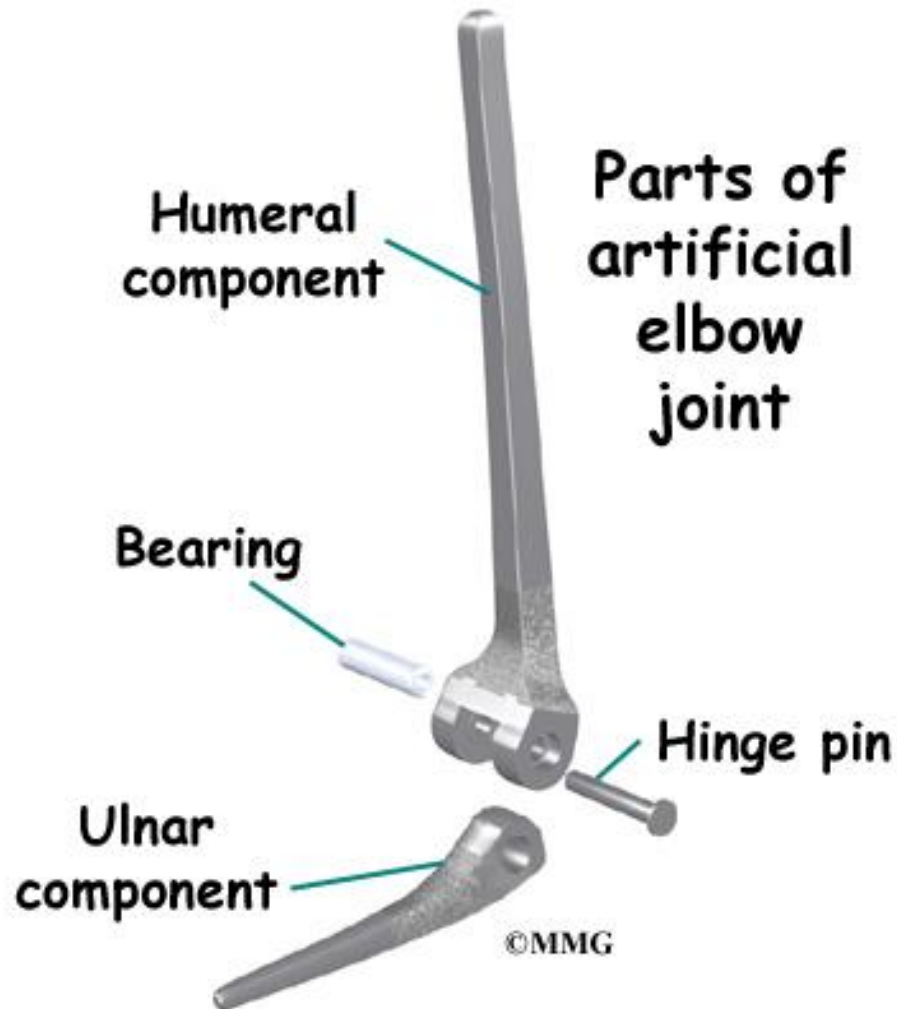
Form follows Function

is a principle associated with modernist architecture and industrial design in the 20th century.

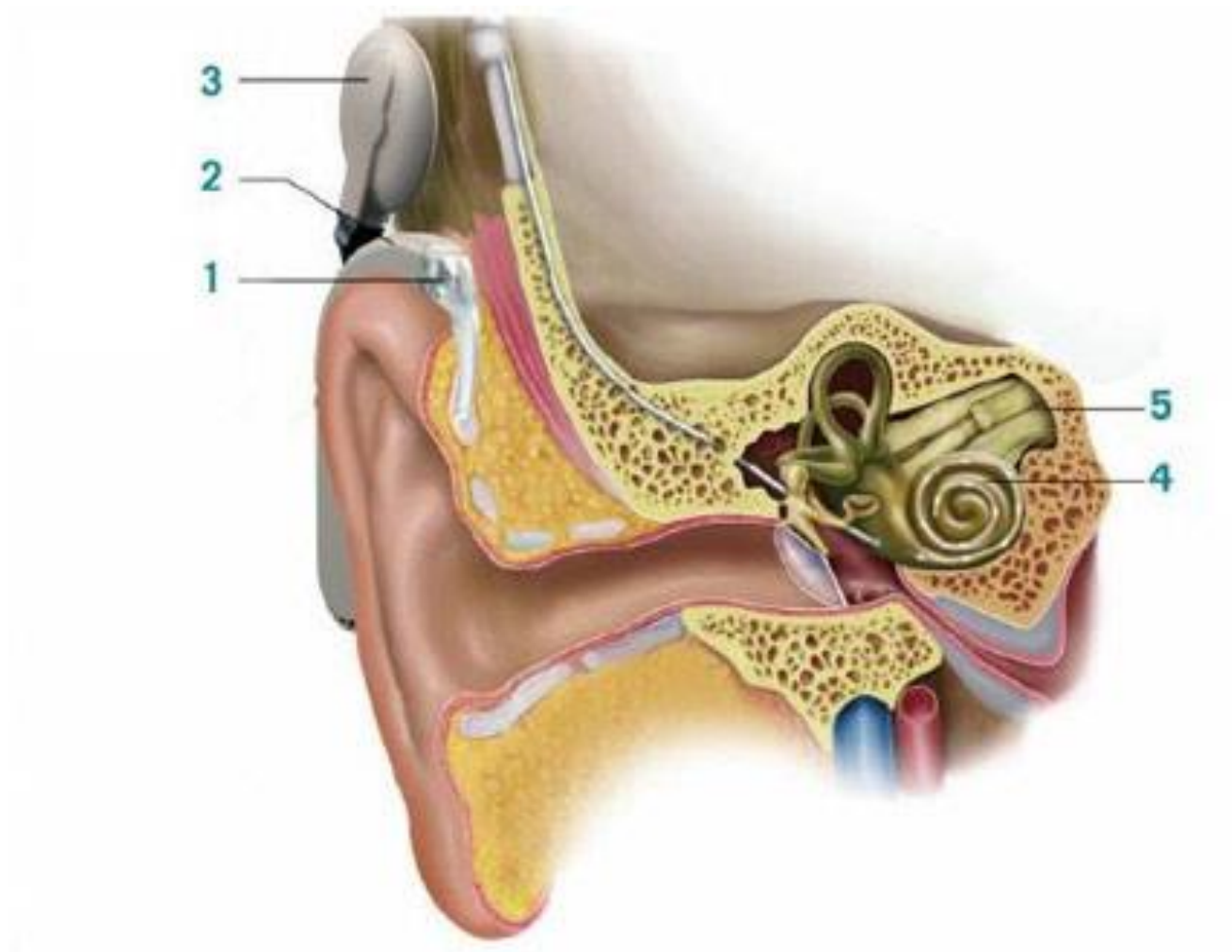
The principle is that the shape of a building or object should be primarily based upon its intended function or purpose.



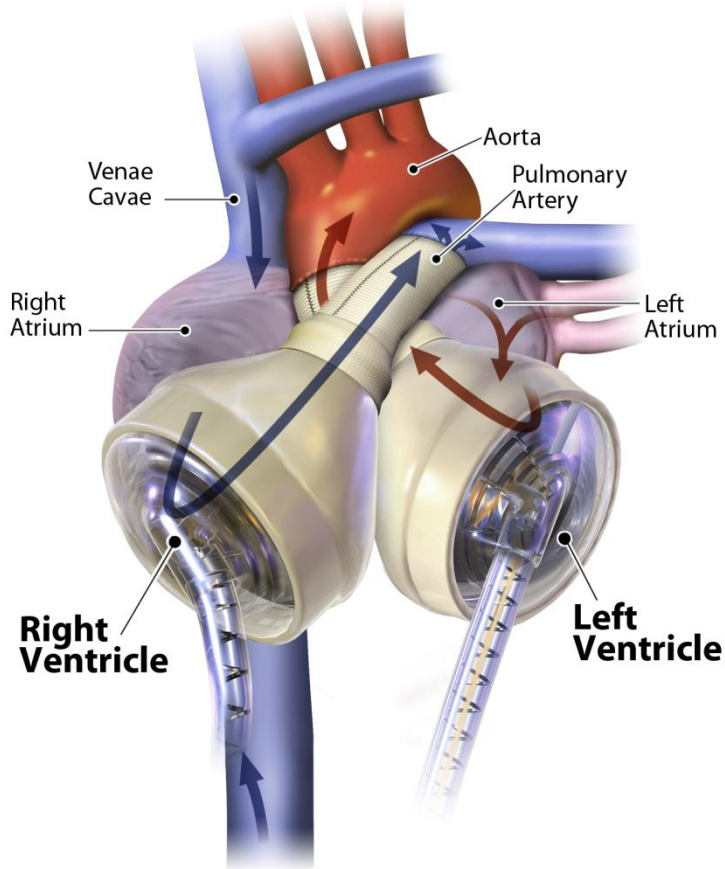
Form follows Function



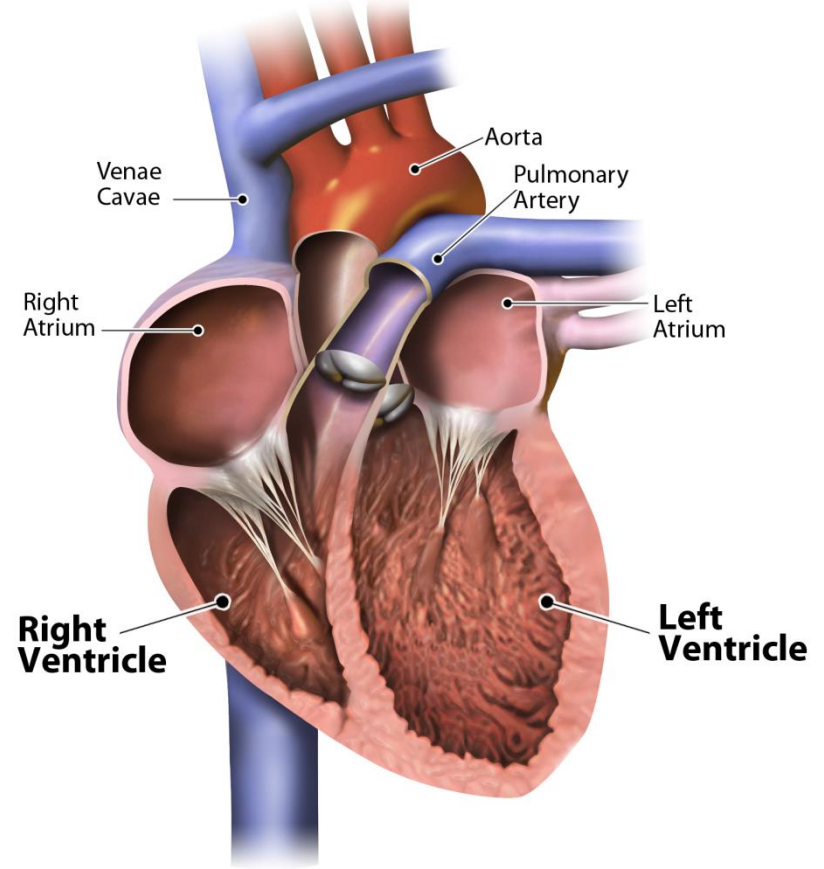
Form follows Function



Form follows Function

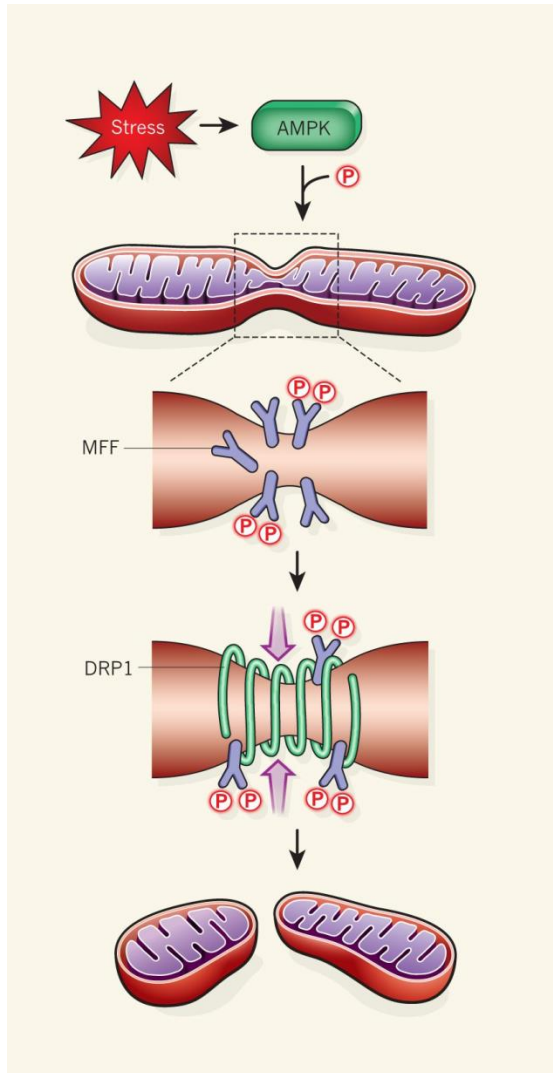


Total Artificial Heart



Human Heart

Form follows Function



Form follows function for mitochondria

Chunxin Wang & Richard Youle

Nature 530, 288–289 (18 February 2016)

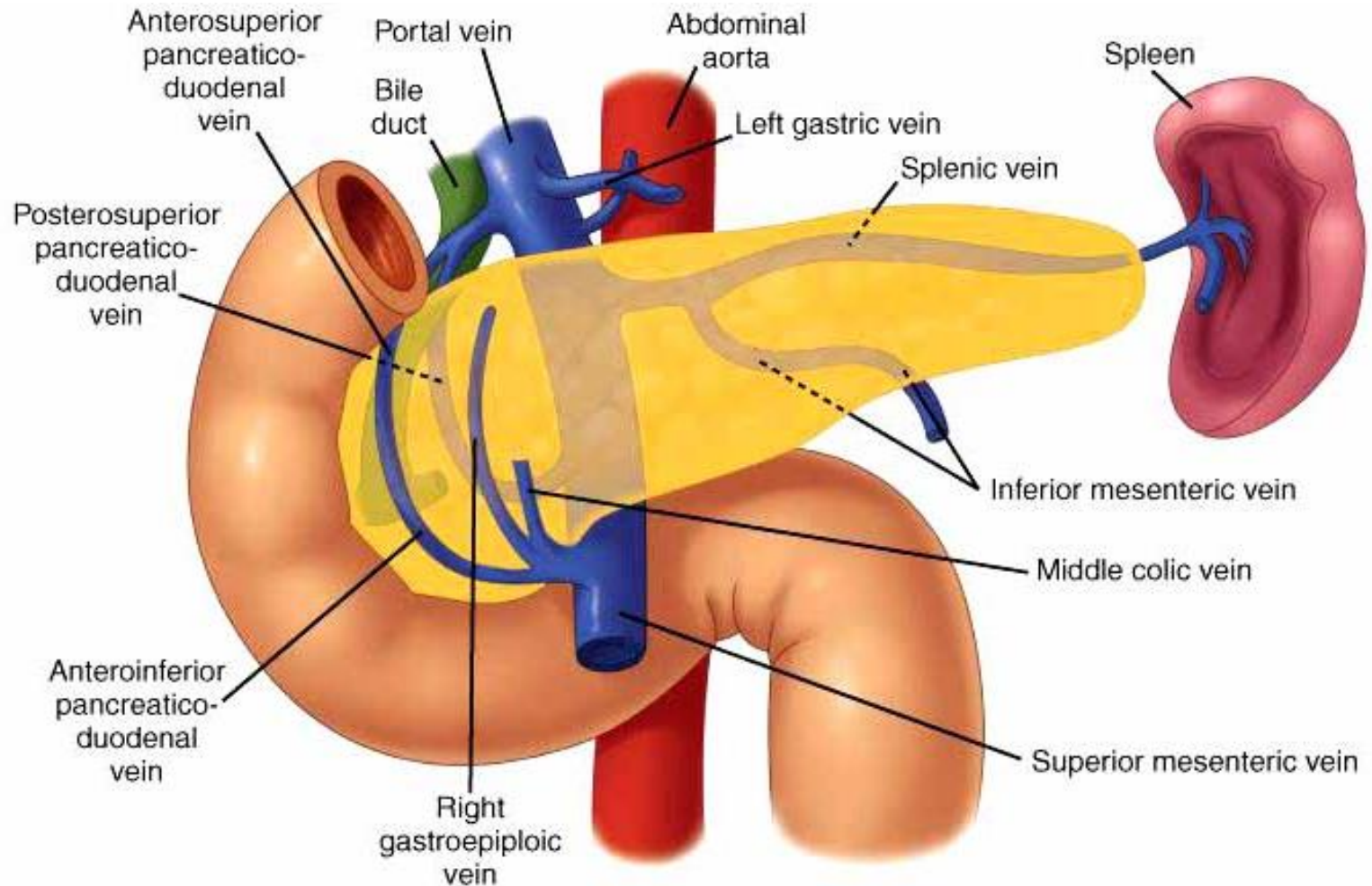
Function follows Form

is a principle associated with modernist architecture in the 21th century.

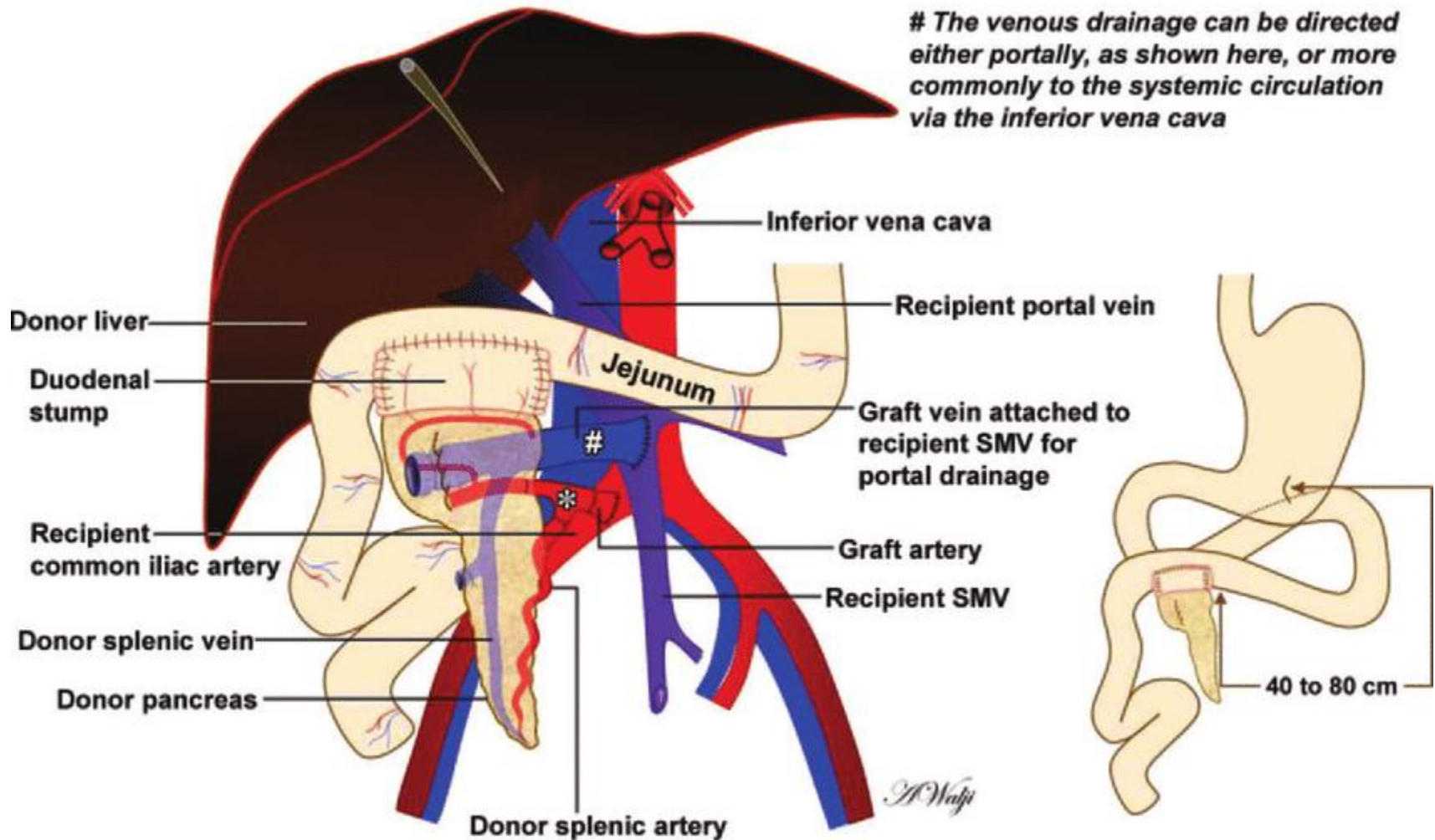
The principle is that the shape offers the form to express and be filled with innovative functions.



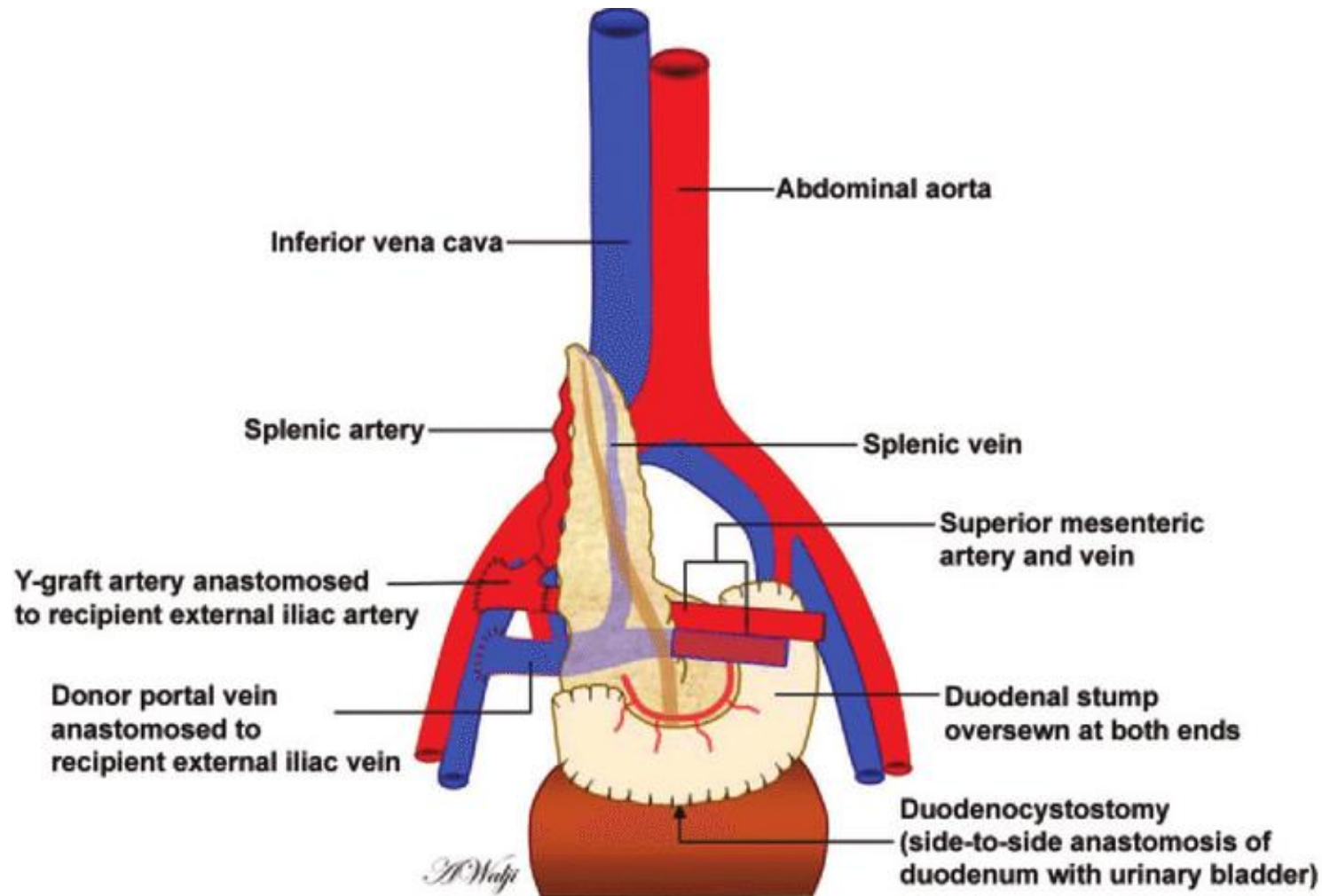
Pancreas Transplantation



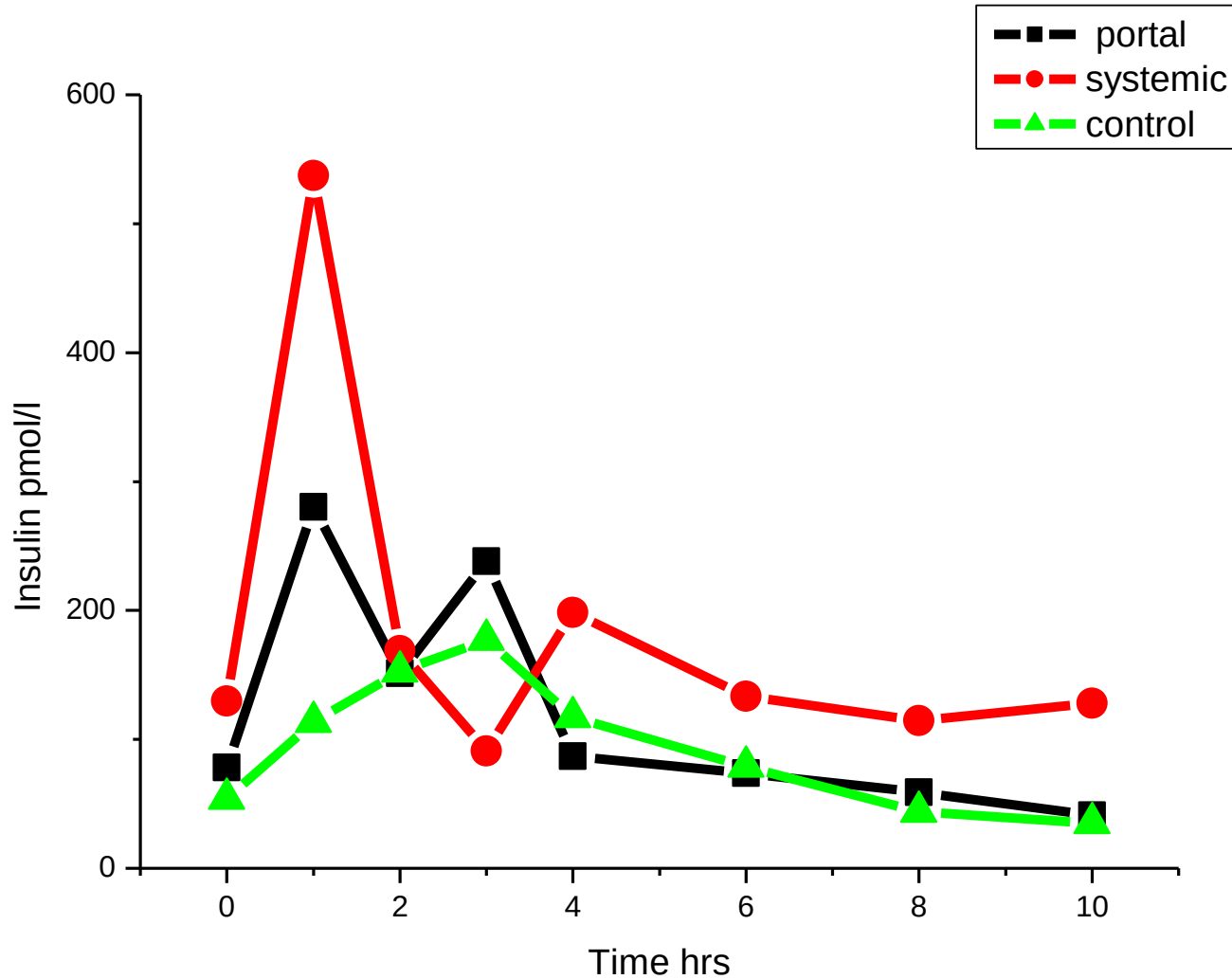
Pancreas Transplantation



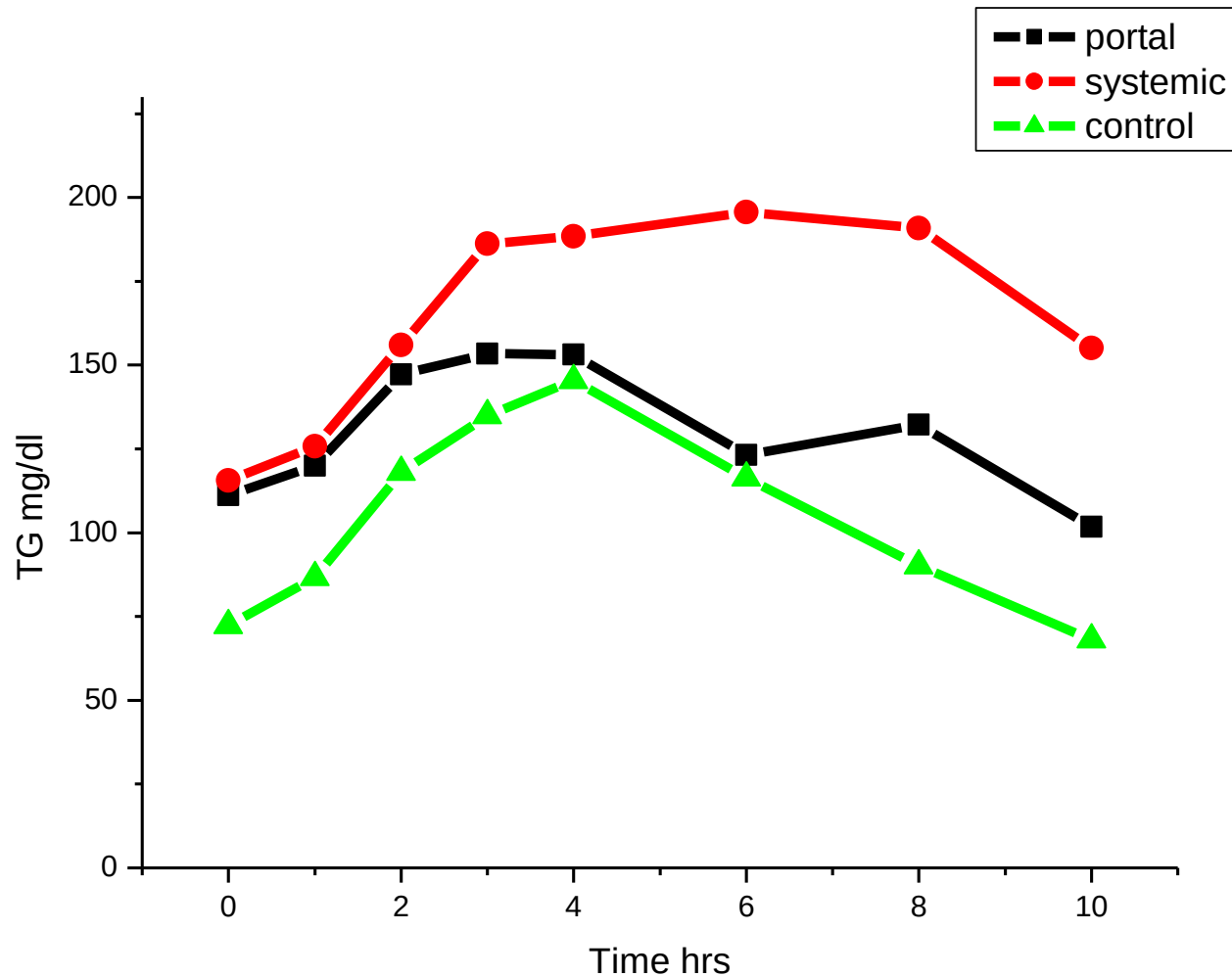
Pancreas Transplantation



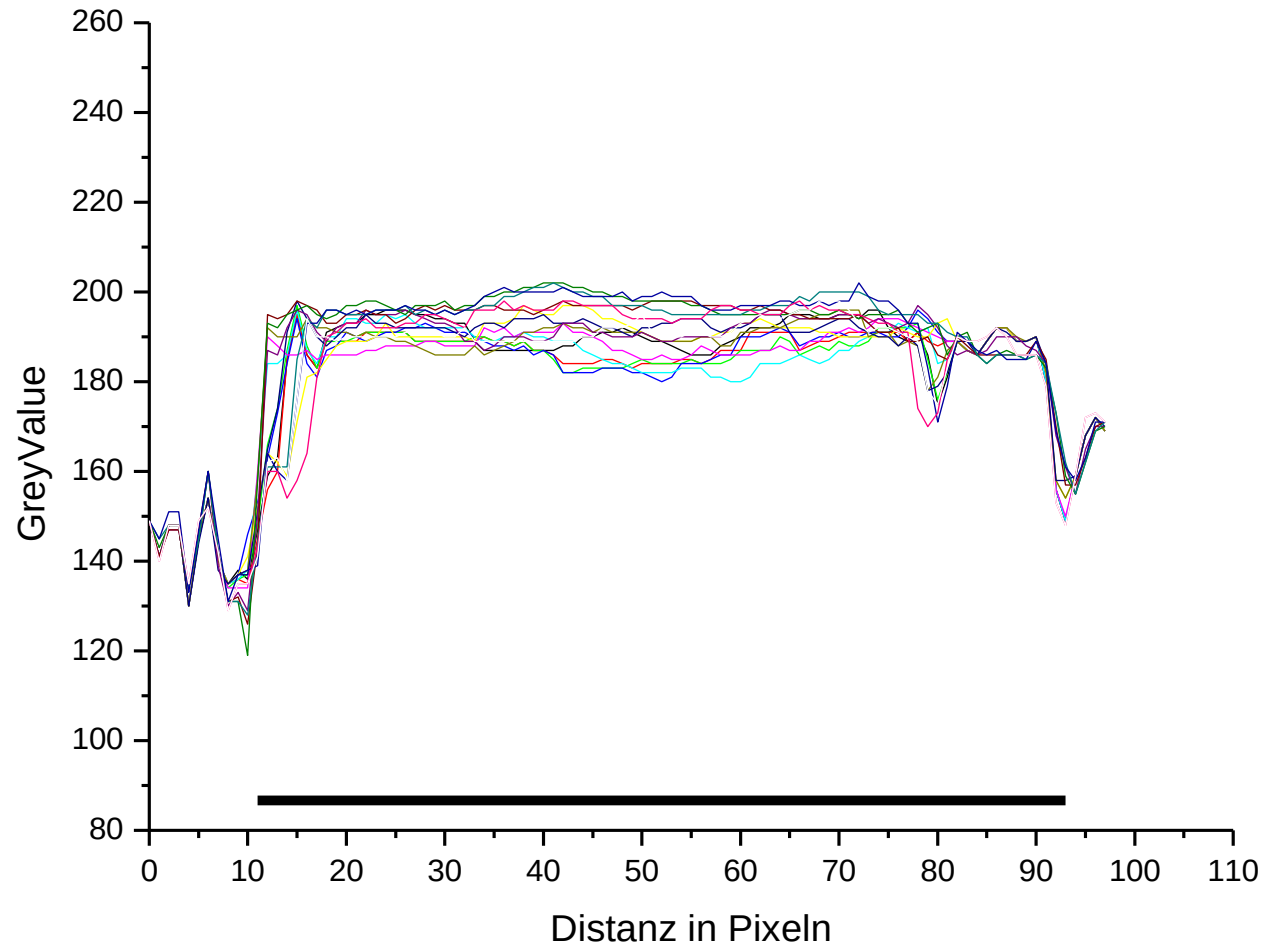
Insulin Response



Triglyceride Response



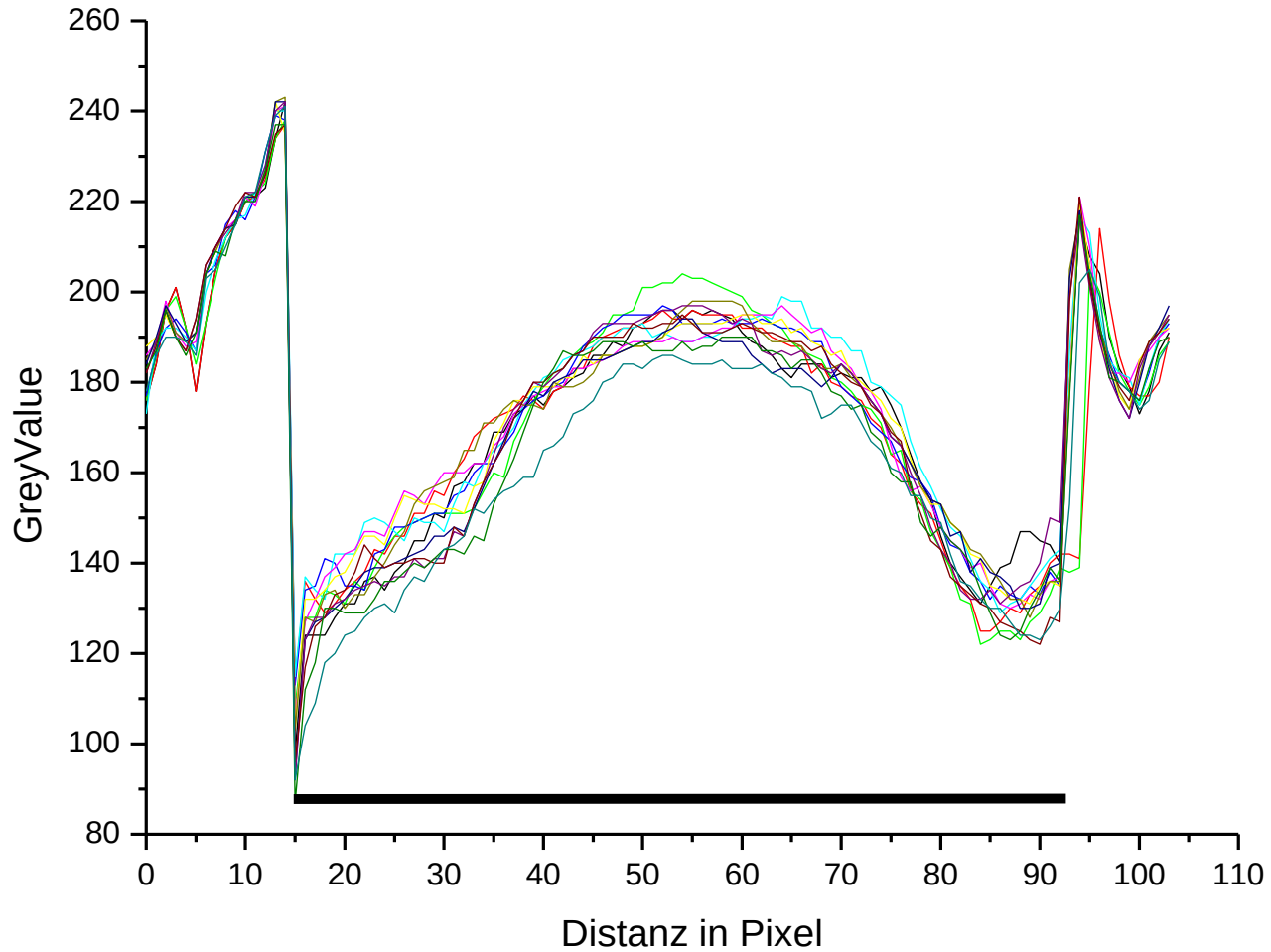
Vascular flow



Vascular stent



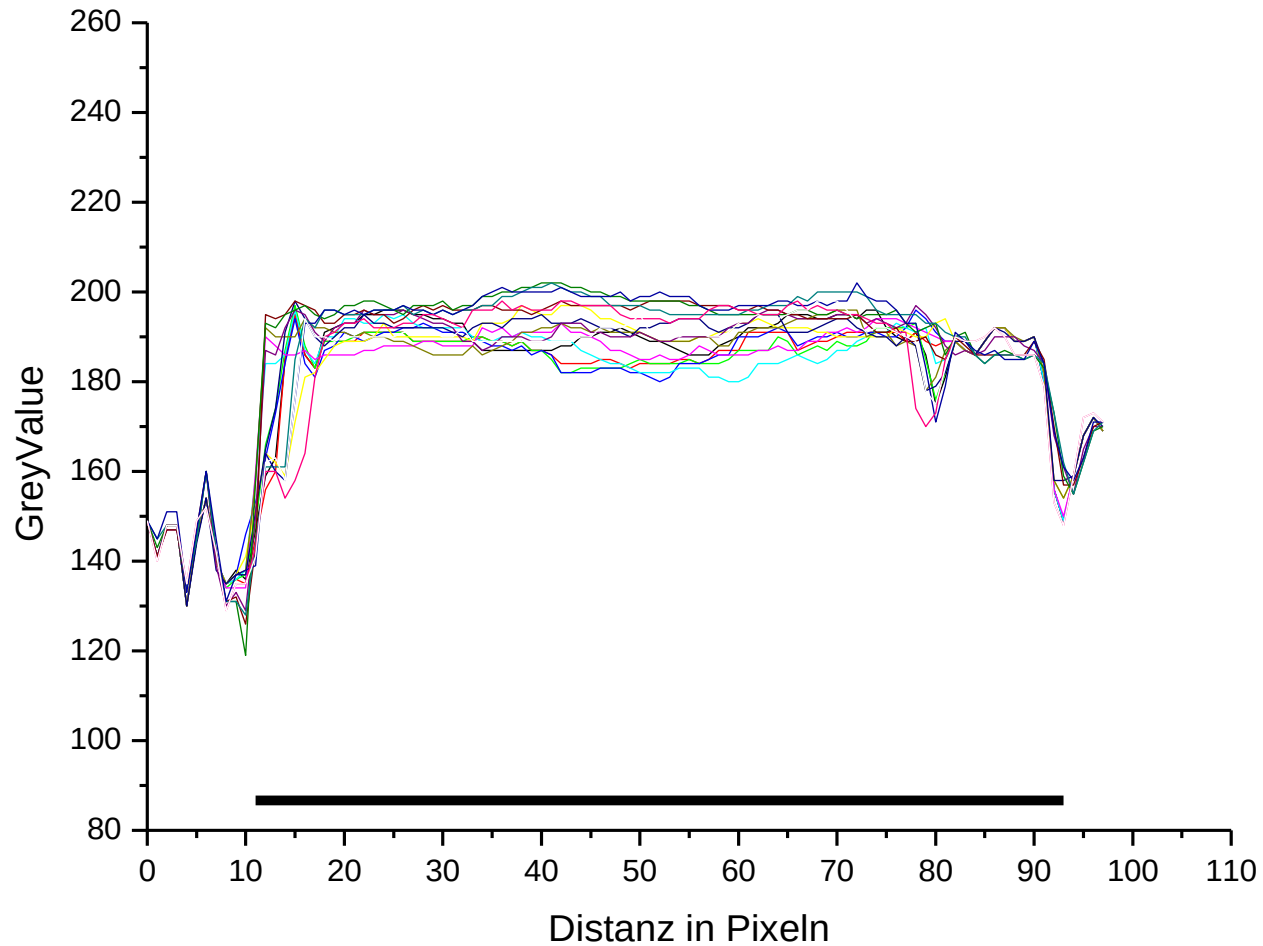
Vascular flow



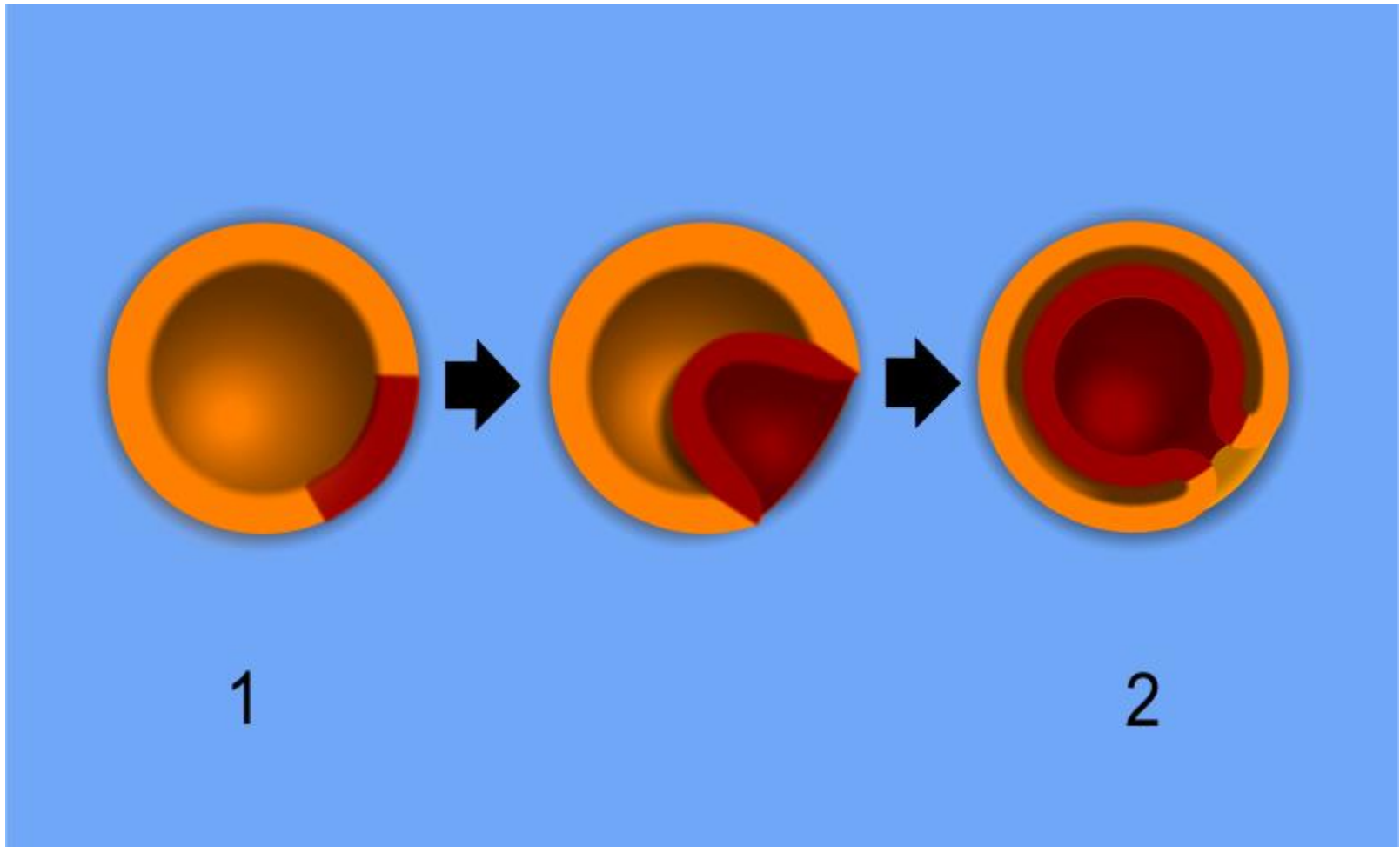
Vascular flow



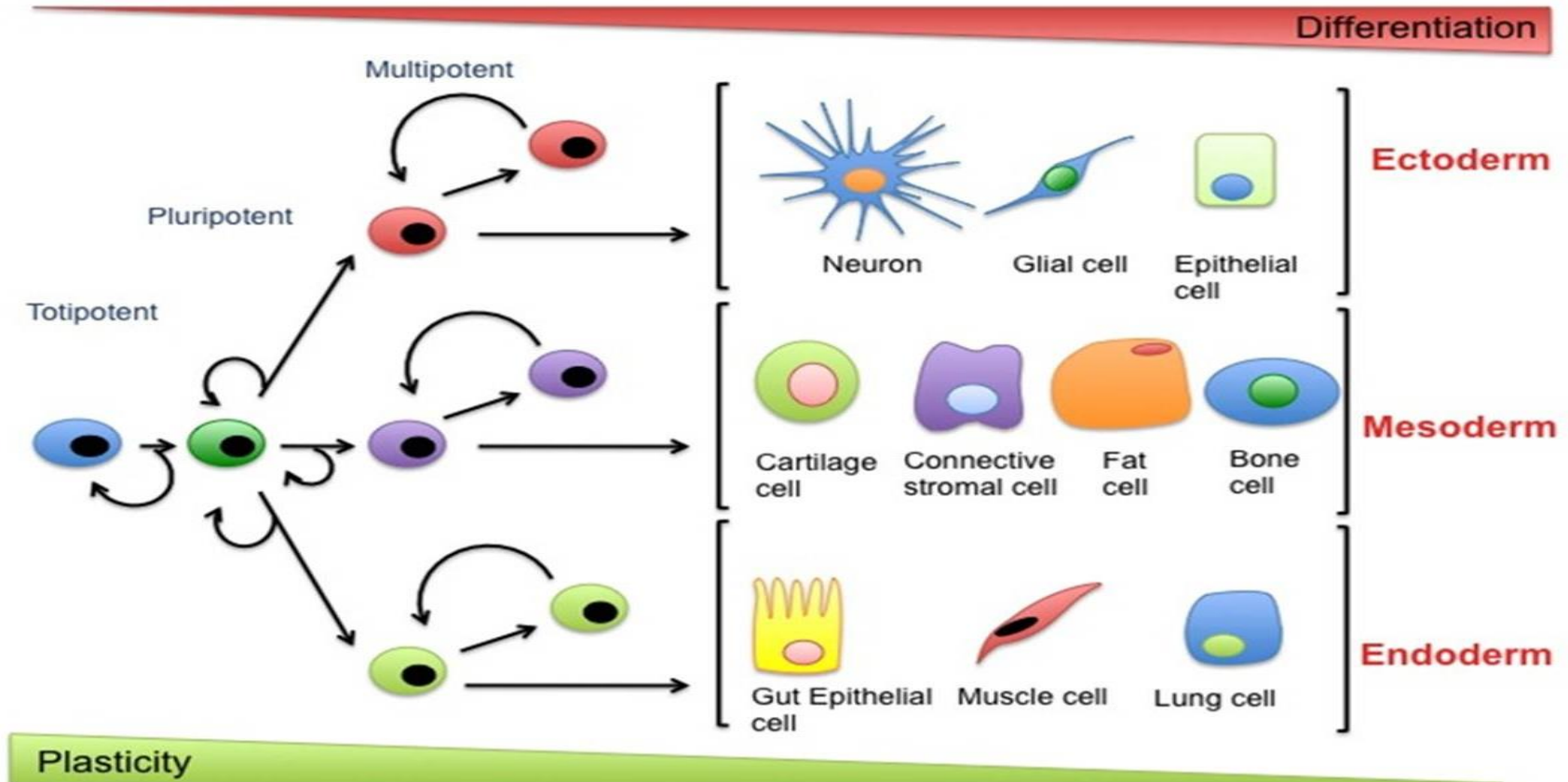
Vascular flow



Germ layers in embryonic development



Cell Differentiation

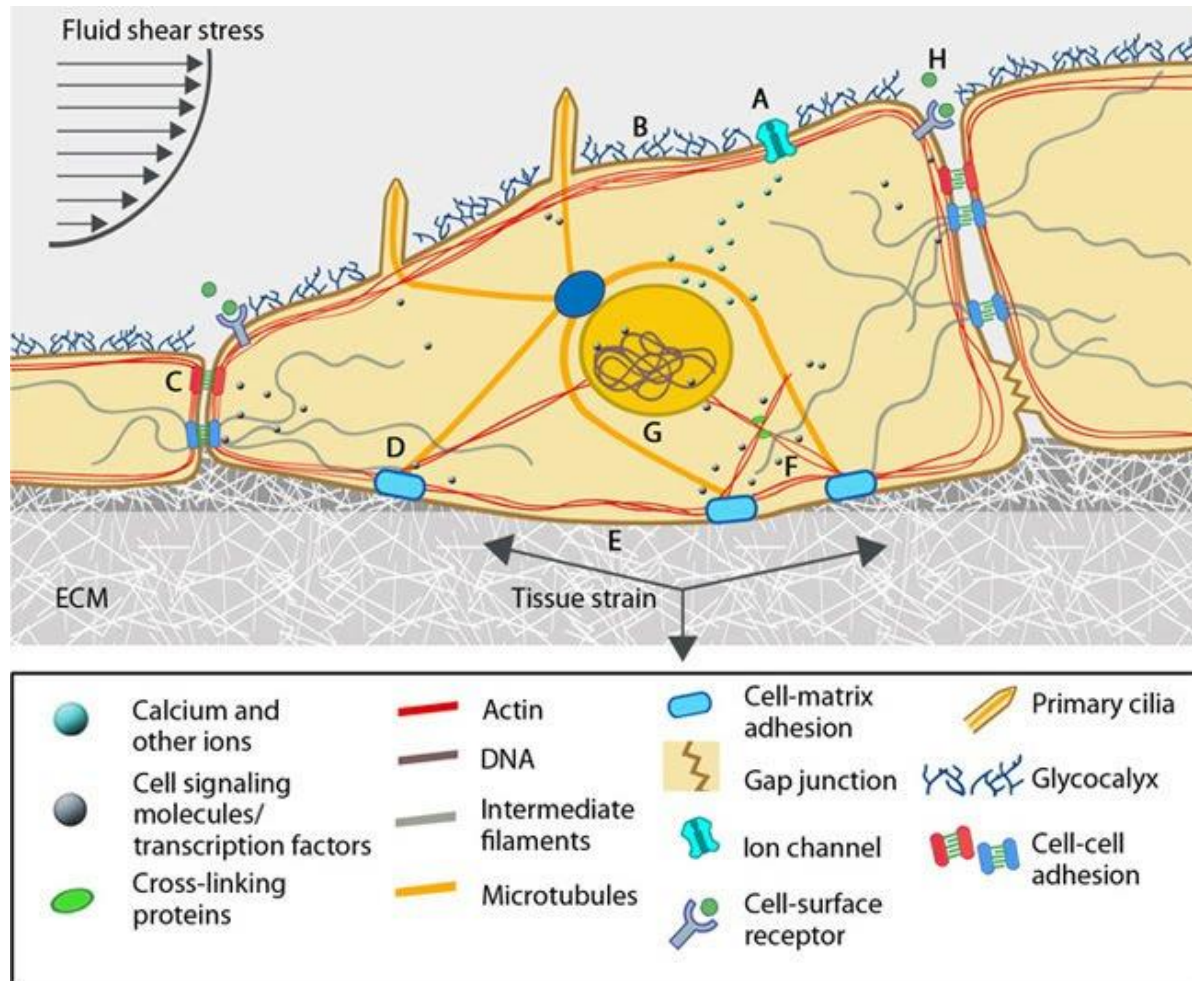




Mechanobiology

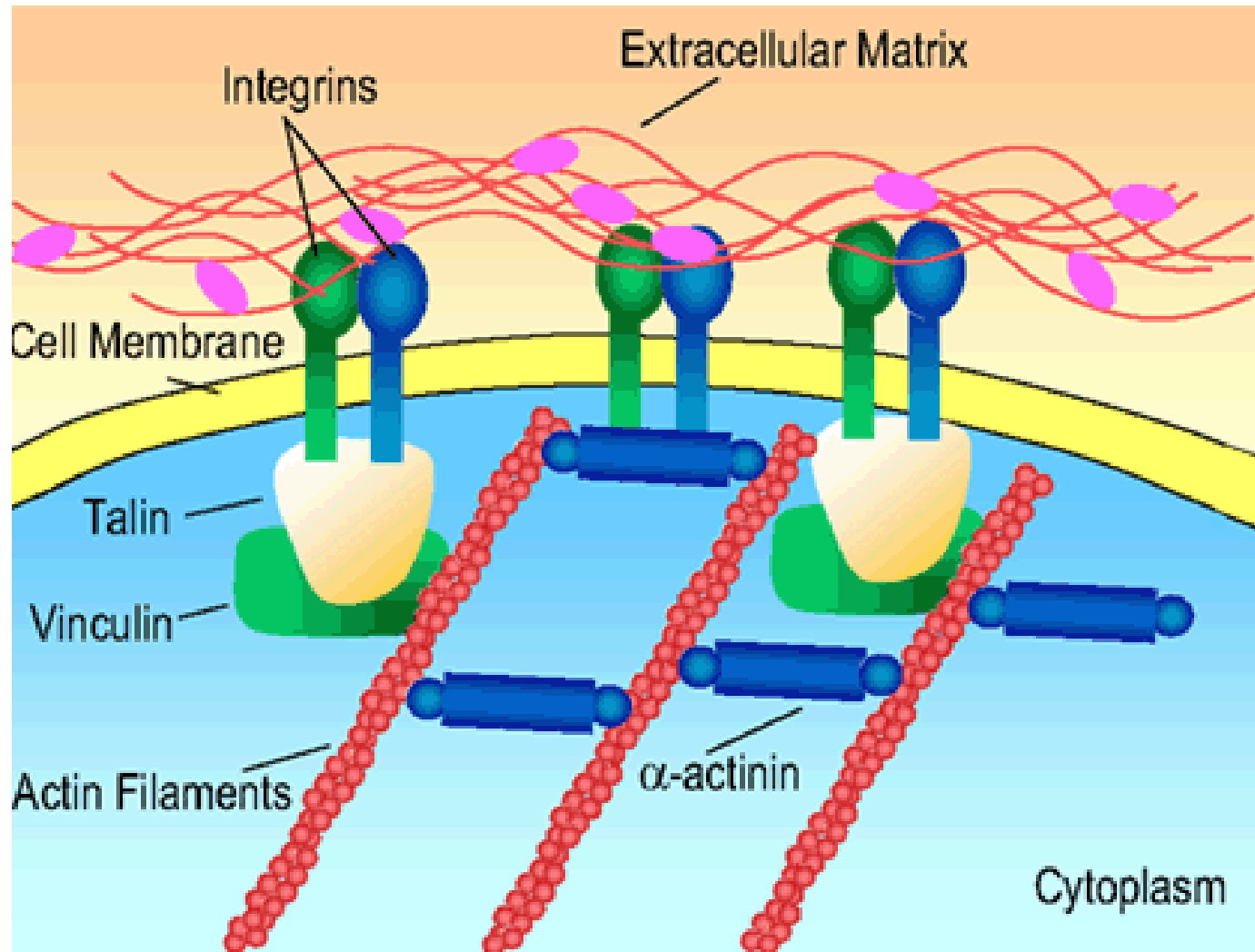
- **Mechanosensing**
- **Intracellular signaling**
- **Signal integration to the nucleus**
- **Response**

Mechanobiology

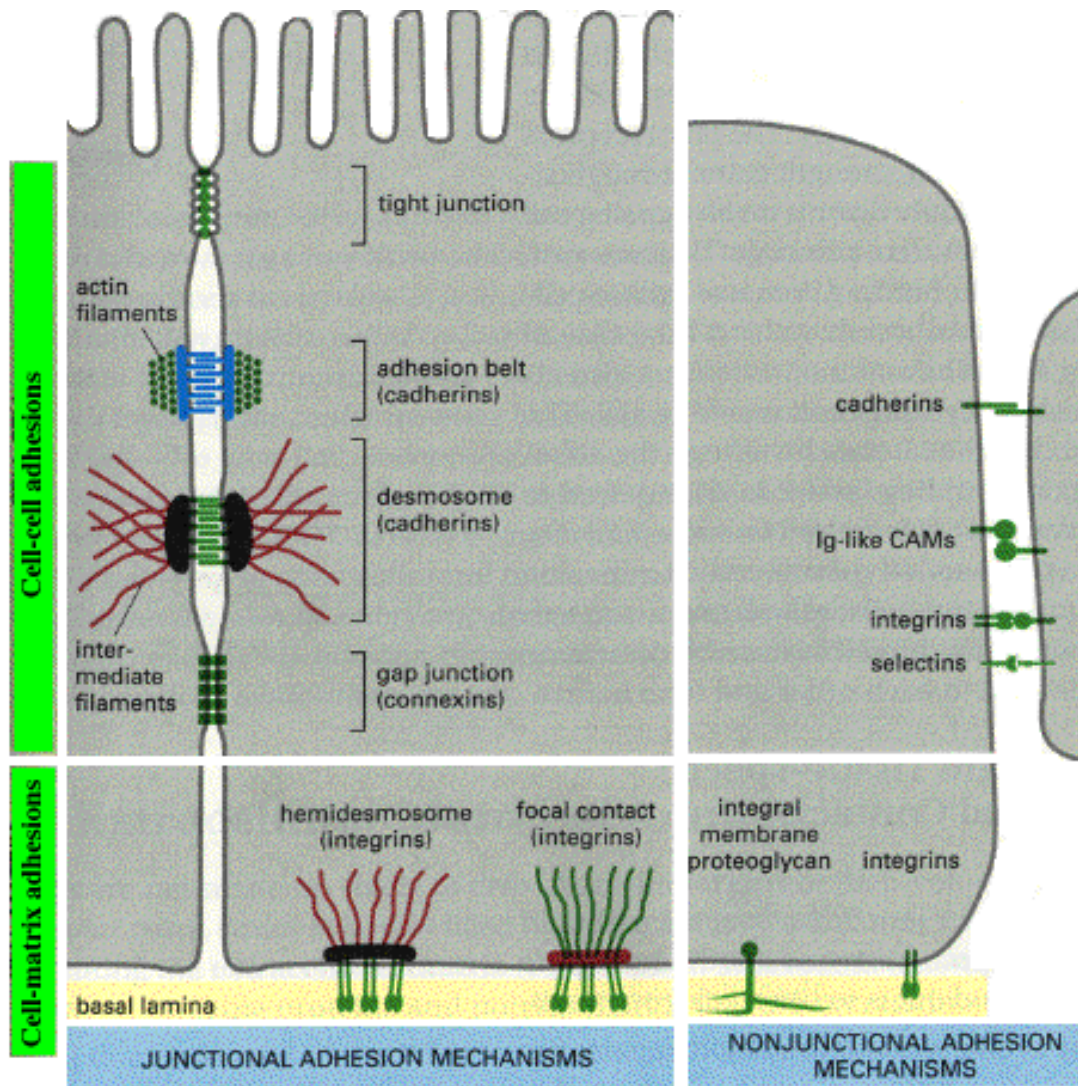


from <http://www.mechanobio.info>

Cell Matrix Adhesion



Cell Cell Adhesion

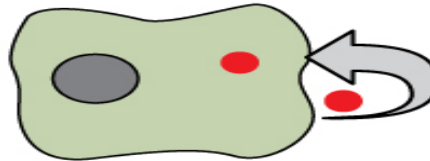


Chemical Signaling

Forms of Chemical Signaling

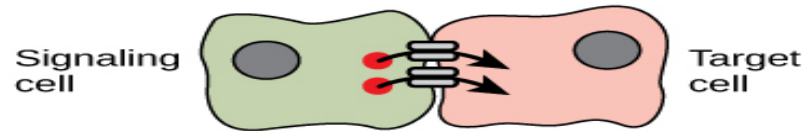
Autocrine

A cell targets itself.



Signaling across gap junctions

A cell targets a cell connected by gap junctions.



Paracrine

A cell targets a nearby cell.

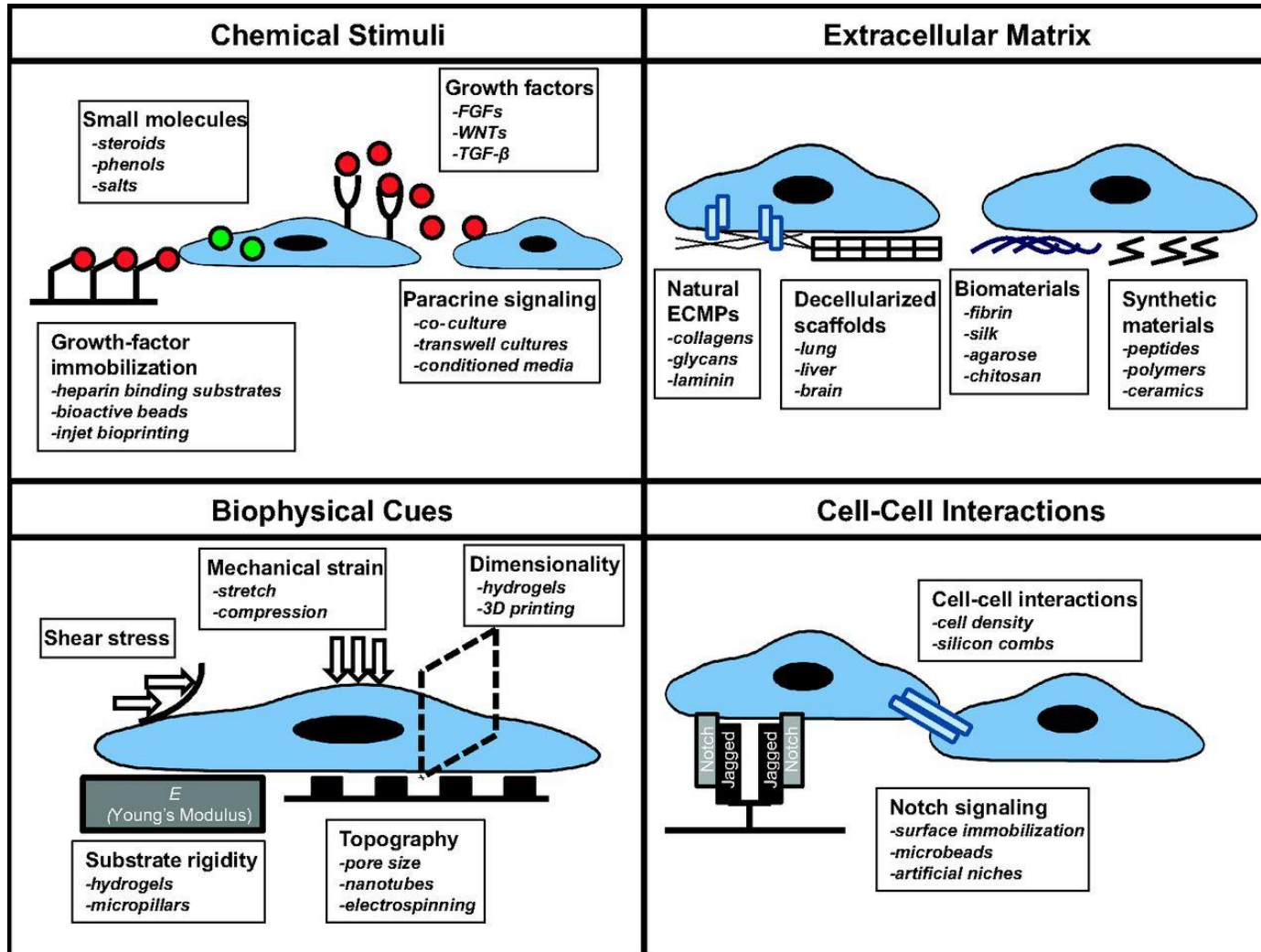


Endocrine

A cell targets a distant cell through the bloodstream.



Surrounding Factors



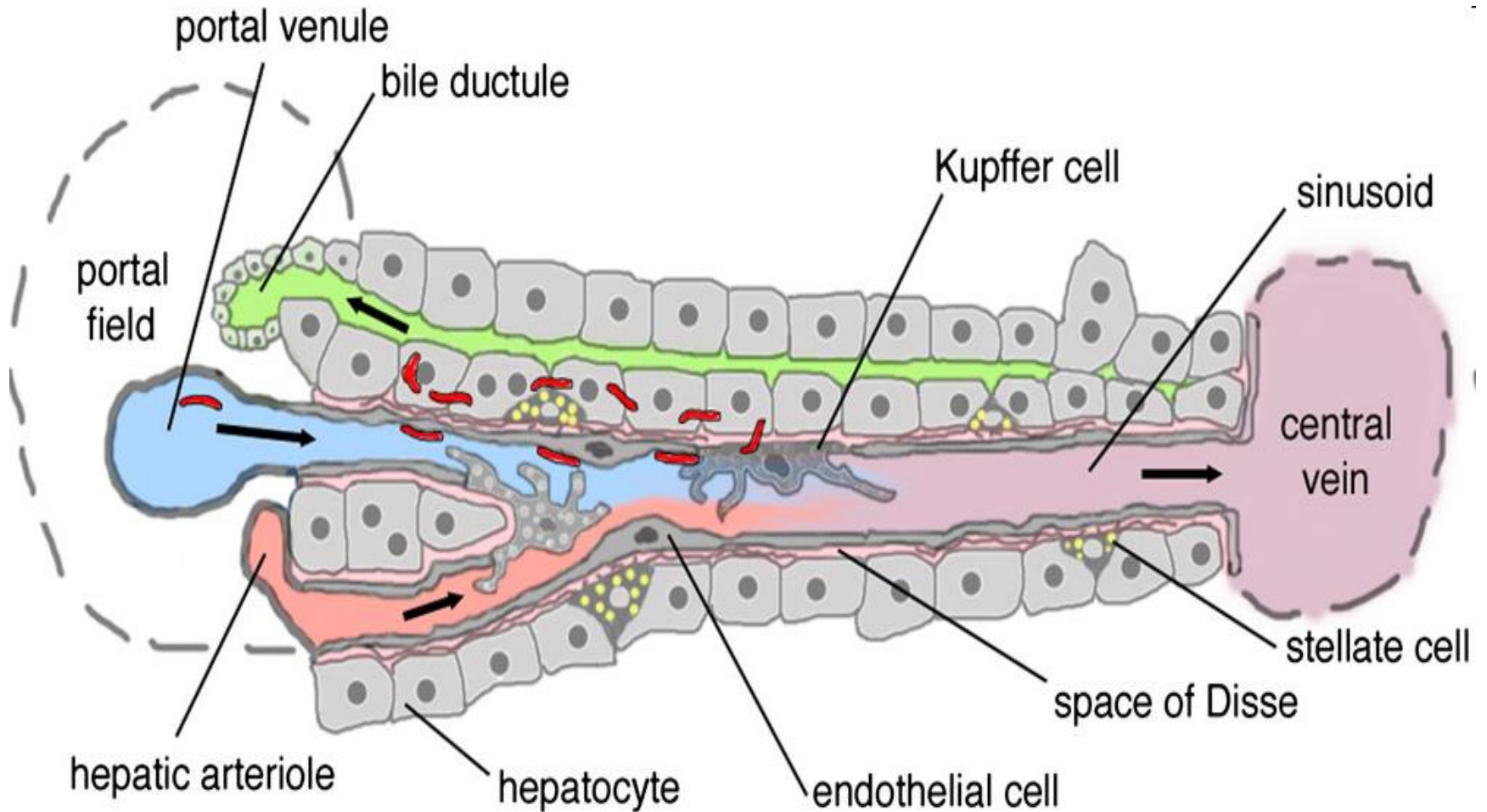
from:

Constructing stem cell microenvironments using bioengineering approaches

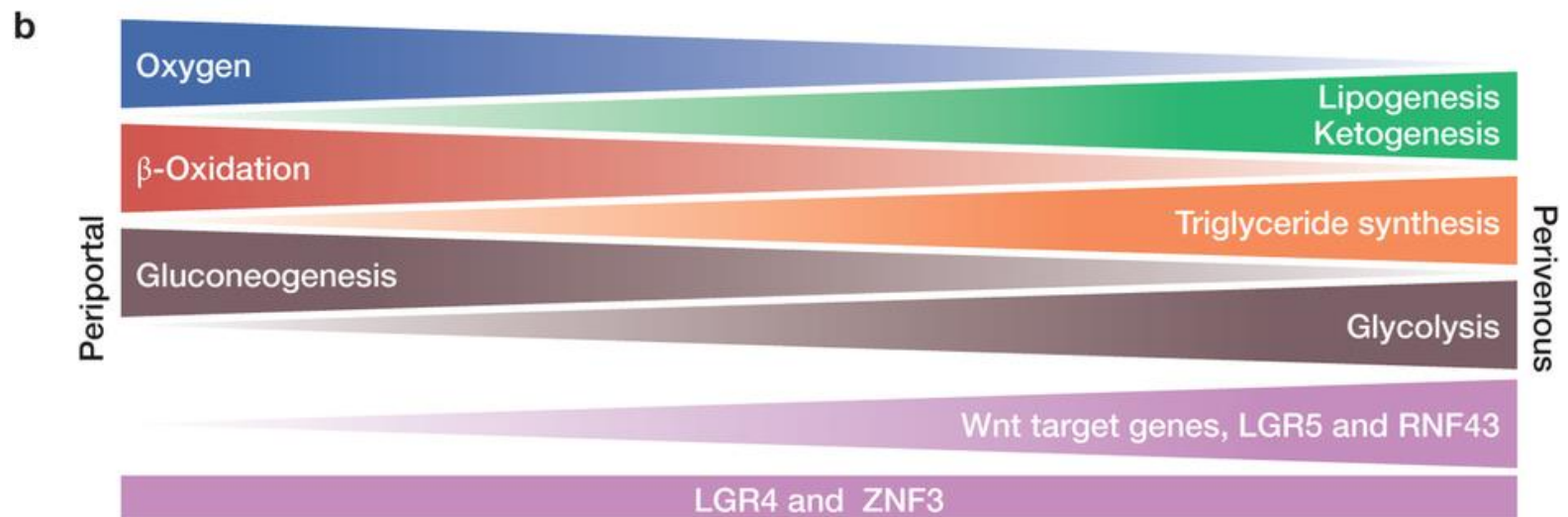
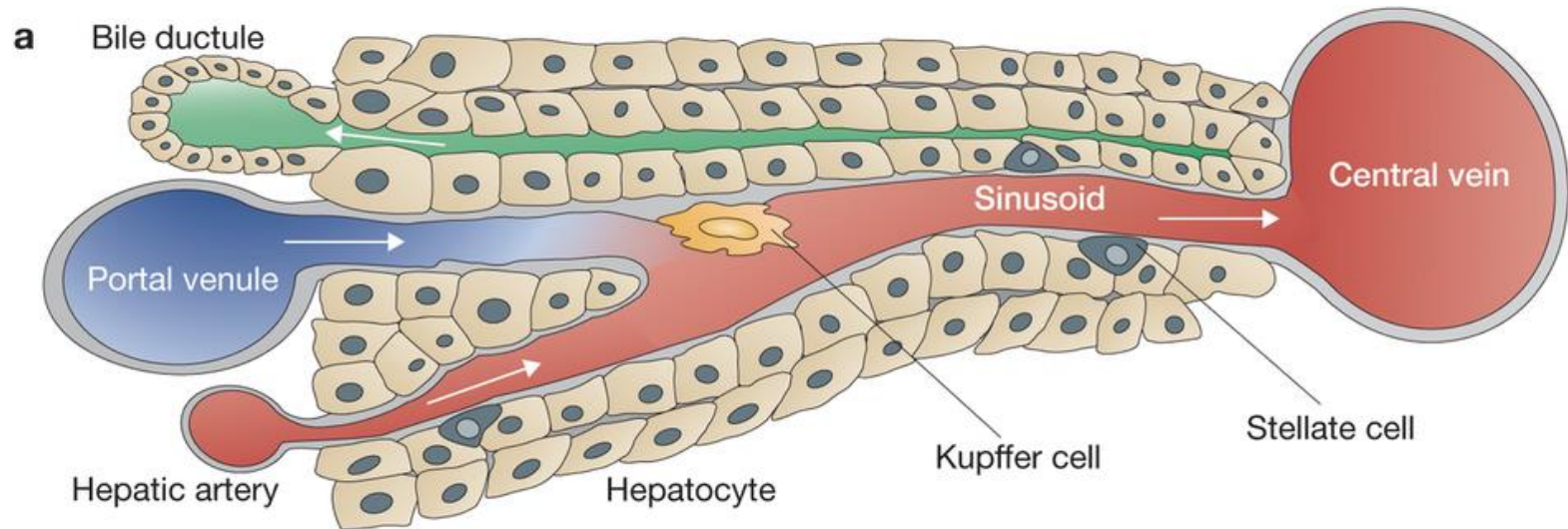
David A. Brafman

Physiological Genomics 2013 Vol. 45 no. 23, 1123-1135

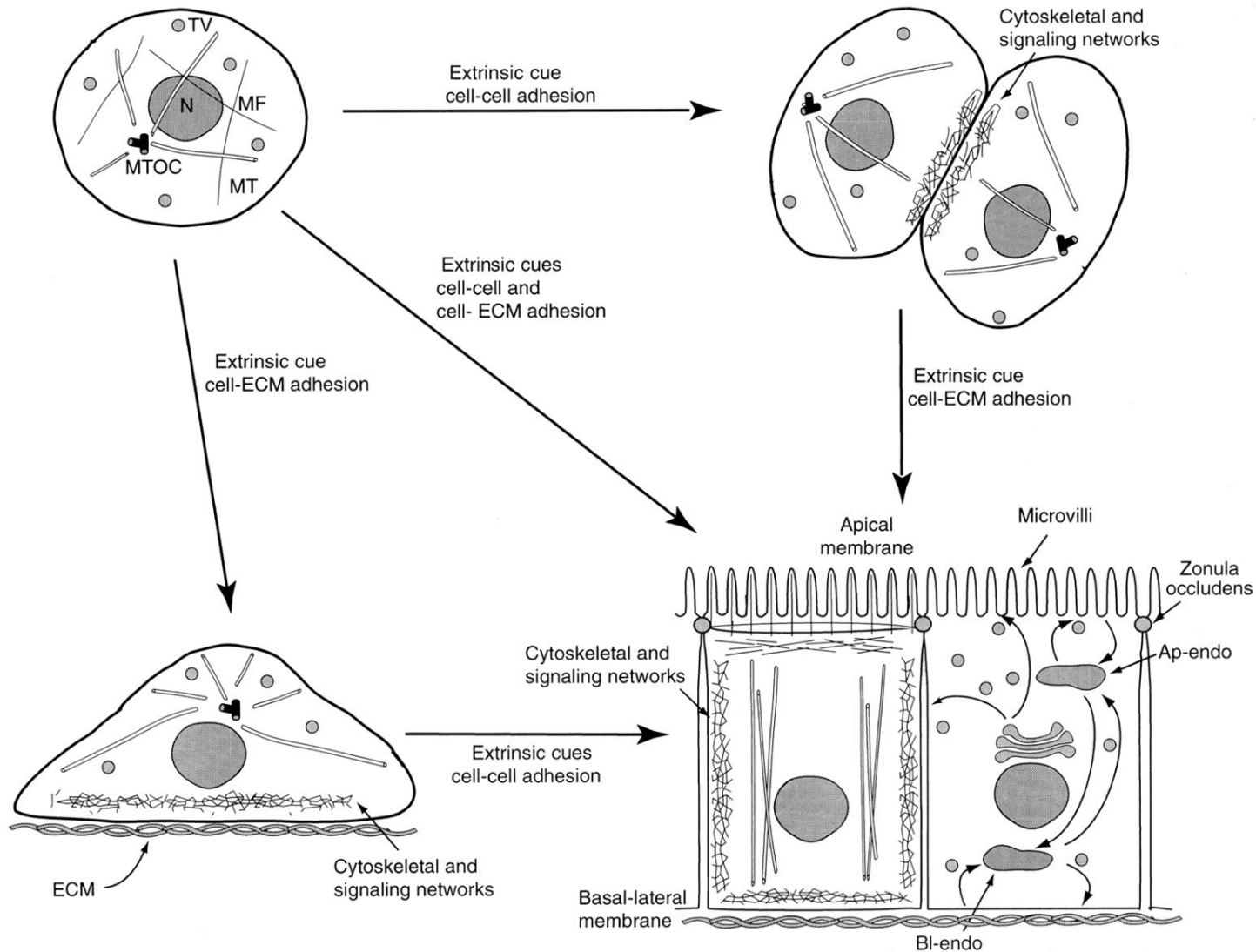
Liver function



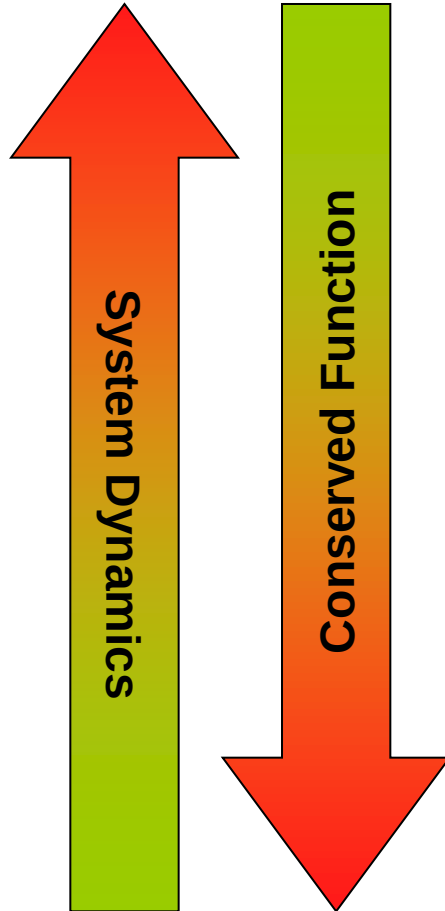
Liver function



Tissue Organization



What follows what?



Function follows Form

Form follows Function

A new Implant

A thought experiment:

- Focus on the form.
- Focus on the function.

Which questions have to be solved?