Bruk av tare for transplantasjon og produksjon av kunstig vev

Berit Løkensgard Strand

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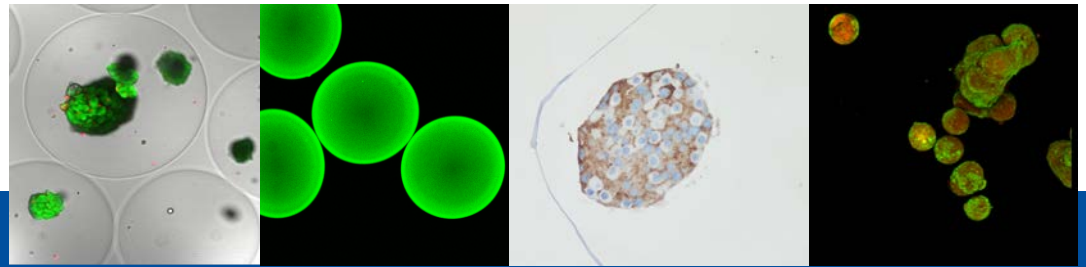
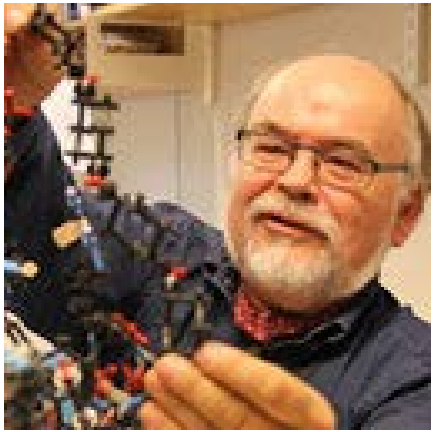


Kunnskap for en bedre verden

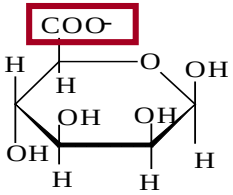

Foto: Mentz Indergaard, NTNU

Olav Smidsrød

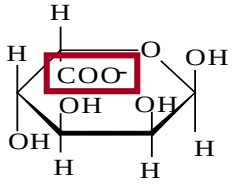


Gudmund Skjåk-Bræk


Foto: Mentz Indergaard, NTNU



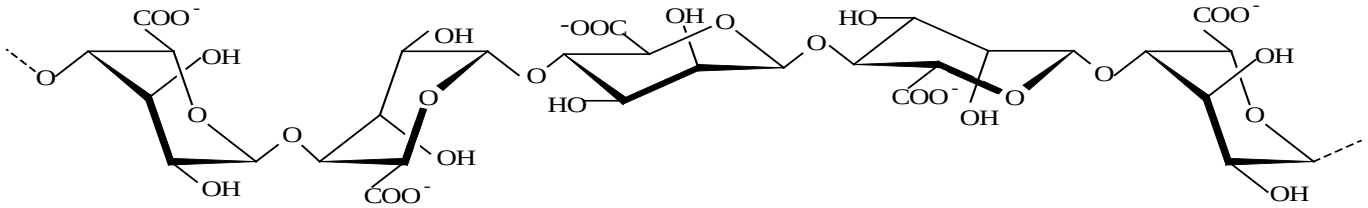
β-D-Mannuronsyre(M)



α-L-Guluronsyre(G)

G : $^{1}C_{4}$

M : $^{4}C_{1}$

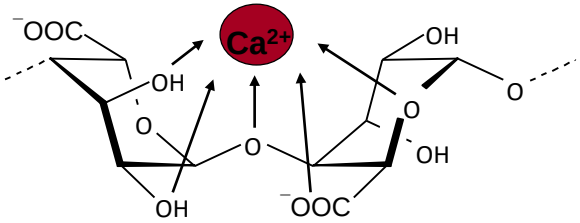


G G M M G

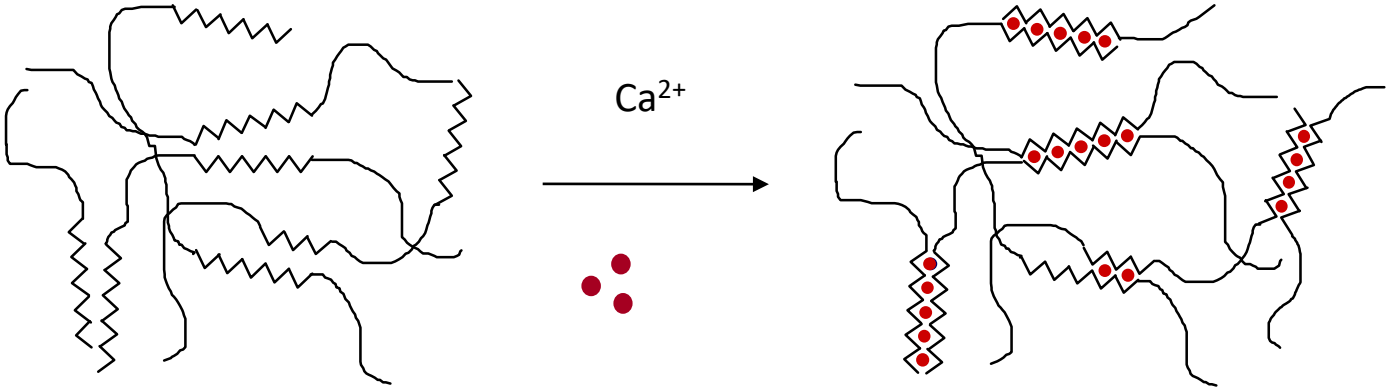
GM M M MGGGGGGGMGMGMGMGM M M M M MG

M - blokk G - blokk MG - blokk M - blokk

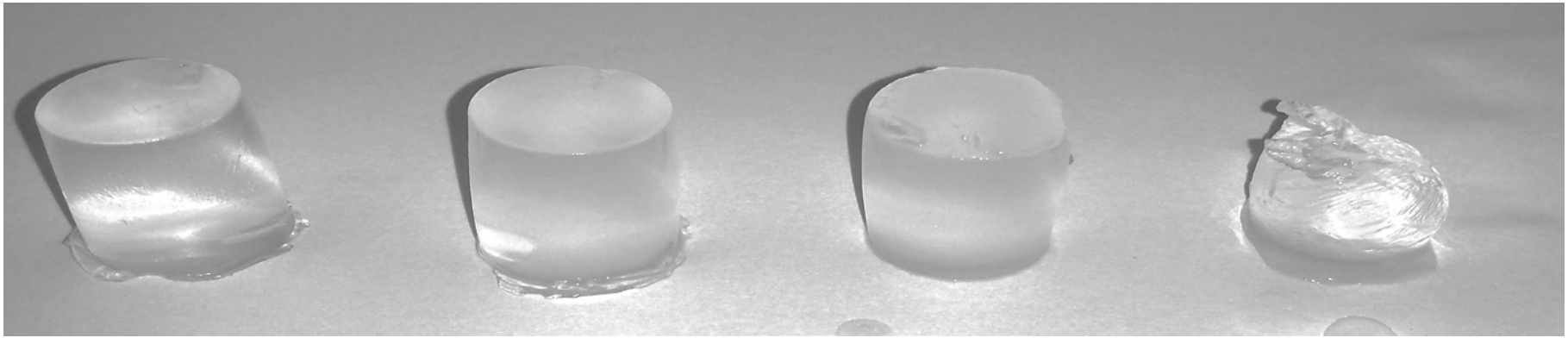
(Fisher and Dörfel 1955; Atkins et al. 1970; Haug et al 1964-1967)



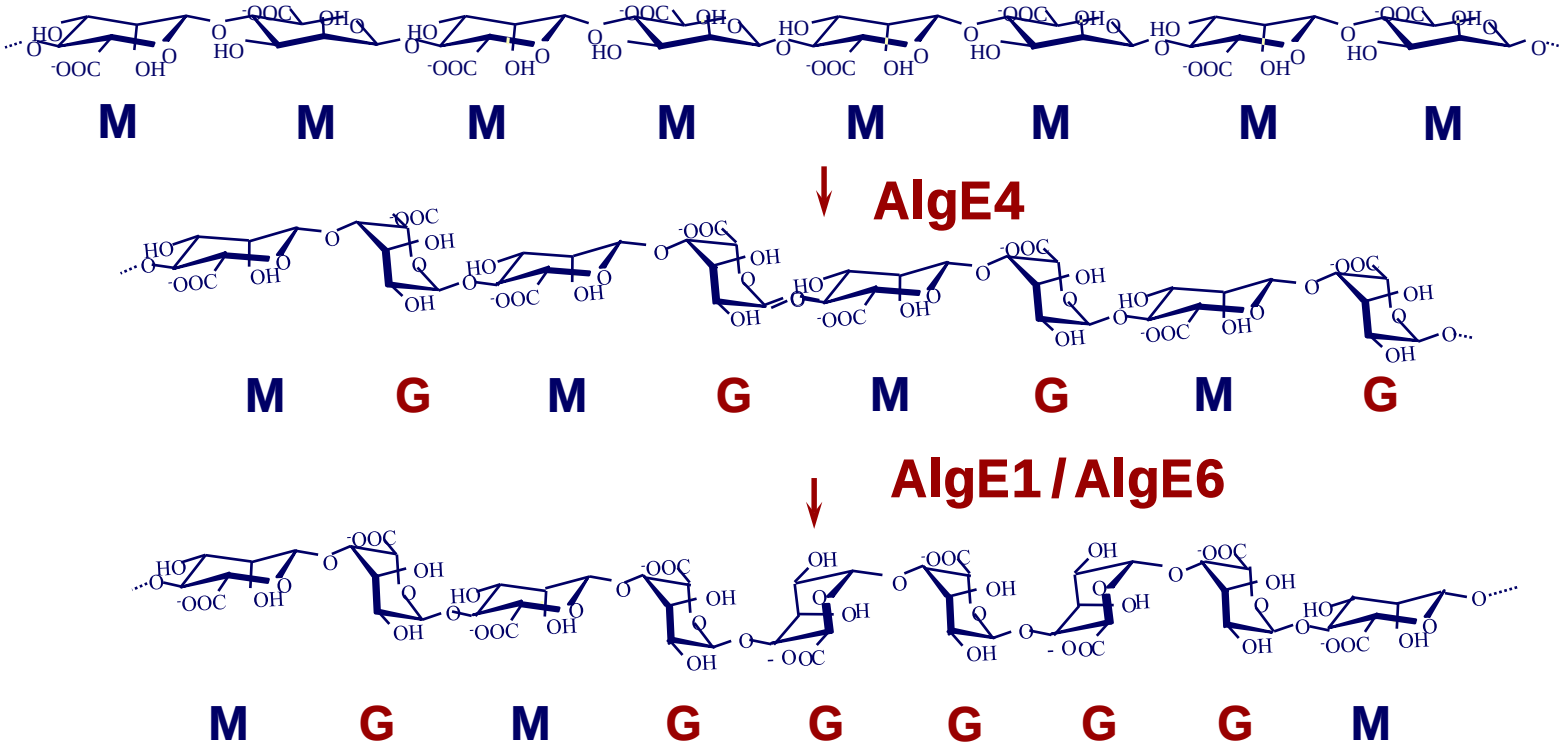
G G



(Grant et al 1973; Smidsrød 1974, Donati et al. 2005)

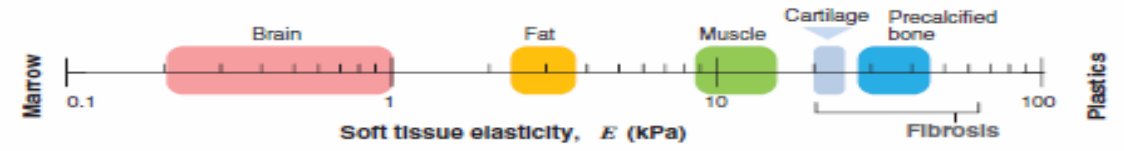


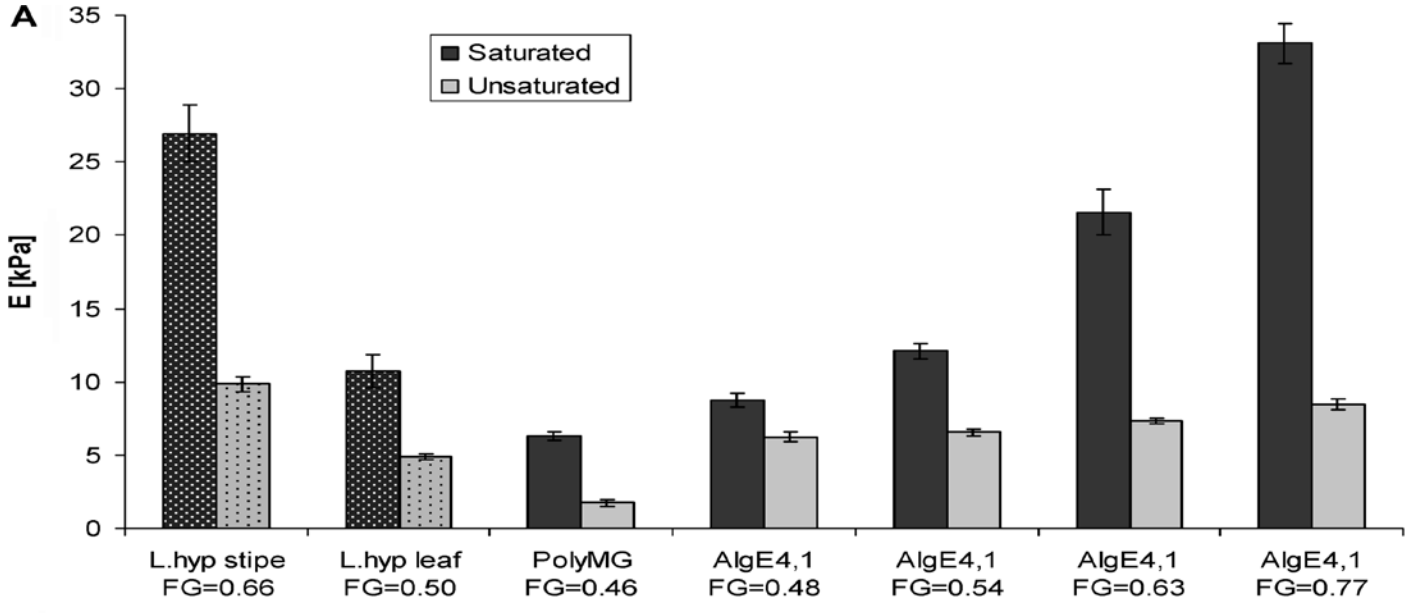
Endring i alginatstruktur med mannuronan C-5 epimeraser



(Valla, Ertesvåg, Sletta and Skjåk-Bræk, Mørch et al. 2007, 2008)

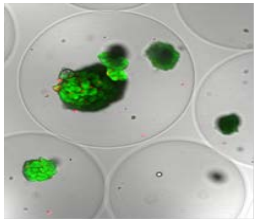
Elastisitet til Ca-alginat geler

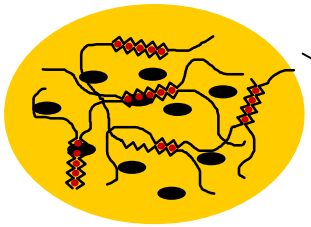




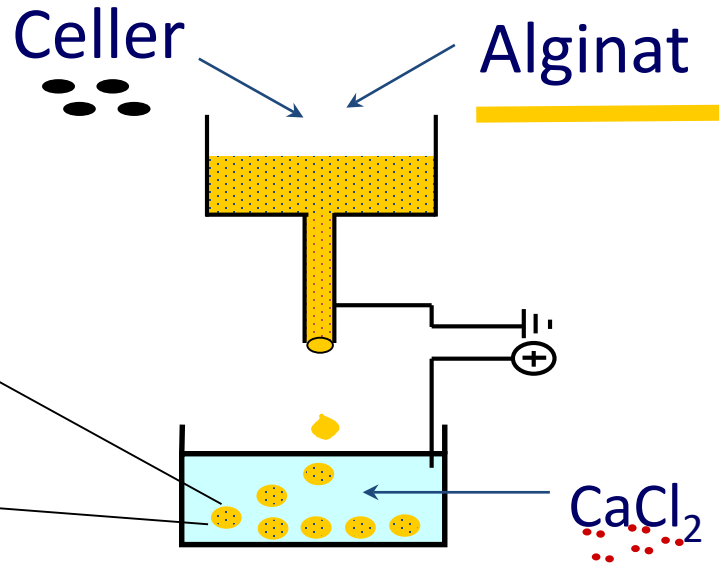
Mørch et al., *Biomacromolecules*, 2008

Innkapsling av celler i Ca-alginat gelkuler

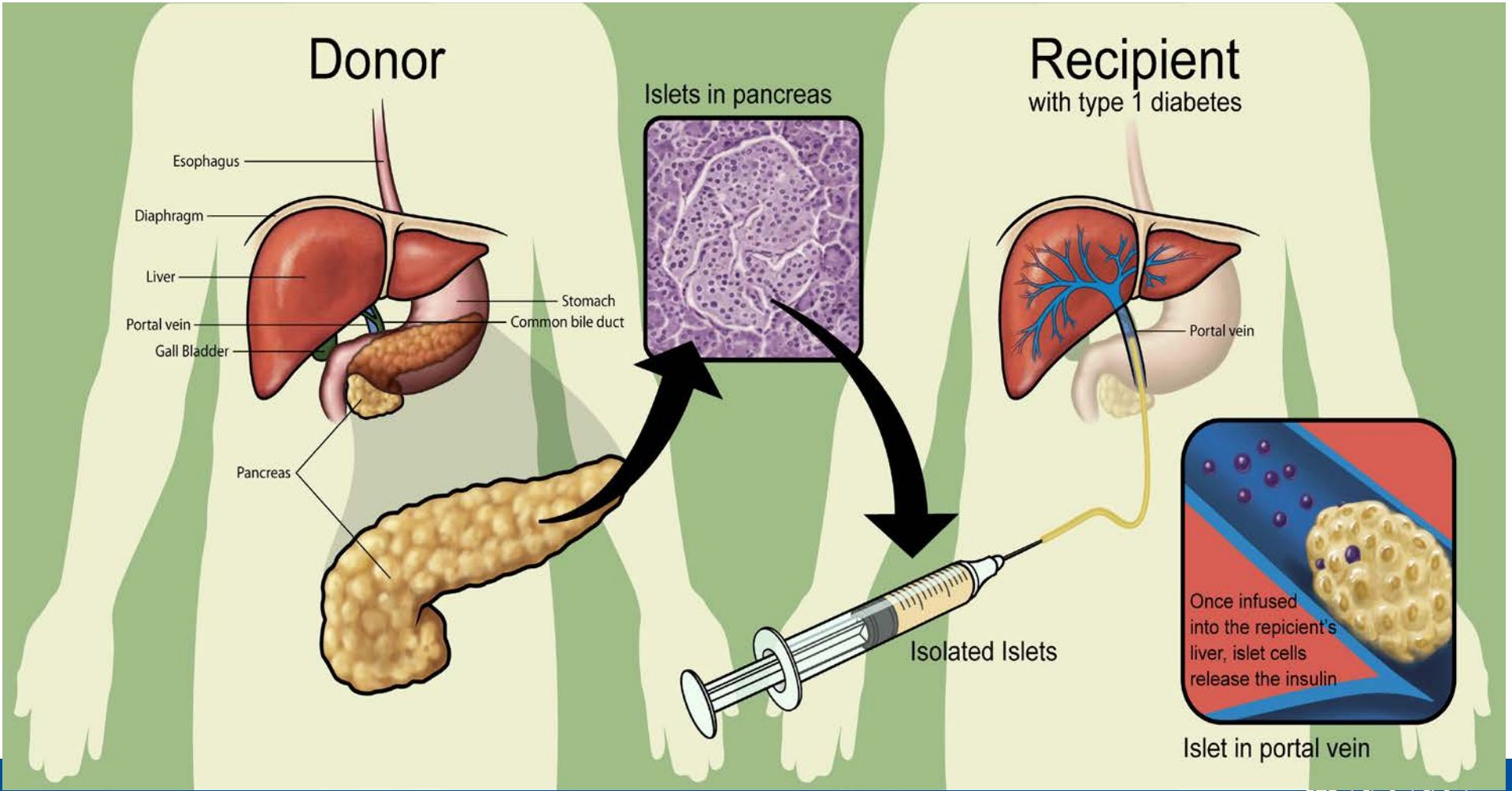




150 – 1500 µm



Smidsrød and Skjåk-Bræk 1990, Strand et al. 2002


Donor
Esophagus
Diaphragm
Liver
Portal vein
Gall Bladder
Stomach
Common bile duct
Pancreas
Islets in pancreas
Isolated Islets
Recipient
with type 1 diabetes
Portal vein
Once infused into the repicient's liver, islet cells release the insulin
Islet in portal vein

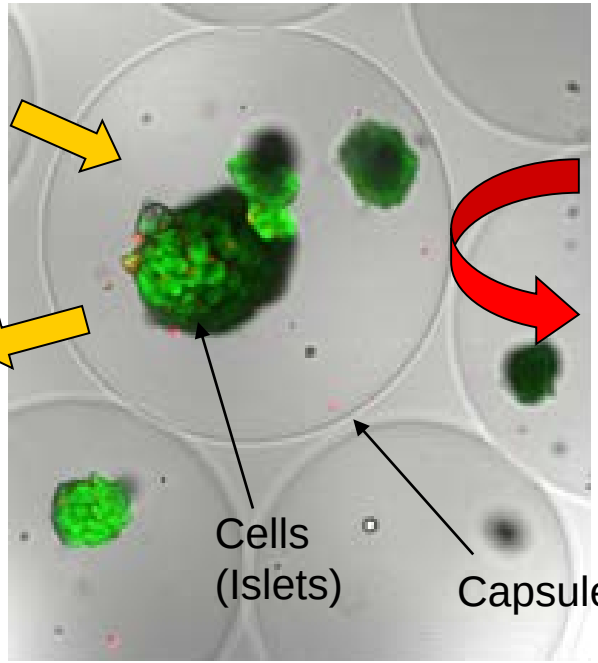
Alginatkapsler i behandling av diabetes

Nutrients and oxygen

Glucose

Cell products

Insulin

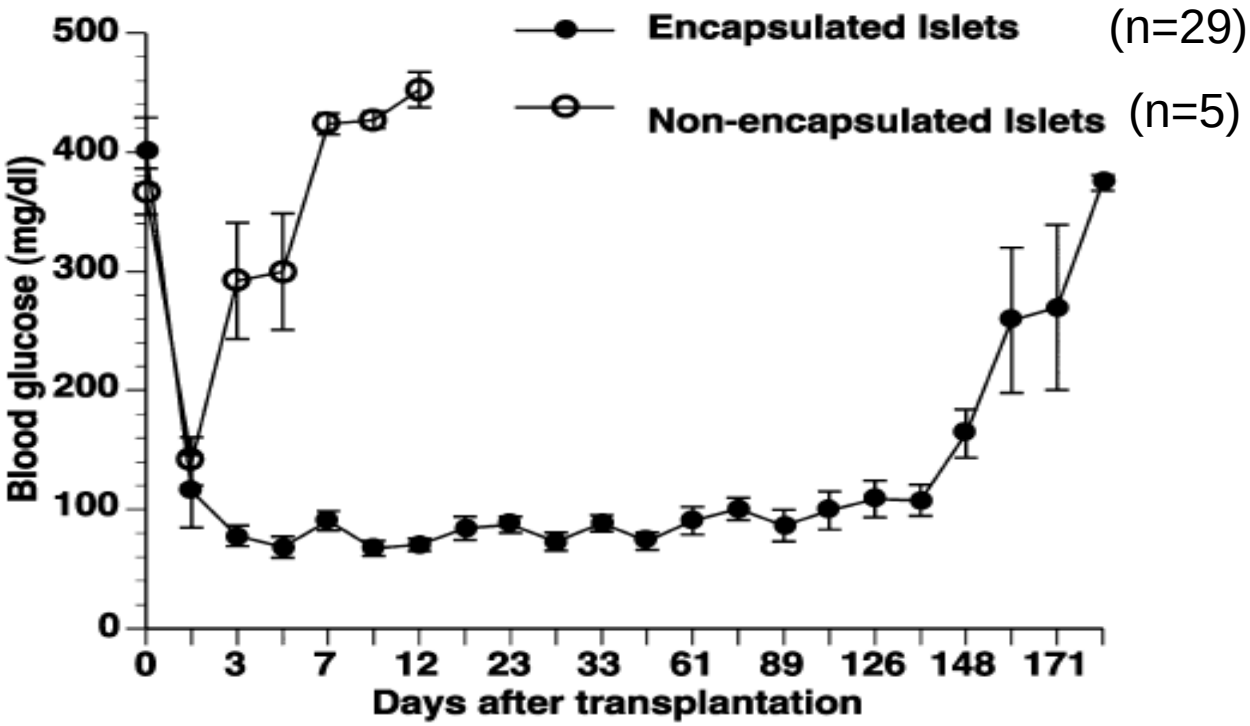


Immune cells

Graft rejection + autoimmune disease

Lim and Sun, Science 1980

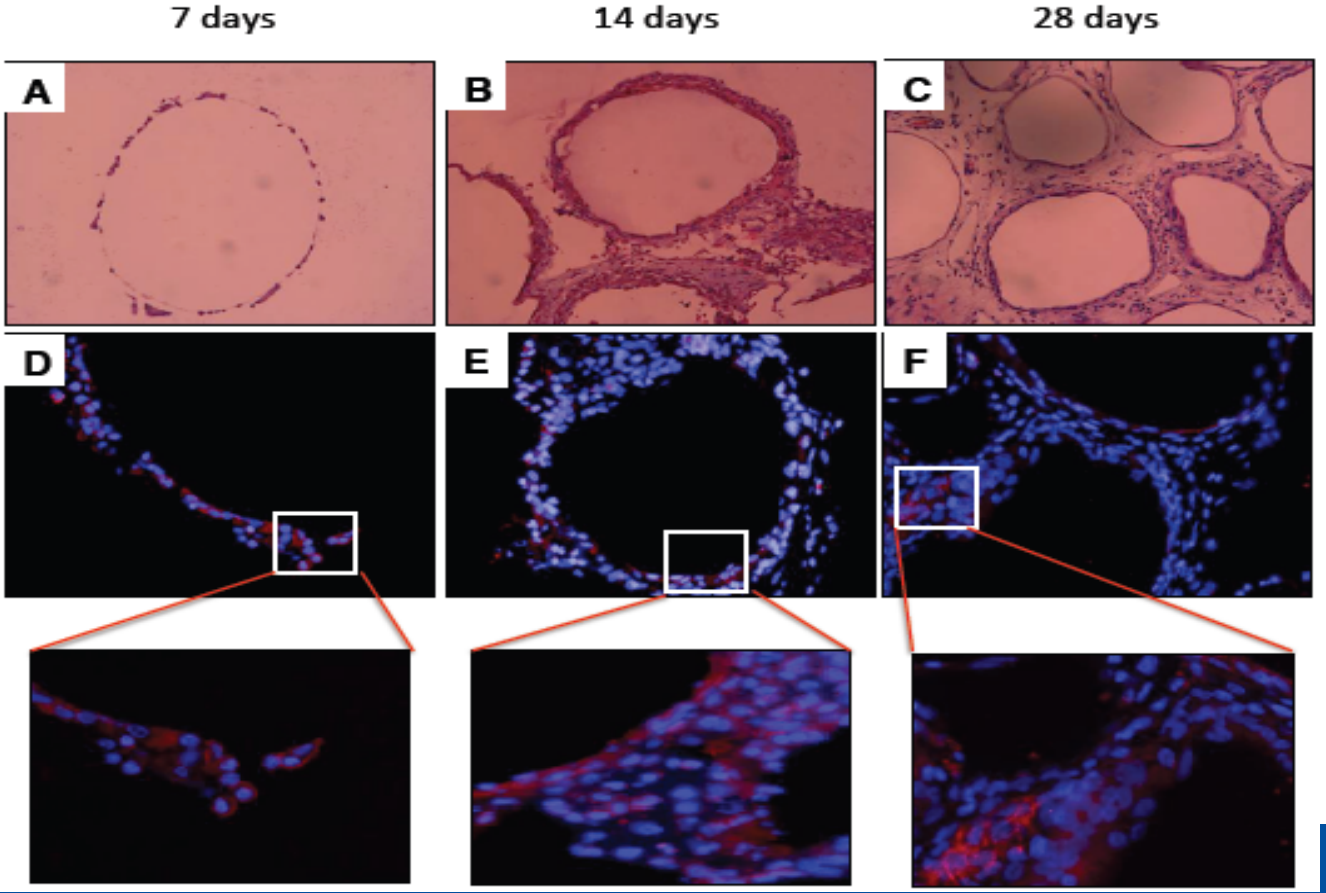
Øyceller fra menneske transplantert til mus



(Qi et al., Xenotransplantation, 2012)

Alginatkuler uten celler implantert i ape

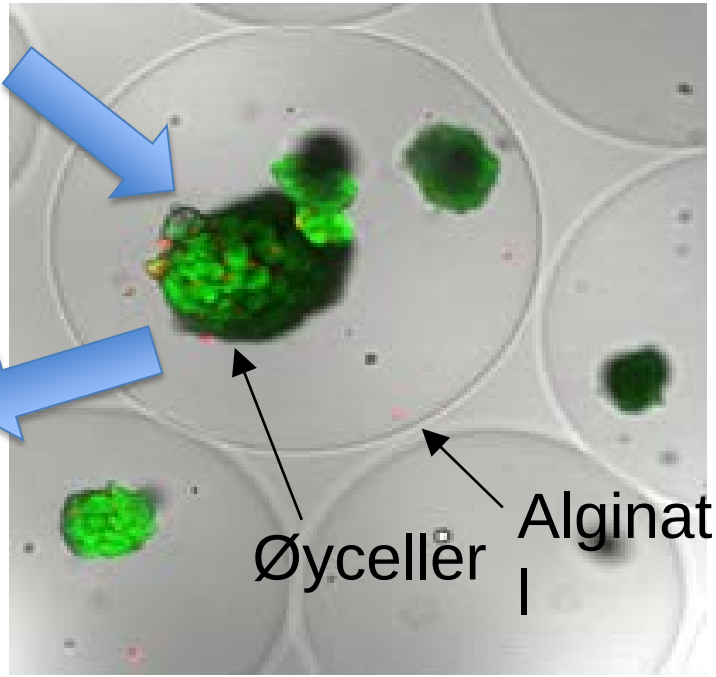
rød:CD11b (makrofag)
blå: kjerne



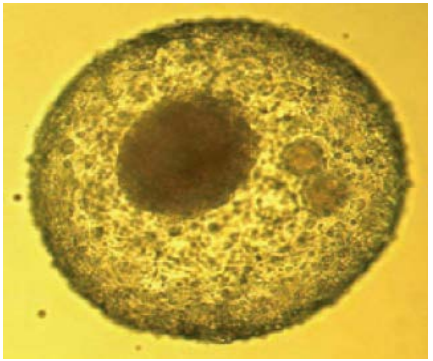
Alginatkapsler i behandling av diabetes

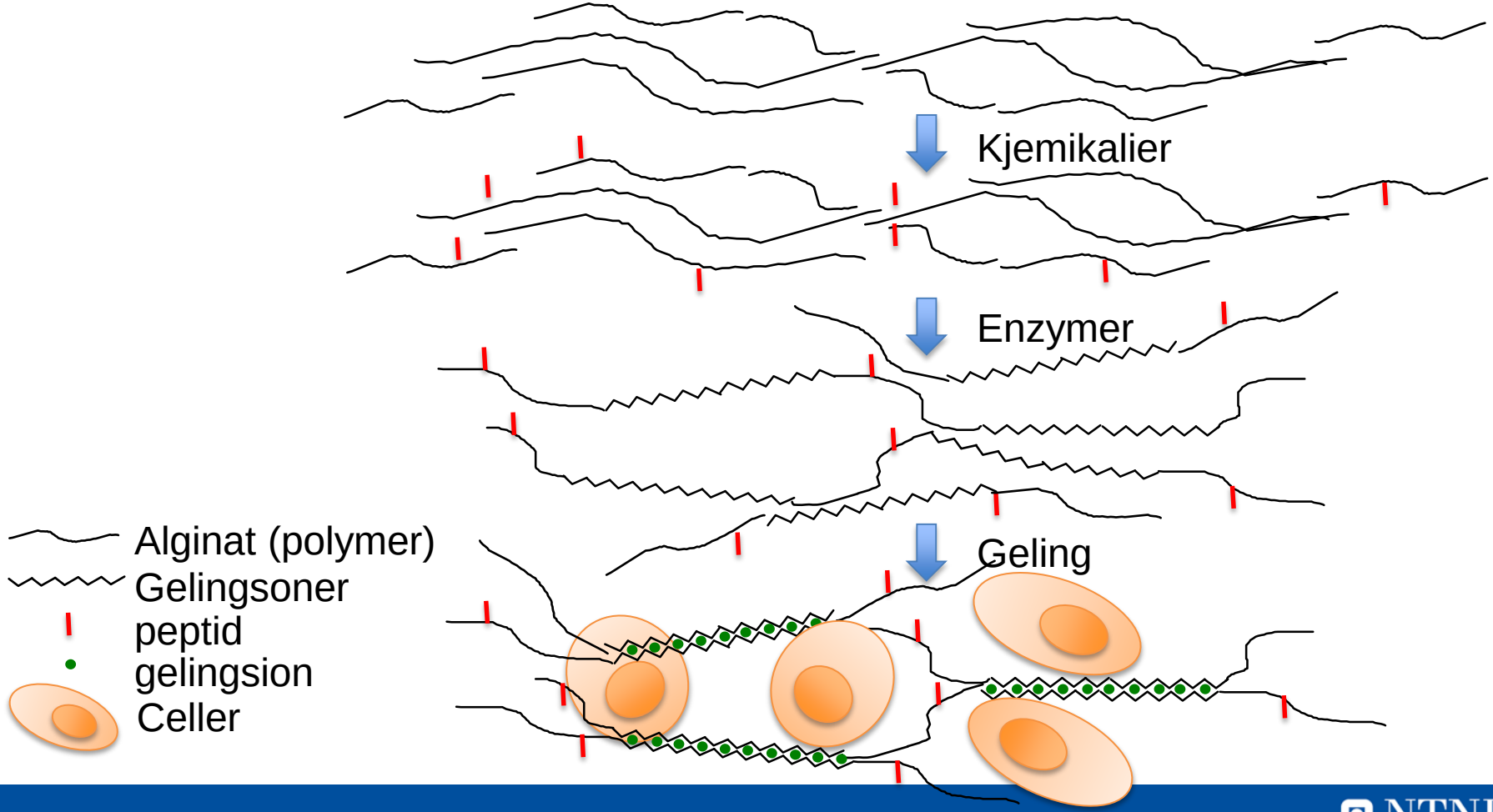
glukose

insulin

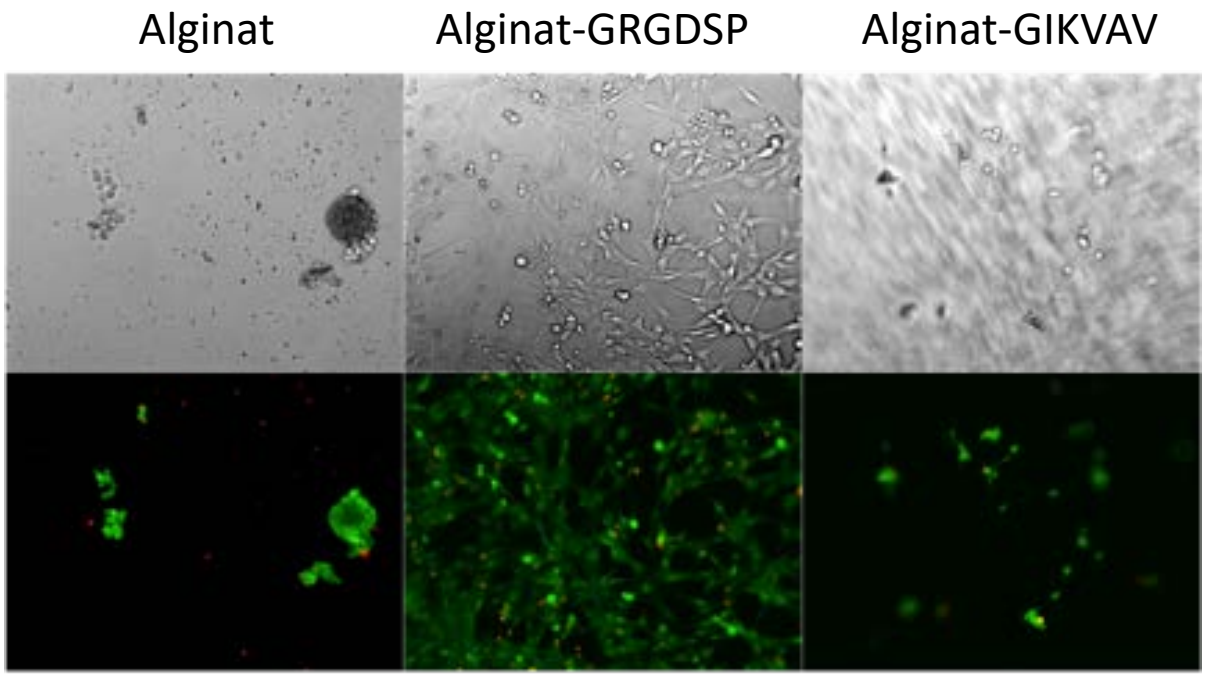


Immunrespons?




Kjemikalier
Enzymer
Geling
Alginat (polymer)
Gelingsoner
peptid
gelingsion
Celler

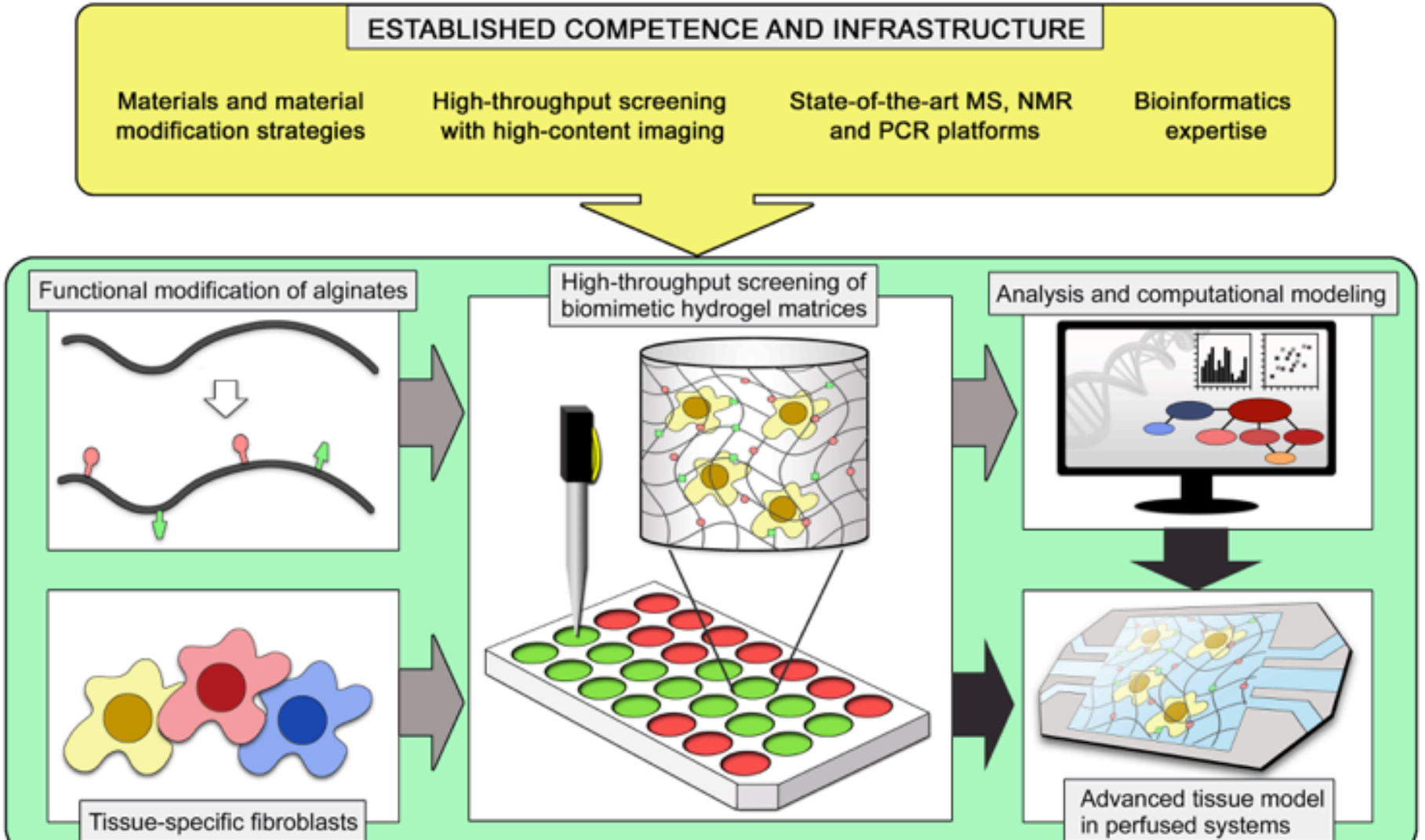
Muskelceller (C2C12) på alginatgeler

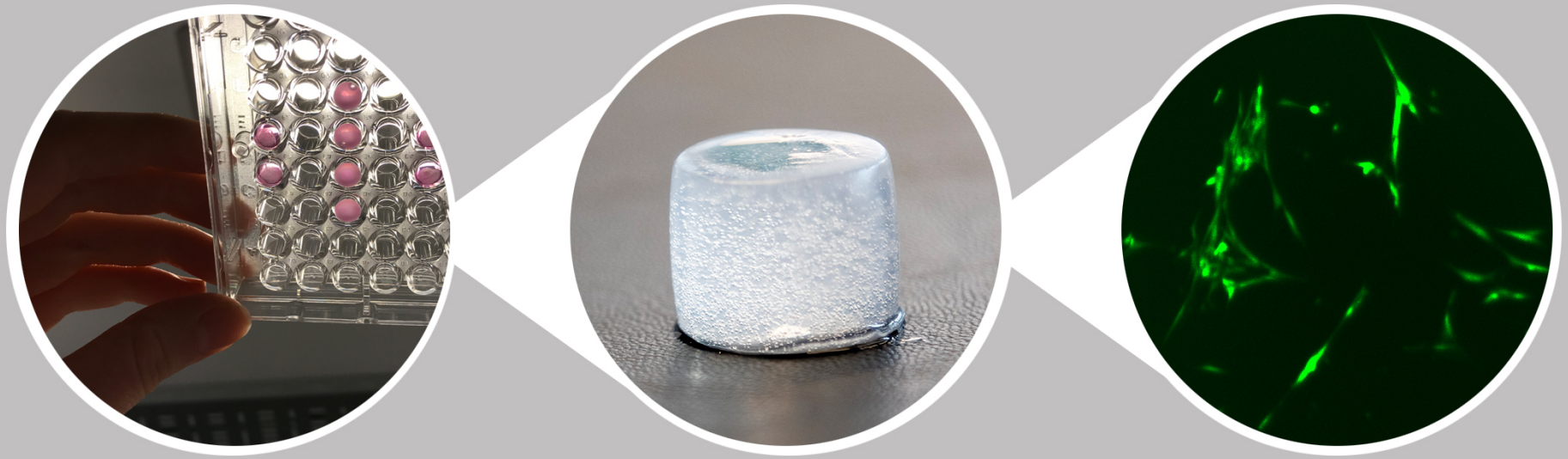


(Formo et al., JBMR 2015)

“3DLife – Emulating Life in 3D with digital and experimental tissue models”

3DLife har som mål å utvikle nye strategier for å lage mikrovev i 3D, for å bidra med modellsystemer av vevs- og organfunksjon og med dette smalne gapet til *in vivo* betingelser.


ESTABLISHED COMPETENCE AND INFRASTRUCTURE
Materials and material modification strategies
High-throughput screening with high-content imaging
State-of-the-art MS, NMR and PCR platforms
Bioinformatics expertise
Functional modification of alginates
Tissue-specific fibroblasts
High-throughput screening of biomimetic hydrogel matrices
Analysis and computational modeling
Advanced tissue model in perfused systems



CENTRE FOR DIGITAL LIFE NORWAY

Forskningsrådet
The Research Council of Norway

SINTEF

NTNU