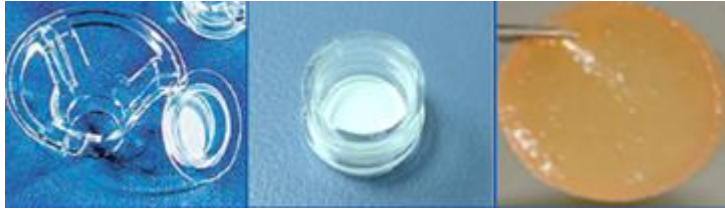


Uvod u biotehnologiju

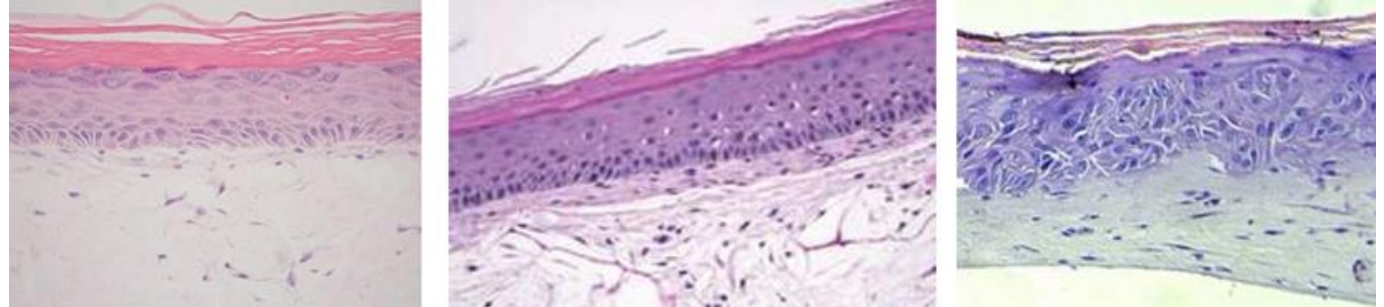
Prof. dr. sc. Anita Slavica

biotehnologija - pogled u budućnost (1)

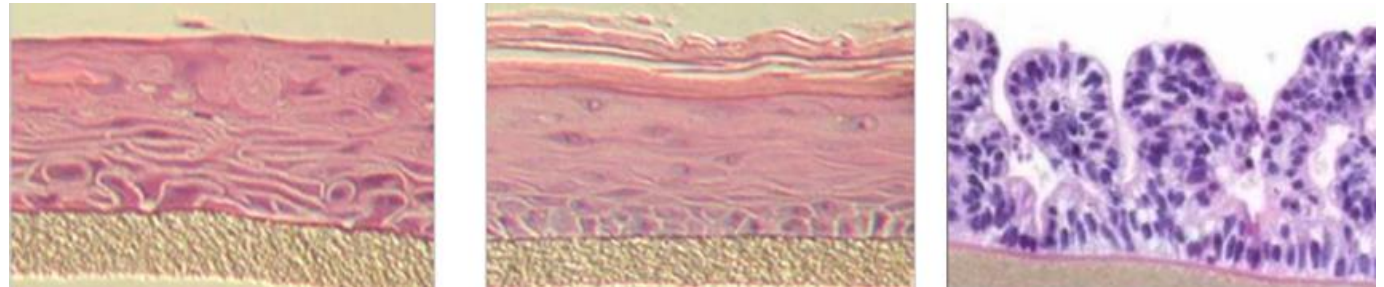
koža



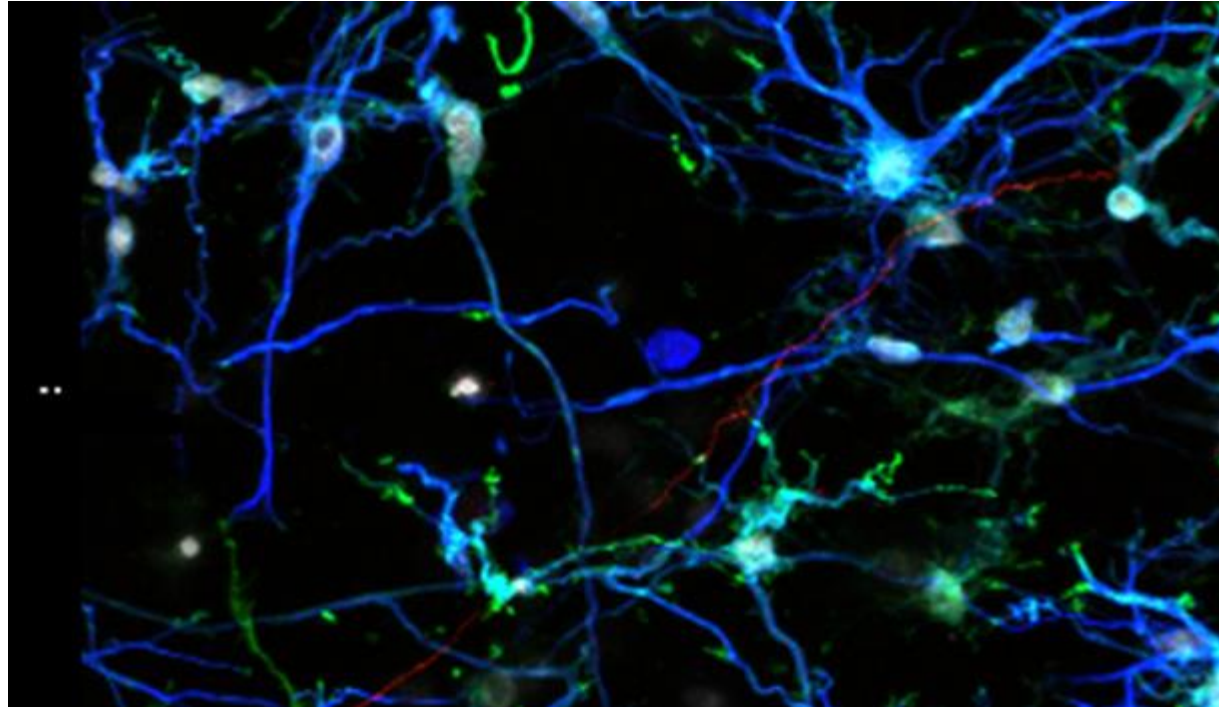
koža



epitel



biotehnologija - pogled u budućnost (2)

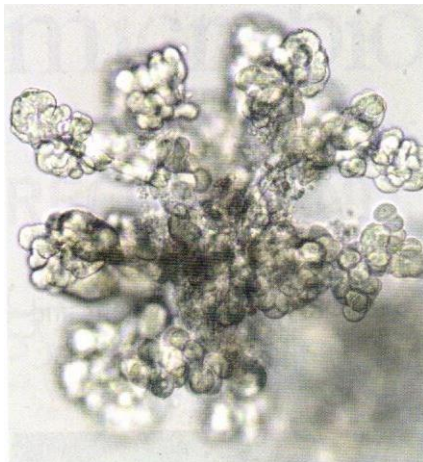


biotehnologija - pogled u budućnost (3)

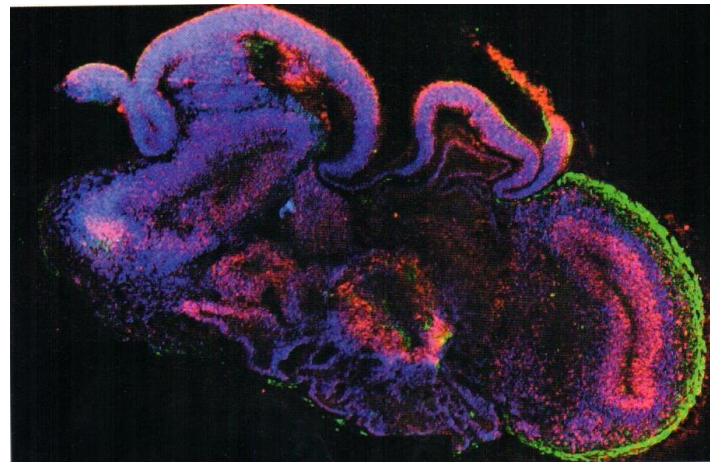
organoidi

„Life happens in (at least) three dimensions. Studying its molecular and cellular basis in flat cells attached to hard plastic, revealing though this is about some aspects of biology, will only take us so far. But scientists have recently added a shiny new tool to their belts: three-dimensional multicellular stem-cell derived constructs that mimic *in vivo* tissue, or organoids.”

Michael Eisenstein, Nature Methods, Vol. 15 No. 1, January 2018

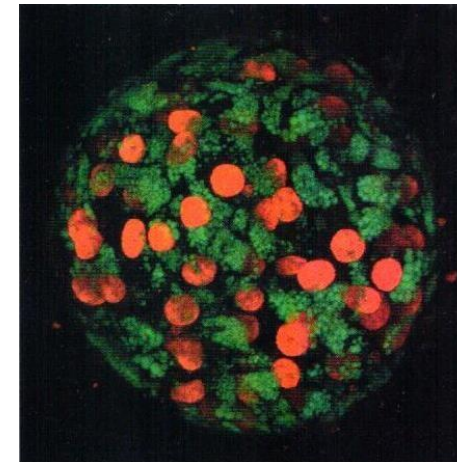


liver cancer



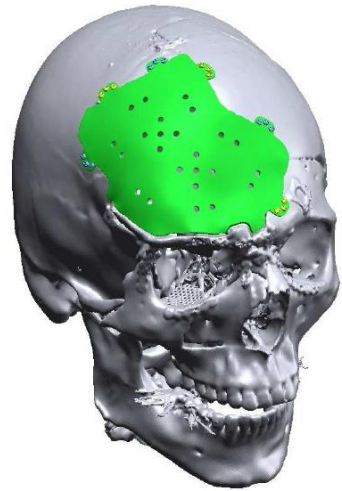
cerebral organoid

(neural stem cells - red, neurons - green)

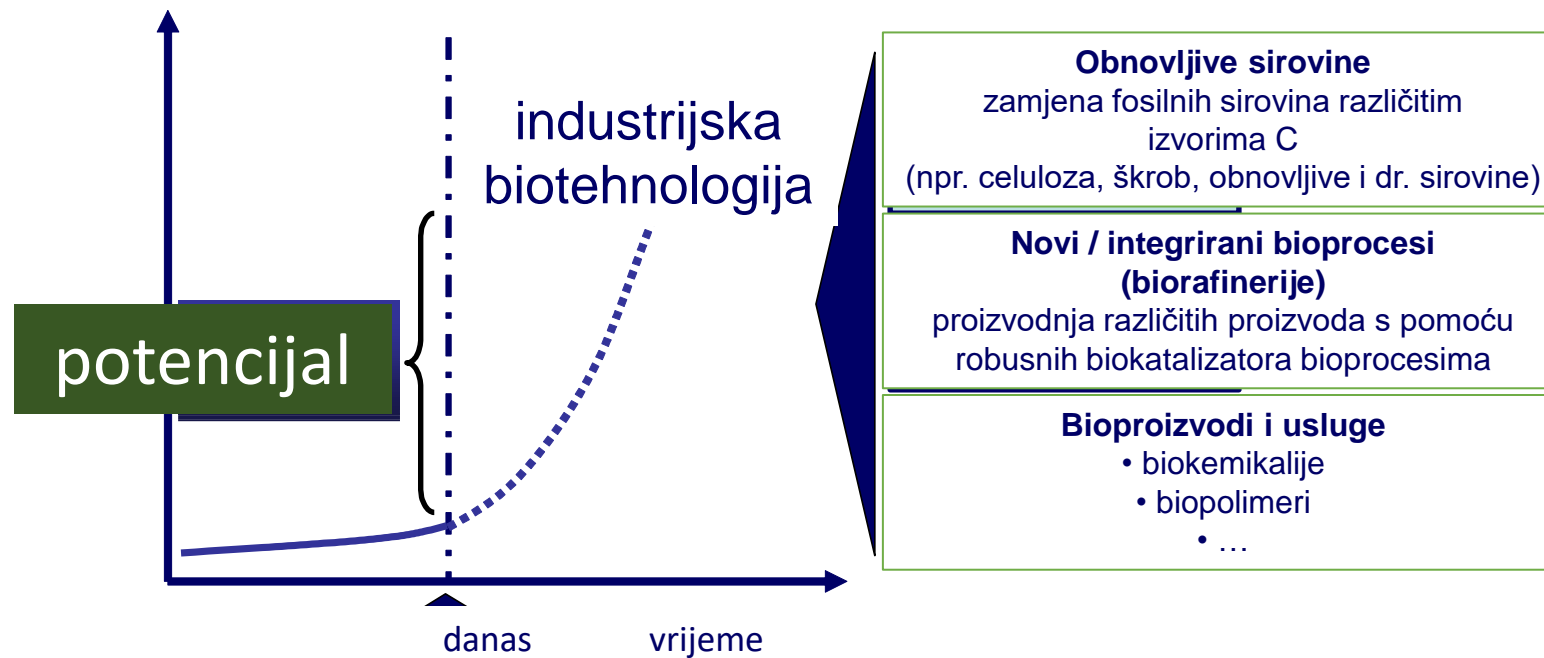


fatty liver

biotehnologija - pogled u budućnost (4)



biotehnologija - pogled u budućnost (5)



biotehnologija - pogled u budućnost (6)

- biotehnologija pripada ključnim tehnologijama bioekonomije Europske unije
- osim proizvodnje hrane, lijekova, kemikalija, materijala, goriva i novih proizvoda i usluga, industrijska biotehnologija osigurava neovisnost europske bioekonomije u smislu
 - (i) povećanja spektra obnovljivih sirovina,
 - (ii) otvara milijune novih radnih mjesta,
 - (iii) prihoduje desetke milijardi eura i
 - (iv) značajno doprinosi dugotrajnoj održivosti kvalitete života Europljana.

biotehnologija - pogled u budućnost (7)

neki (novi) pojmovi:

- industrijska biotehnologija - stup **bio-based industrije**;
- **bioekonomija** (Republika Hrvatska definira strategiju bioekonomije);
- kružna ekonomija;
- lanci vrijednosti;
- sirovina (engl. *biomass feedstock*);

biotehnologija - pogled u budućnost (8)

- *Bio-based* industrija je od iznimnog značaja za Europu;
- Europska bioekonomija u primarnom sektoru obrće godišnje **2,1 trilijuna EUR**;
- od ovog ukupnog iznosa na kemikalije, plastiku, farmaceutike, papir i proizvode od papira, zatim na šumarstvo, tekstilnu industriju, biogoriva i bioenergiju odnosi se 600 milijardi EUR;
- Europska bioekonomija osigurava **posao za 18,3 milijun Europljana**;
- u industrijskoj biotehnologiji zaposleno je 500,000 ljudi i proizvodi se 31 milijarda EUR dodane vrijednosti;
- do 2030. očekuje se stalan porast ovih vrijednosti do 1.500,000 radnih mjesta i 99 milijardi EUR dodane vrijednosti;

biotehnologija - pogled u budućnost (9)

- bio-based lanci vrijednosti i njihovi stupovi:

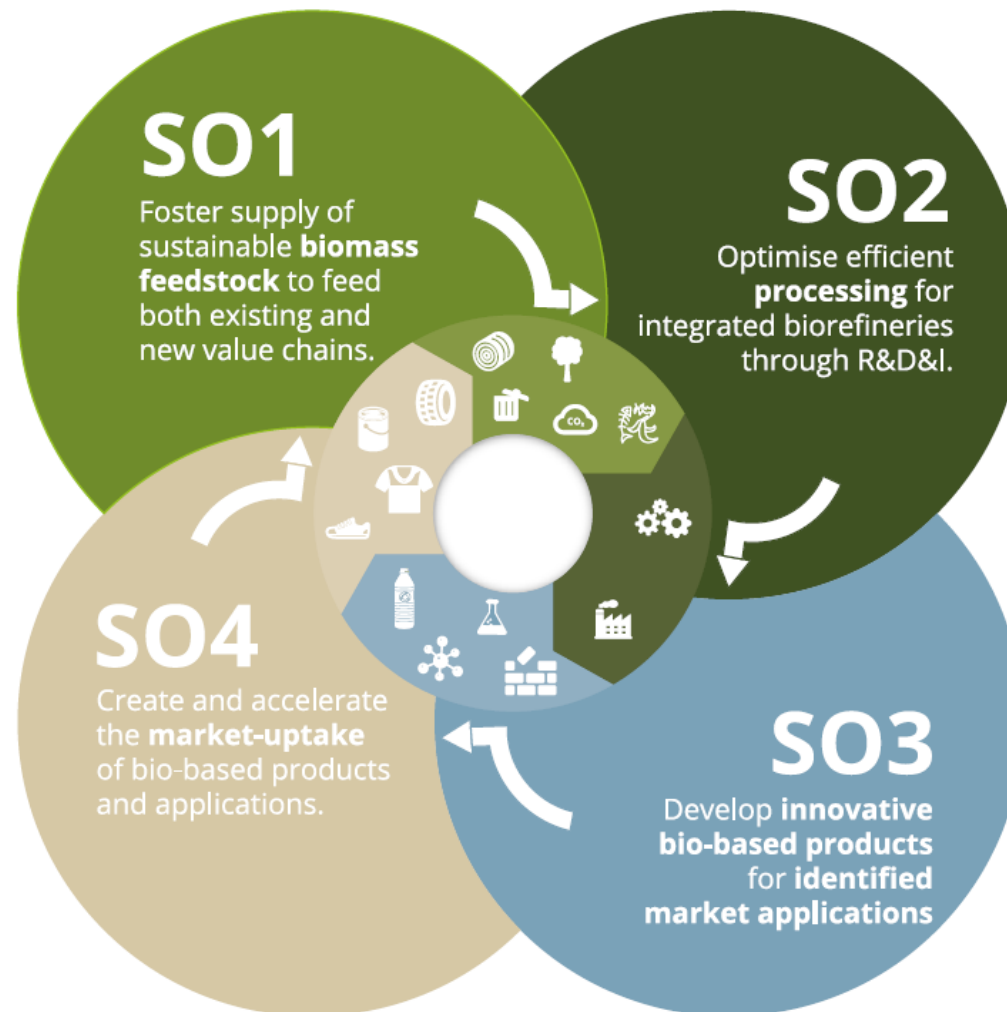
(1) *biomass feedstock*;

(2) učinkovito procesiranje sirovina (A i B) u integriranim biorafinerijama
(istraživanje, razdvoj i inovacije, engl. research, development and innovation, R&D&I);

(3) inovativni *bio-based* proizvodi i usluge;

(4) tržište *bio-based* proizvoda i usluga.

biotehnologija - pogled u budućnost (10)



biotehnologija - pogled u budućnost (11)

Biomass and organic waste

From the agro-based industries

- Feedstock originating from the agriculture and agro-food industries
- Agricultural crops such as flax, hemp and fibre
- Co-products, side streams, and residues from the agriculture, including animal manure and from the agro-food industries, including residues from food processing plants

From the forest-based industries

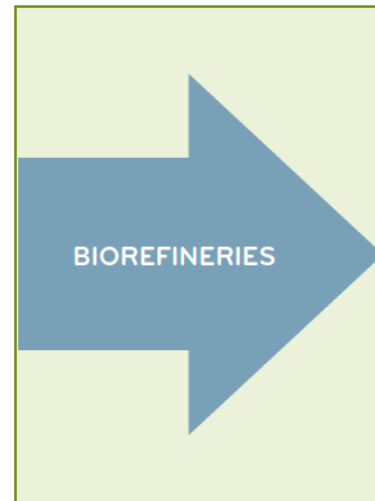
- Feedstock originating from the forest and forest-based industries
- 'Woody and non-wood forest feedstock'
- Co-products, side streams, and residues from the forest and forest-based industries, including the wood industry, saw mills, Paper and Pulp

From the aquatic-based industries

- Feedstock originating from the aquatic and aquatic-based industries, including aquaculture, the fish and fish processing industries
- Co-products, side streams and residues from the aquatic and aquatic-based industries

Bio-waste and CO₂

- Biodegradable garden and park waste
- Food and kitchen waste from households, restaurants, caterers and retail premises
- Waste water and sludge
- CO₂



Bio-based products & markets

- Bio-based chemicals
- Bio-based plastics, polymers, materials, packaging
- Specialties (for example bio-based surfactants, lubricants, pharmaceuticals, nutraceuticals, cosmetics)
- Textiles
- Food ingredients and feed
- Advanced biofuels

biotehnologija - pogled u budućnost (12) - biorafinerija



biotehnologija - pogled u budućnost (13) - akademija

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- **Duration of study:** 4 semesters
- **ECTS credit points:** 120
- **Academic degree:** "Diplom-Ingenieurin" or "Diplom-Ingenieur" (Dipl.Ing. or DI), equivalent to the Master of Science (MSc)
- **Language of instruction:** English
- [Admission requirements >](#)

Curriculum

- [English ↓](#)
- [German ↗](#)

[Semester plan ↗](#)

UP.03.1.1.03.0051 "Razvoj programa cjeloživotnog učenja u području prehrambene tehnologije, biotehnologije i nutricionizma primjenom HKO-a,,

Razvojni biotehnolog

Biotehnolog u bioekonomiji

biotehnologija - pogled u budućnost (14)

