

The background of the slide is a close-up photograph of several ripe strawberries. The strawberries are bright red with visible yellowish seeds (achenes) on their surface. Some green leaves are also visible. The image is slightly blurred, creating a soft, naturalistic feel.

**Mitä elämän universaali
nanotason viestintä voisi kertoa
luomutuotannon arvosta
&
miten tätä voidaan mitata**

Professori Seppo Vainio,
Kvantum Instituutti, Oulun yliopisto
Tel. 040 747 0939 – e-mail: Seppo.Vainio@oulul.fi

Terve Ympäristö Terve Ihminen

[Etusivu](#) [Tapahtumat](#) [Artikkelit](#) [Tietoa hankkeesta](#) [Yhteystiedot](#)

Ympäristön ja ihmisen yhteinen tulevaisuus – nouse kiertueemme kyytiin

Millainen on suhteemme luontoon, nyt ja tulevaisuudessa? Terve ympäristö – terve ihminen -hankkeen tiedonkeruumatka on alkanut! Virtuaalinen tiedebussi kuljettaa sinut tapahtumiin ja keskusteluihin ympäri Suomen – katso pysäkit kartasta ja tutustu tapahtumiin.





FarmEVs

FarmEVs

The FarmEVs project centers around plant extracellular vesicle farming. The consortium consists of eight partner institutes led by Gabriella Pocsfalvi from the the National Research Council of Italy, Institute of Biosciences and Bioresources in Naples, Italy. The principal investigator for the project at the University of Oulu is Prof. Seppo Vainio.

Funders



MITÄ ON LUOMUVILJELY?

Luomuviljely on maanviljelyn ja ruoantuotannon tapa, jossa yhdistyy ympäristön kunnioitus, luonnon monimuotoisuus, luonnonvarojen säästäminen ja eläinten hyvinvointi.

PERUSPERIAATTEET



Kemiallisten torjunta-aineiden ja synteettisten lannoitteiden käyttö on kielletty



Antibioottien käyttöä rajoitetaan ankarasti



Geenimuunnellut lajikkeet on kielletty



Viljelykasveja vuorotellaan



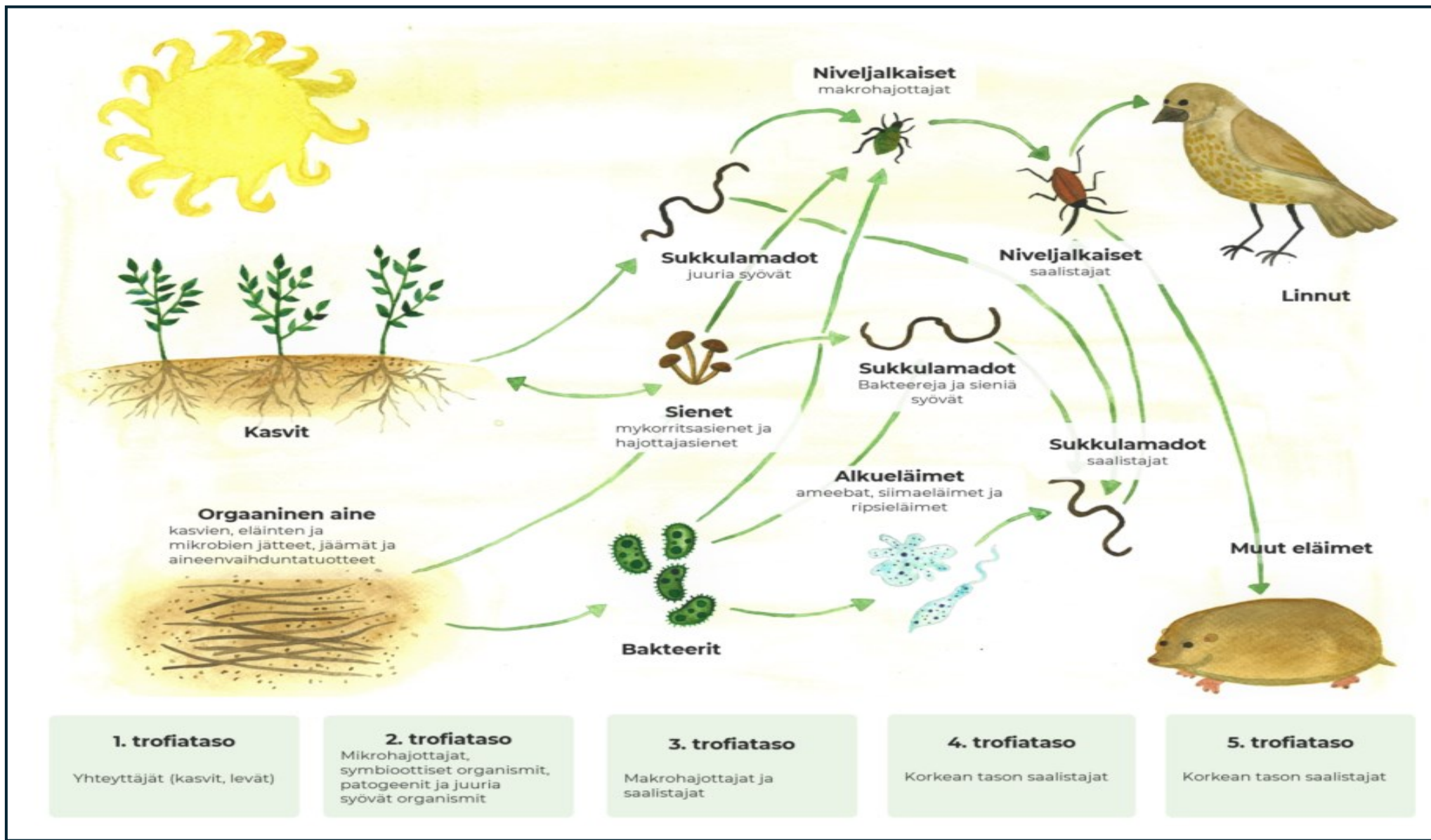
EU-luomumerkin käyttö takaa, että luomutuotteen tuotannossa on noudatettu EU-sääntöjä



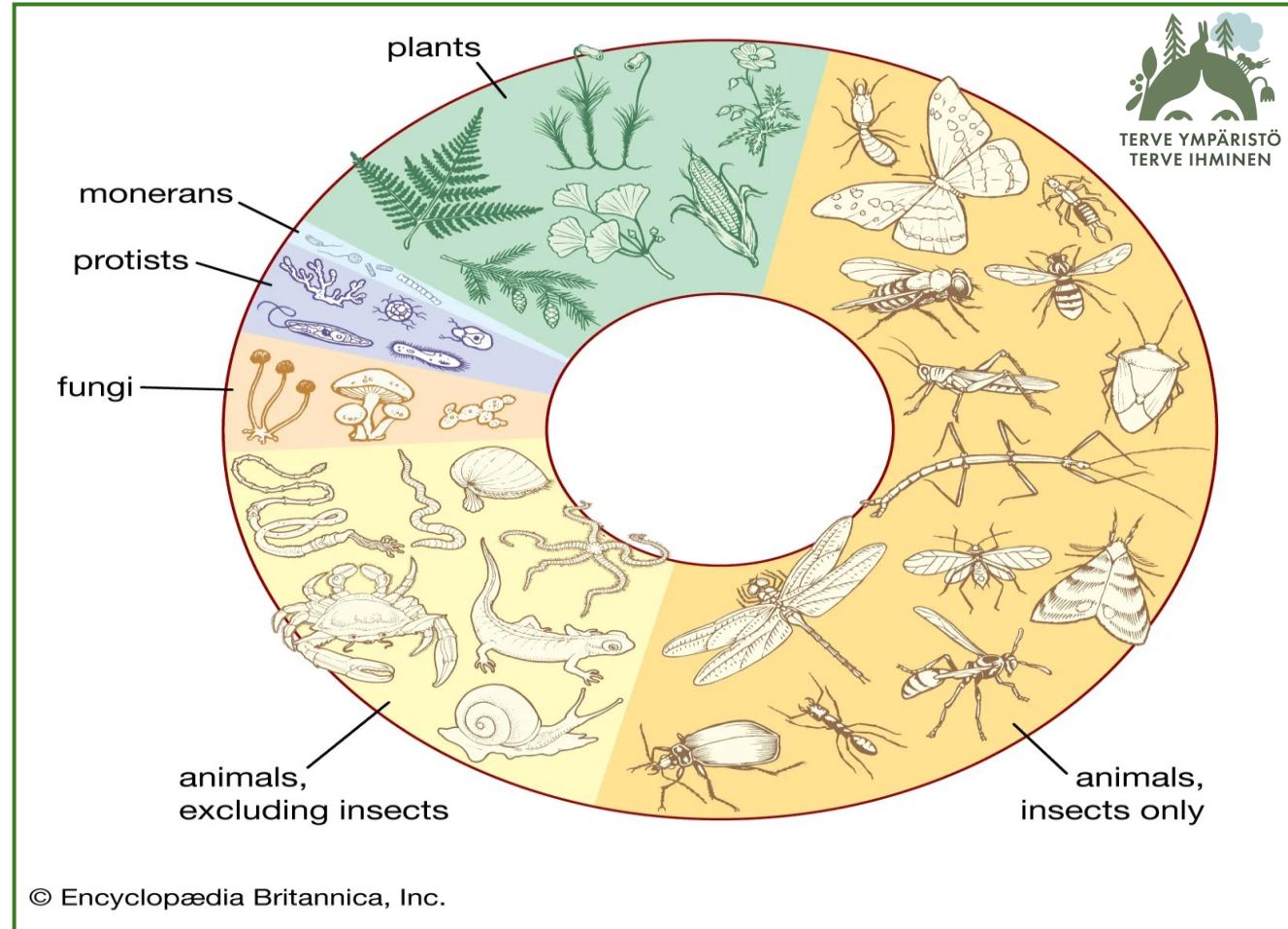
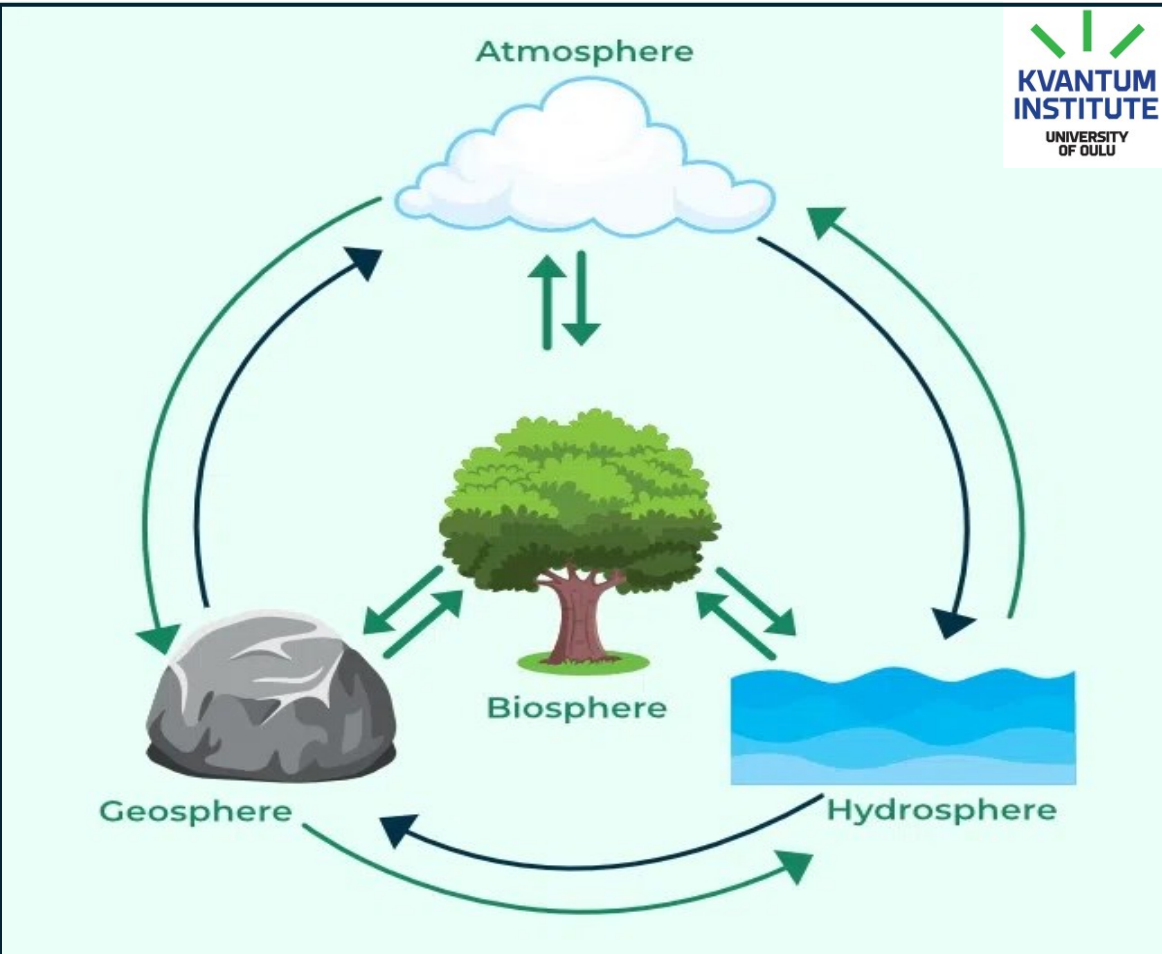
europarl.eu

Lähteet:
EPRS, Euroopan komissio

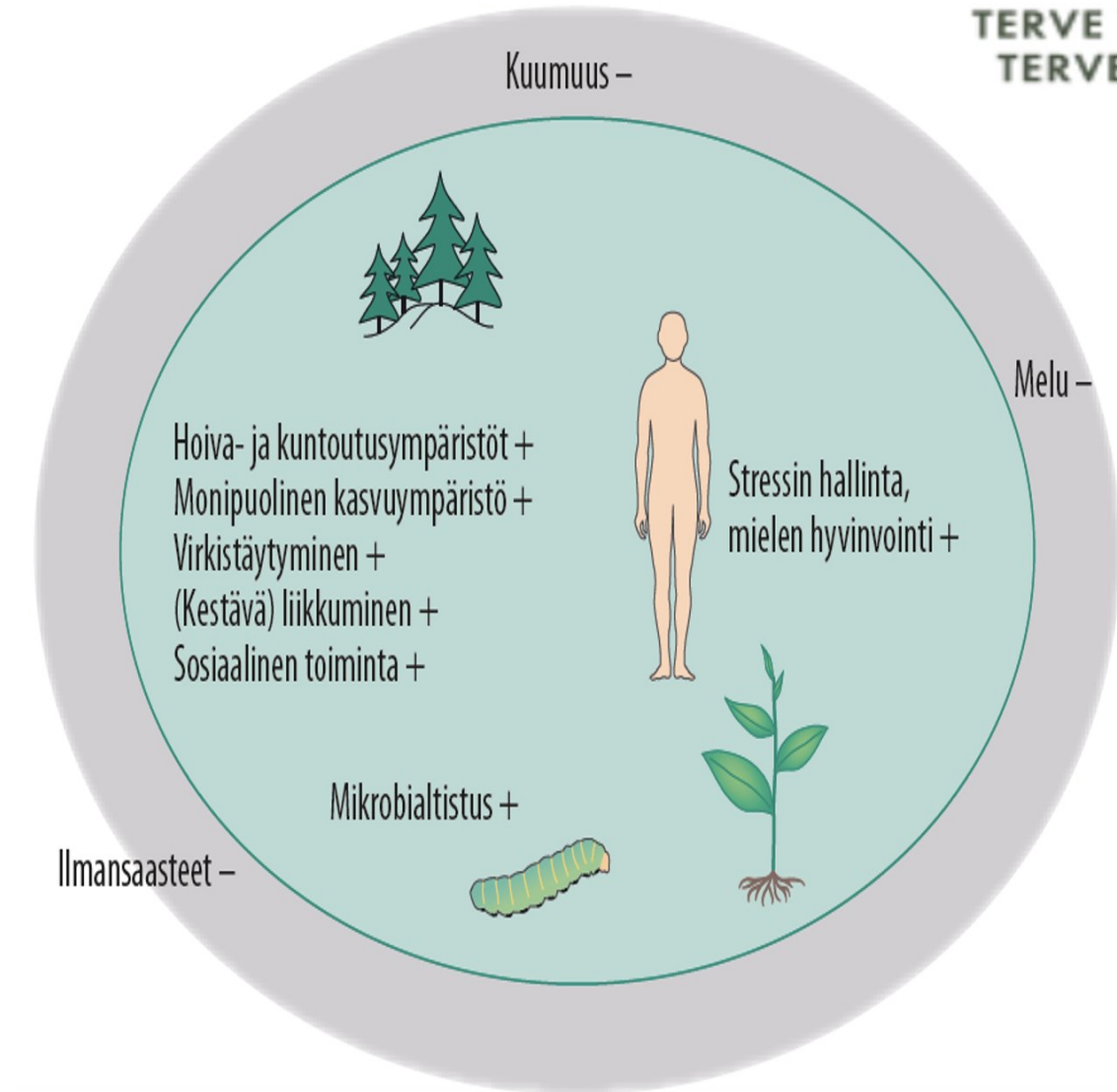
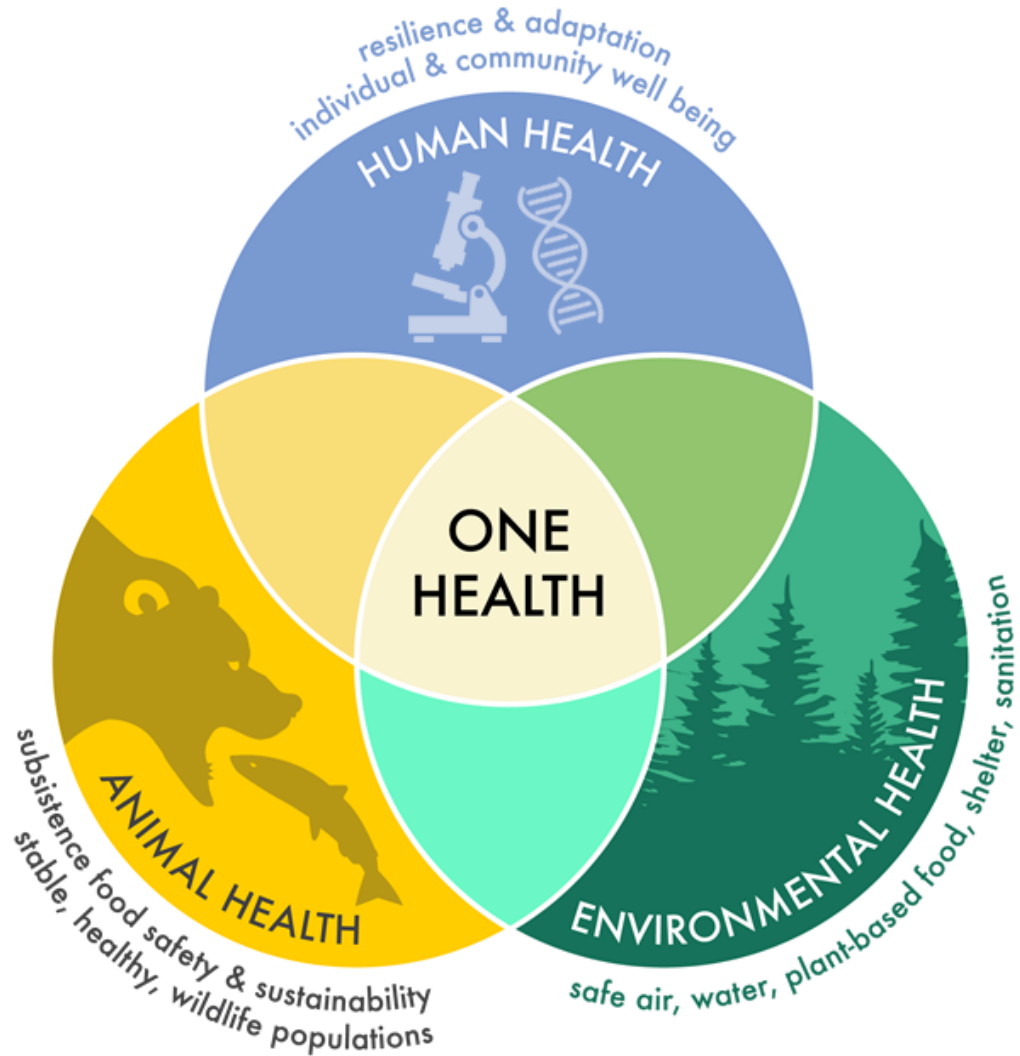
Lajit muodostavat erilaisia suhteita ekossteemissä – niiden tuntemus on keskeistä kestävän kehityksen & maanviljelyn kannalta



BIOMIN tason lajien vuorovaikutussuhteet

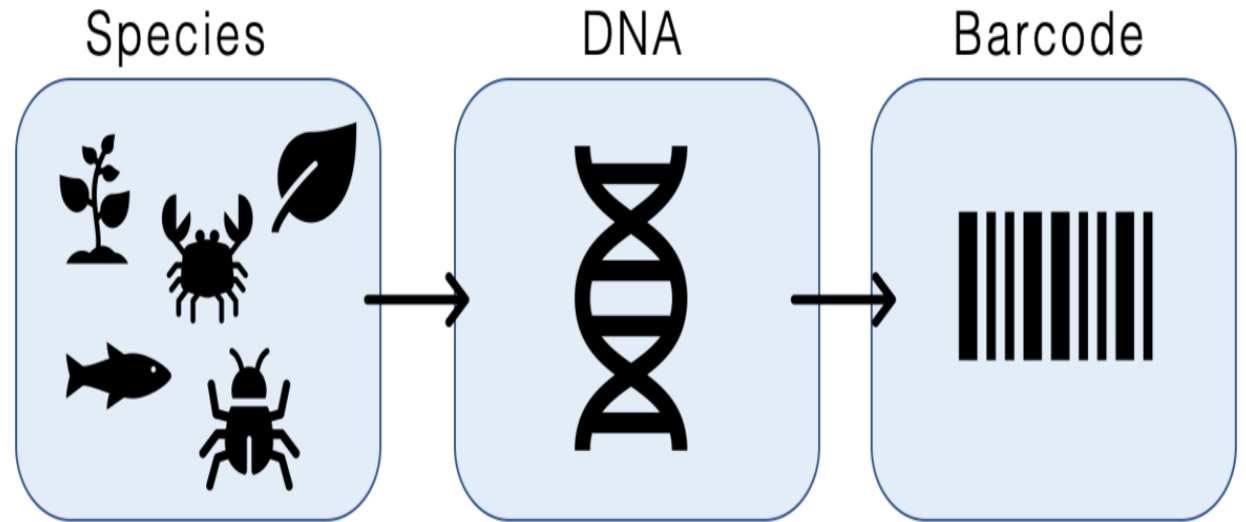
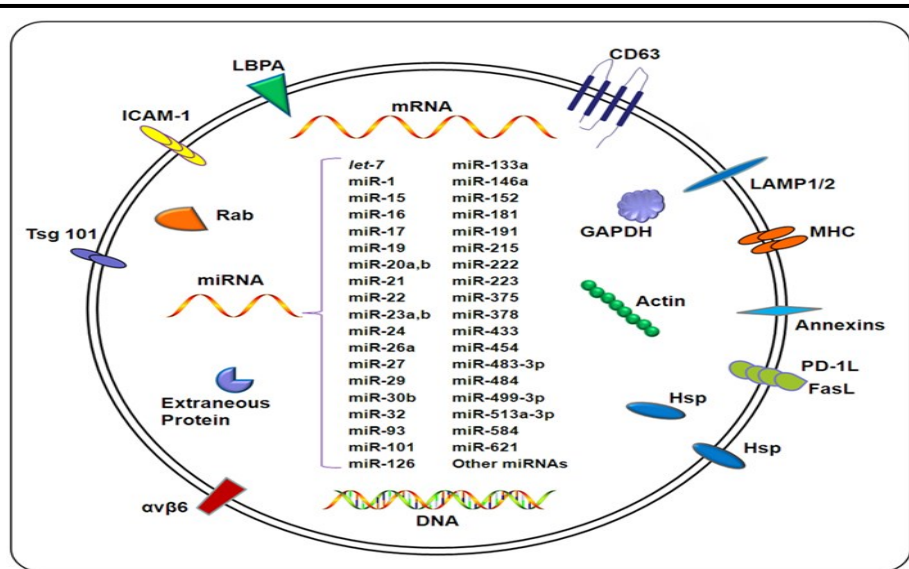


Yhteinen terveys & sen suhde maaviljelyyn strategiaan ravintoon

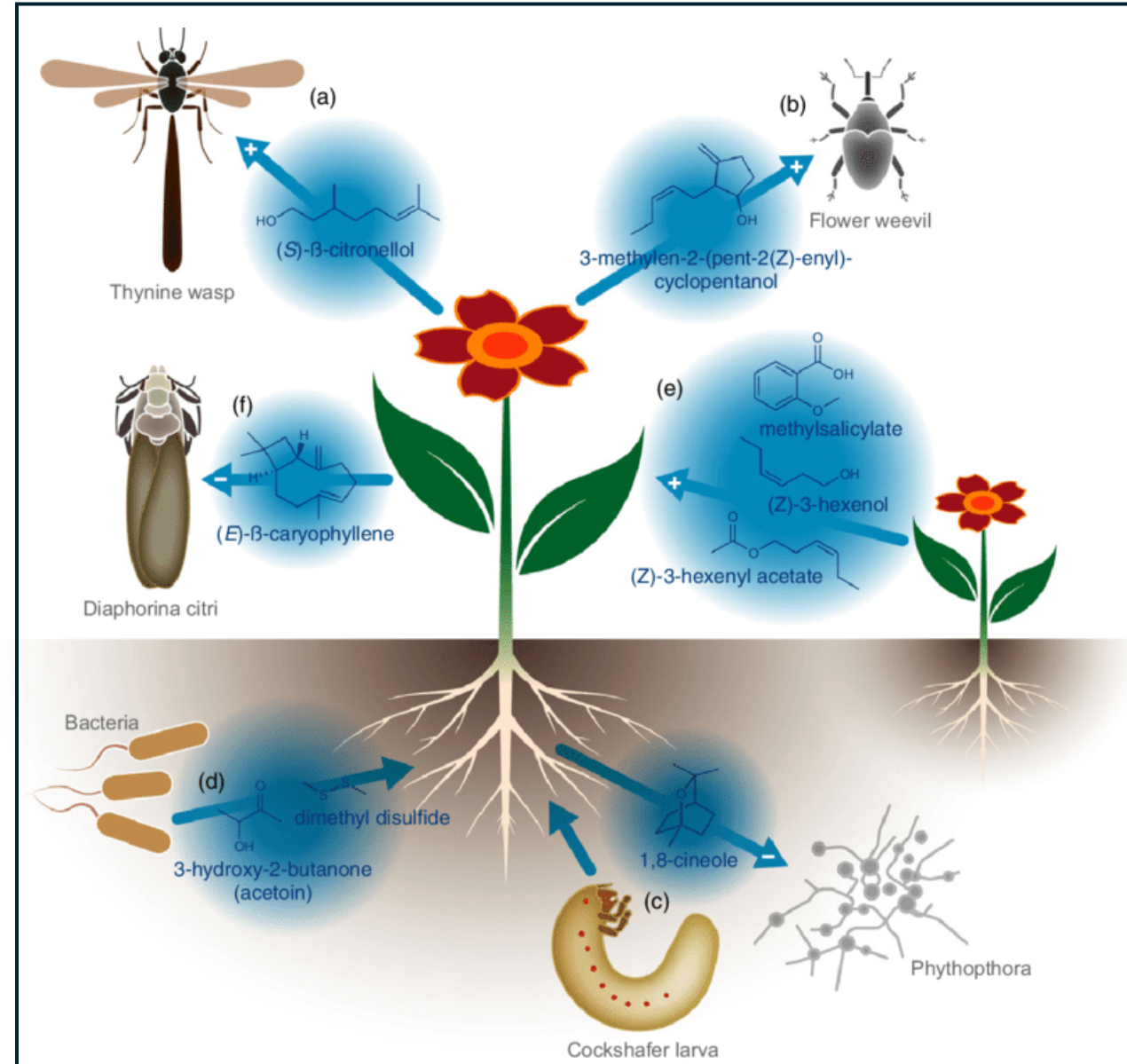
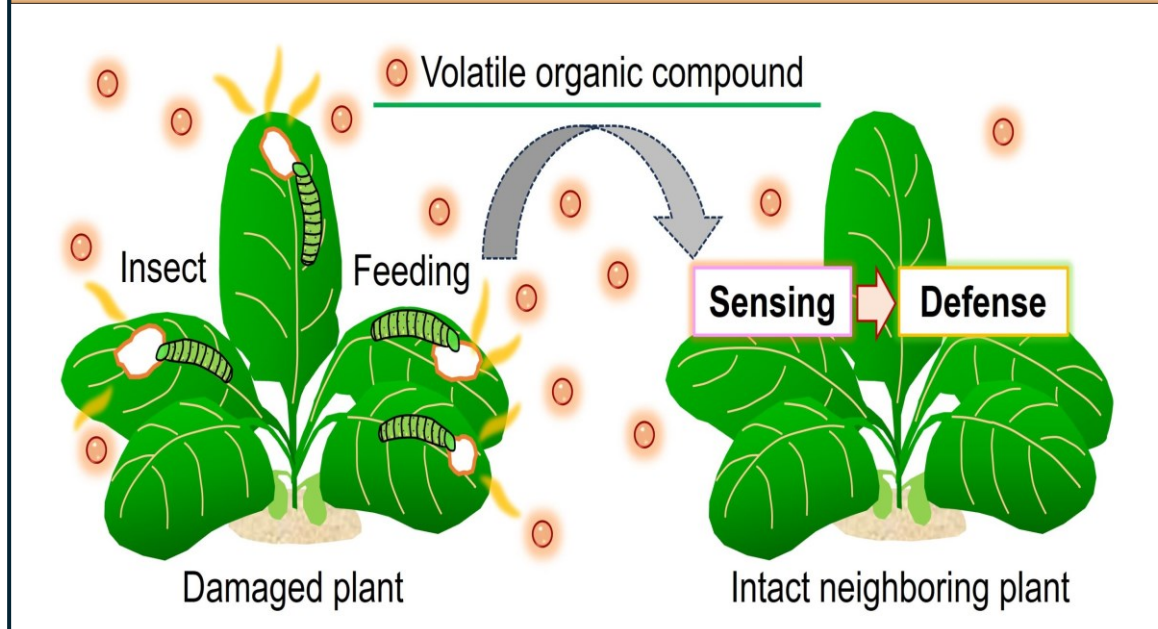
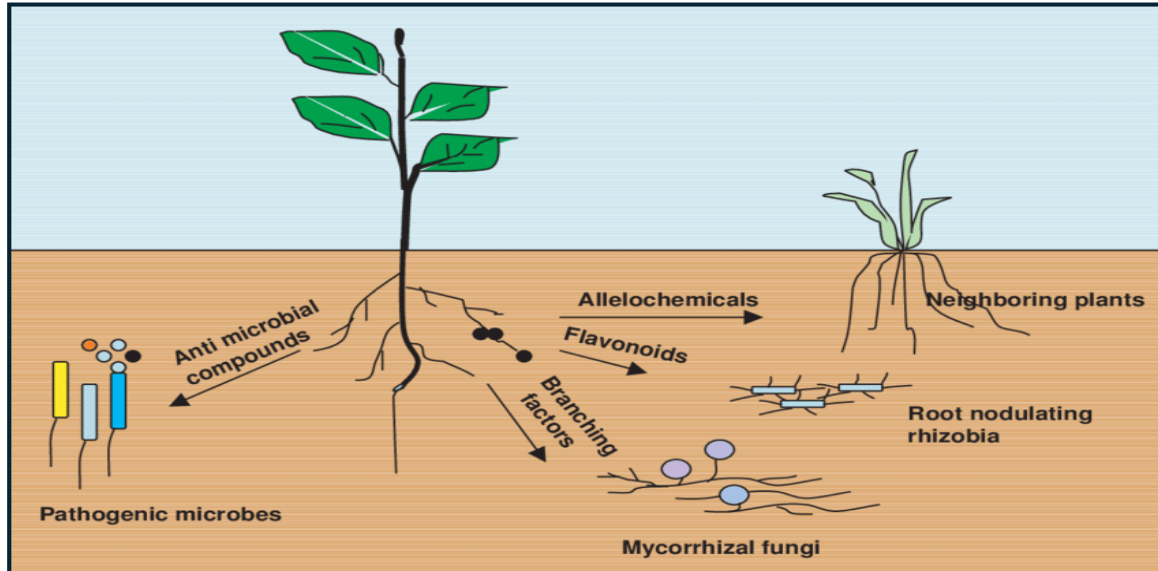


Lajit voidaan identifioida ympäristö DNA:n kautta

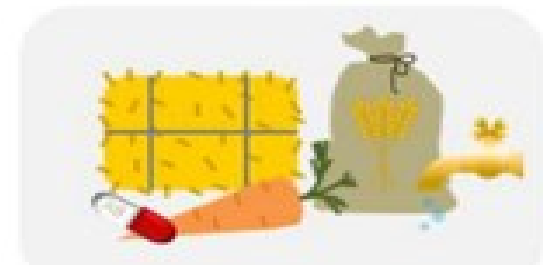
eDNA Metabarcoding Applications



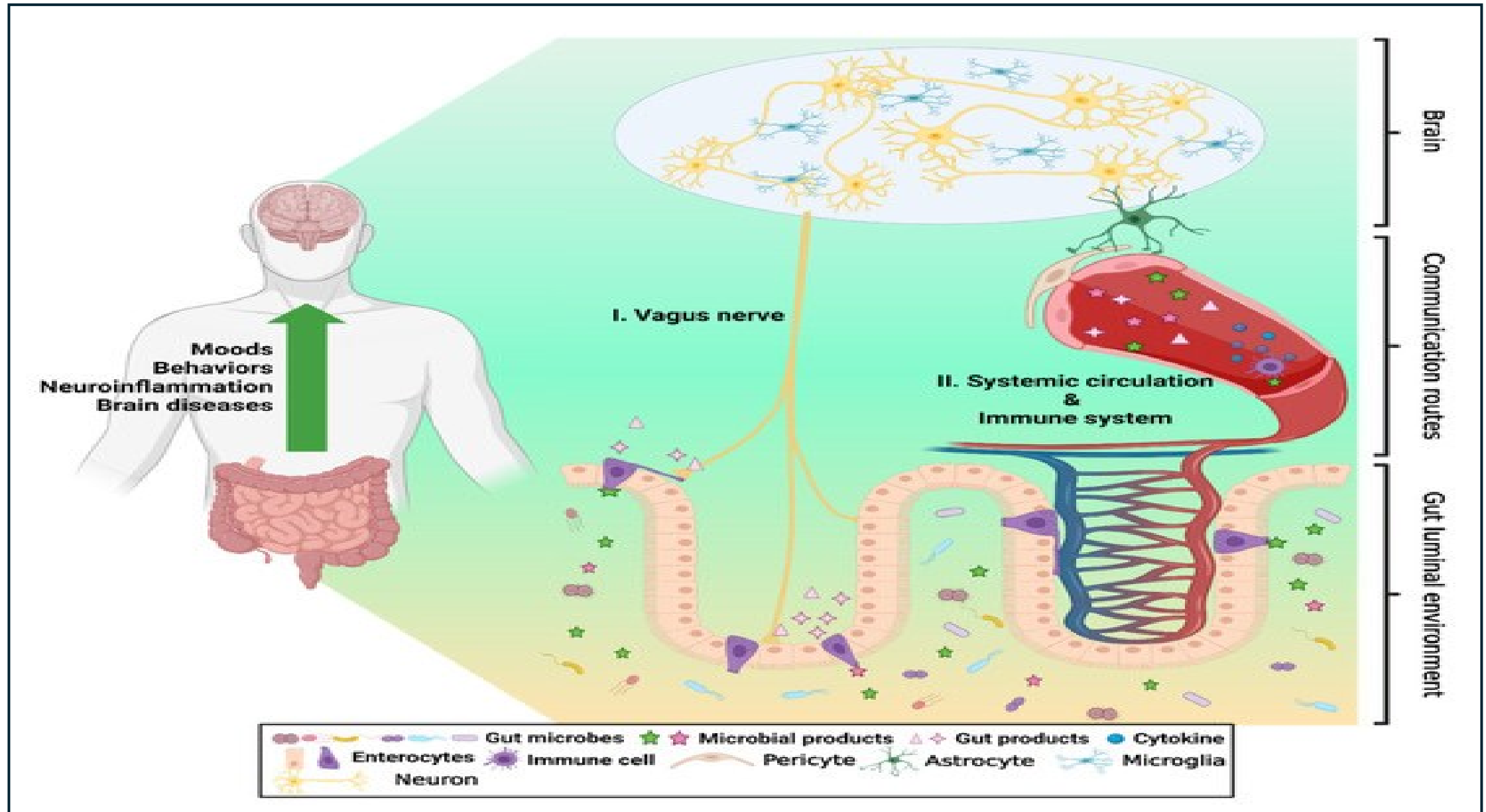
Lajit kommunikoivat keskenään monella tavalla säädel- kasvua ja erilaistumista



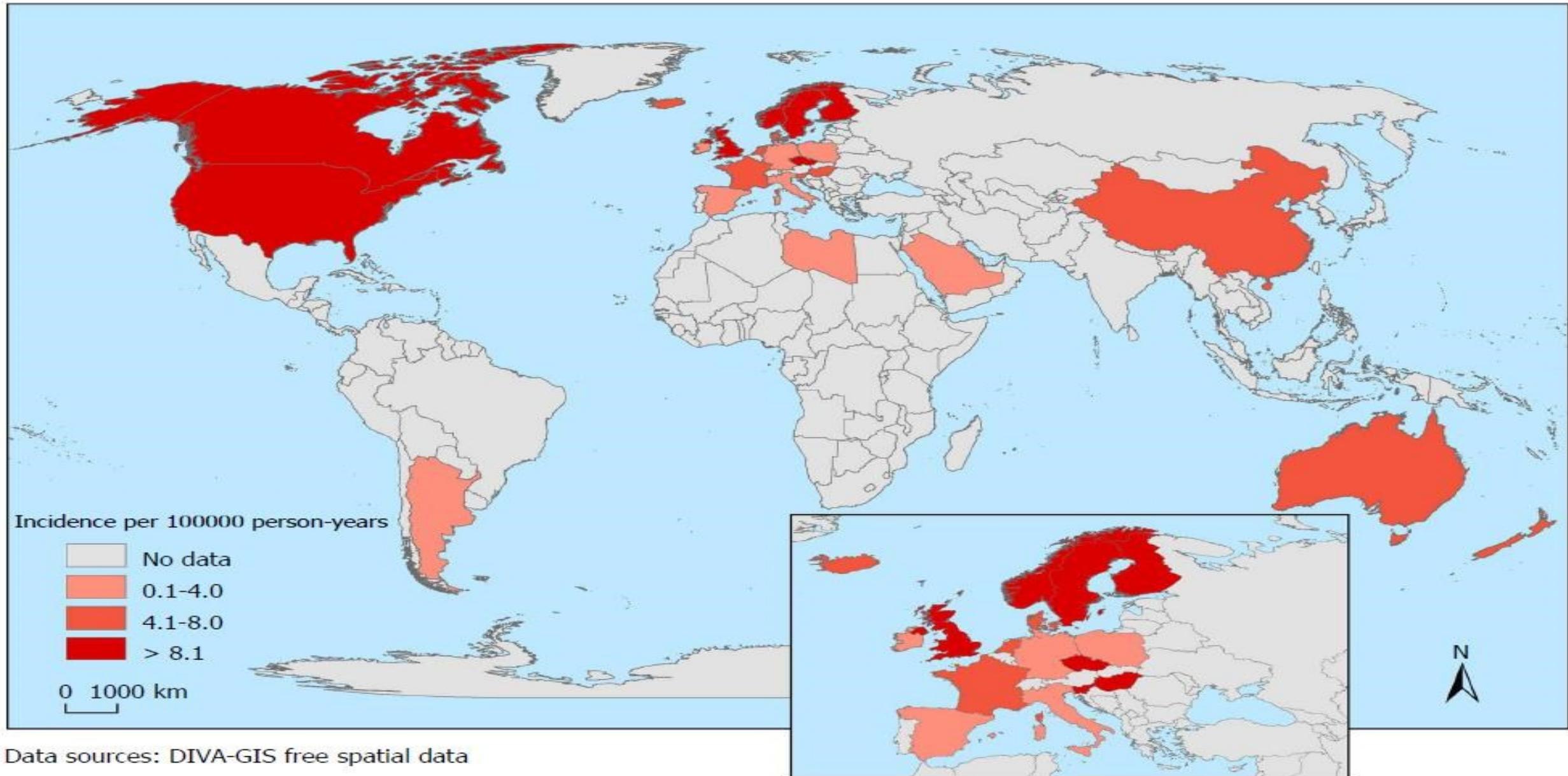
**Ei vain ihmisen,
mutta
eläintenkin
mikrobiomiston
lajikirjo heikkenee
suhteessa
ympäristön
& ravinnon
lajiköyhyyteen**



Ravinnon laatu, mikrobiomisto ja viljelyolosuhteet heijastuvat osin elimistöön suolen nanotason rakkuloiden kautta

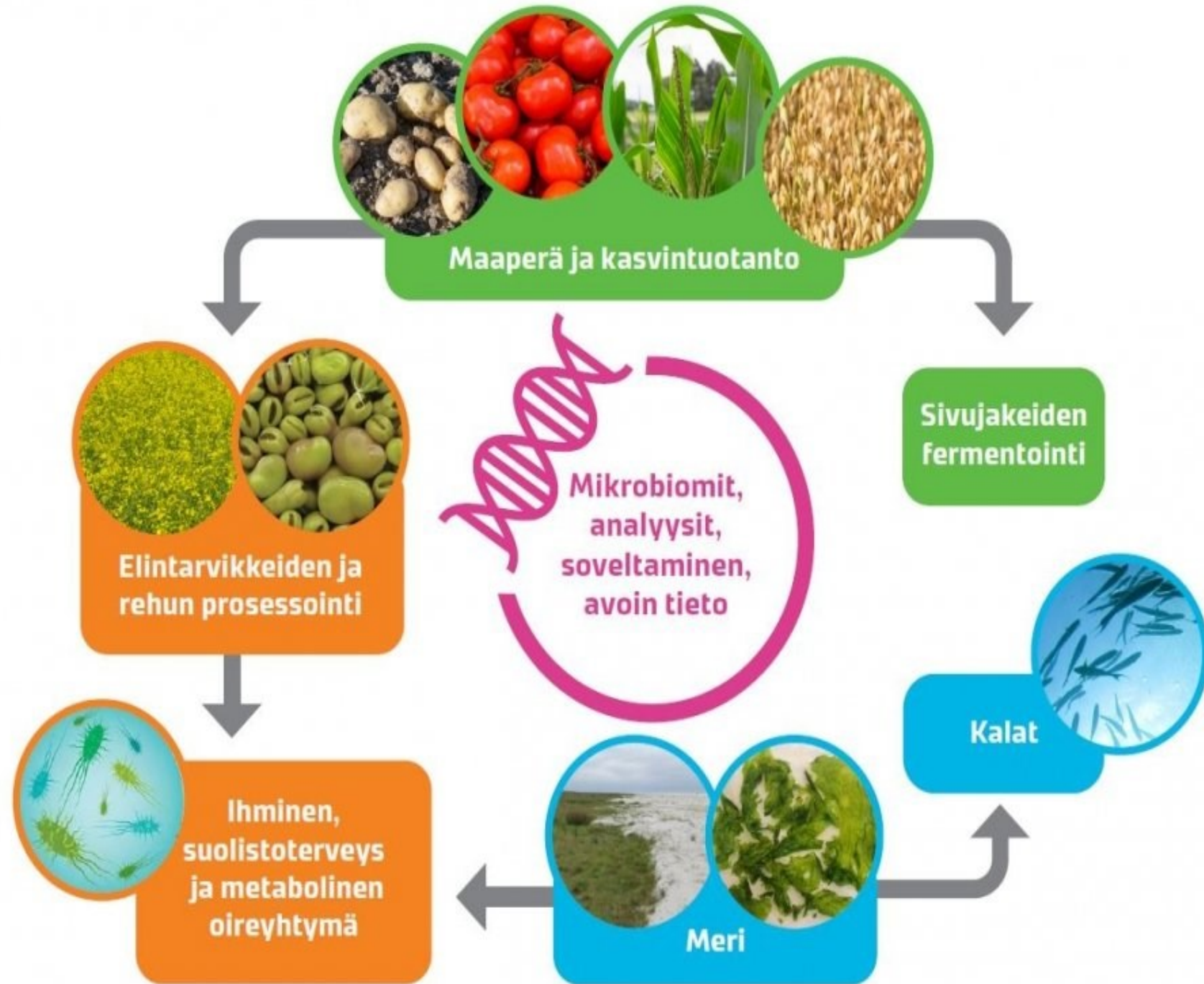


Lasten, nuorten & imeväisten ikäisten suolisairauksien levinneisyys

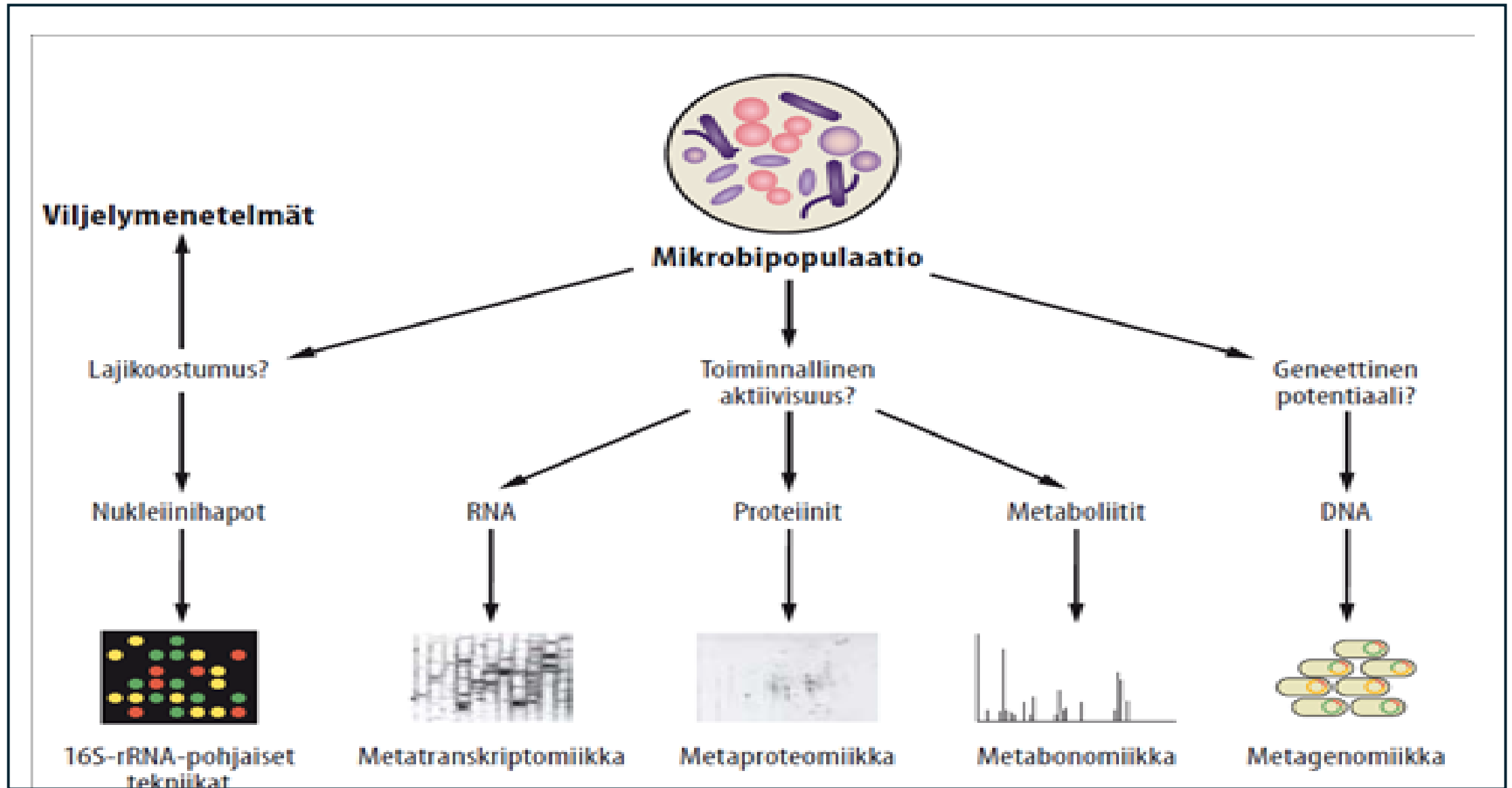


Luontoa voidaan
tutkia ns.
OMIIKKA
teknologioilla

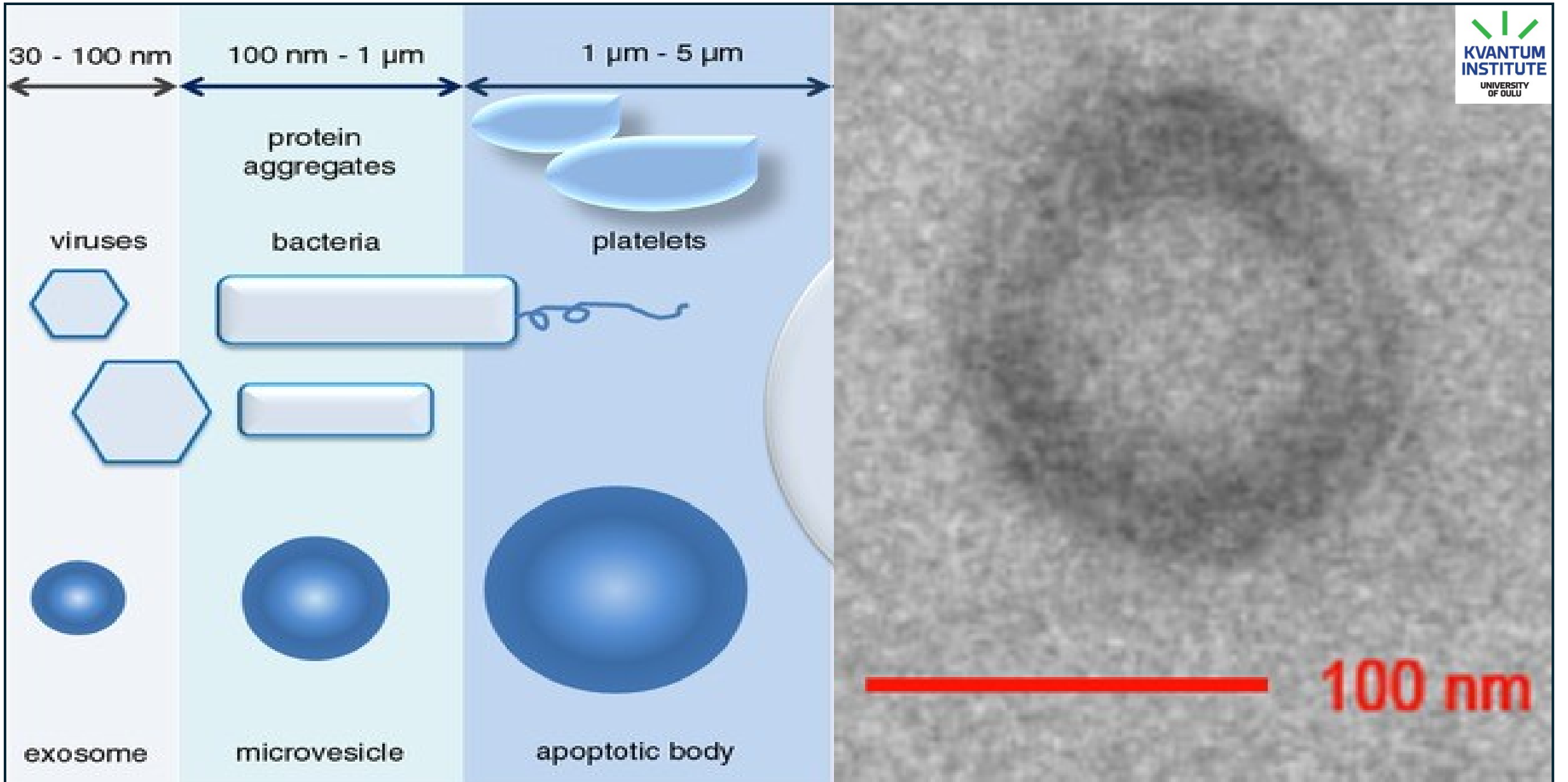
Havaitsemme
viljelyn vaikutuksia
seikkaperäisemmin
jatkossa



Maan lajistoa voidaan tutkia laaja-alaisin tutkimuskeinoin

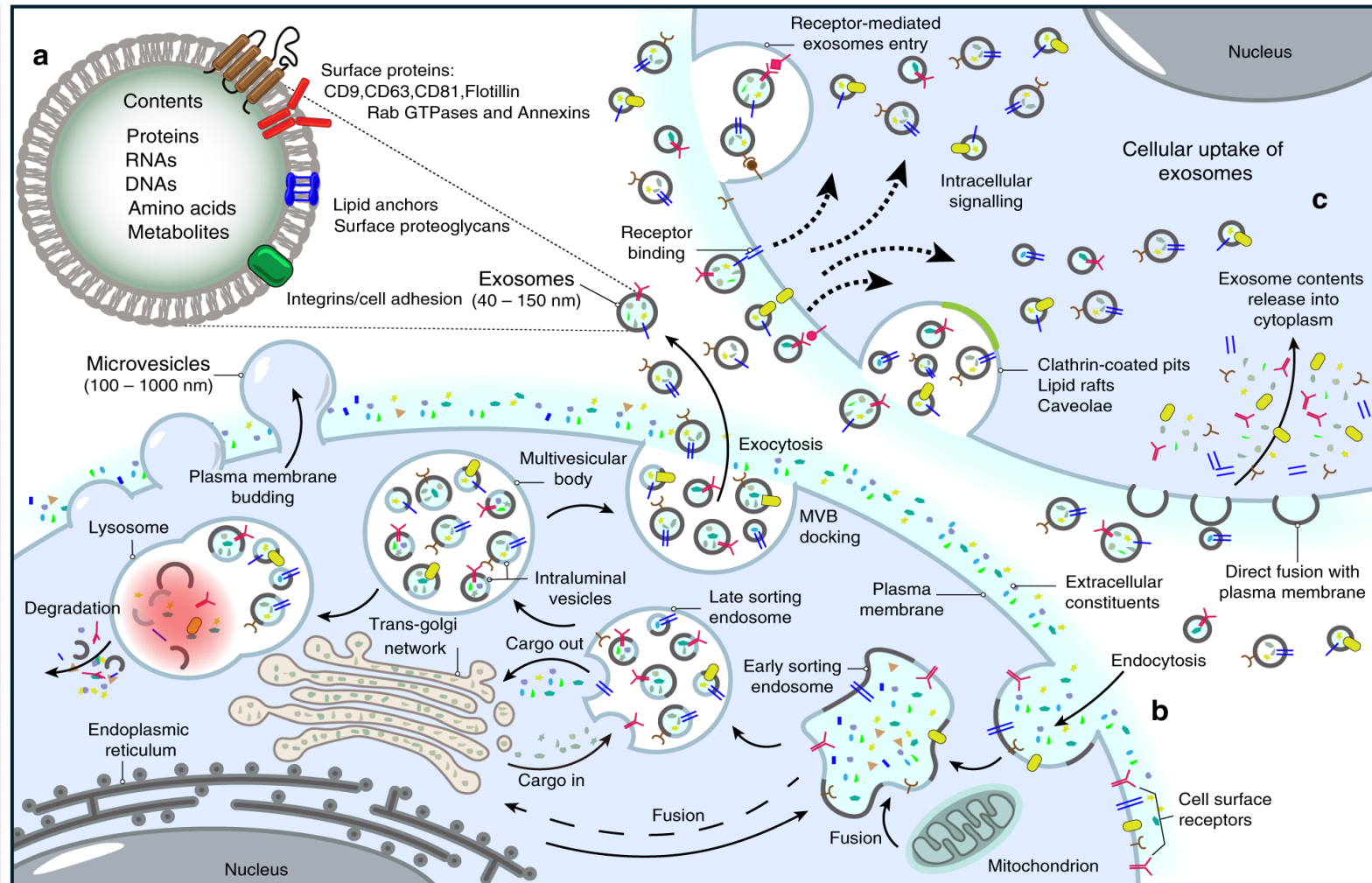
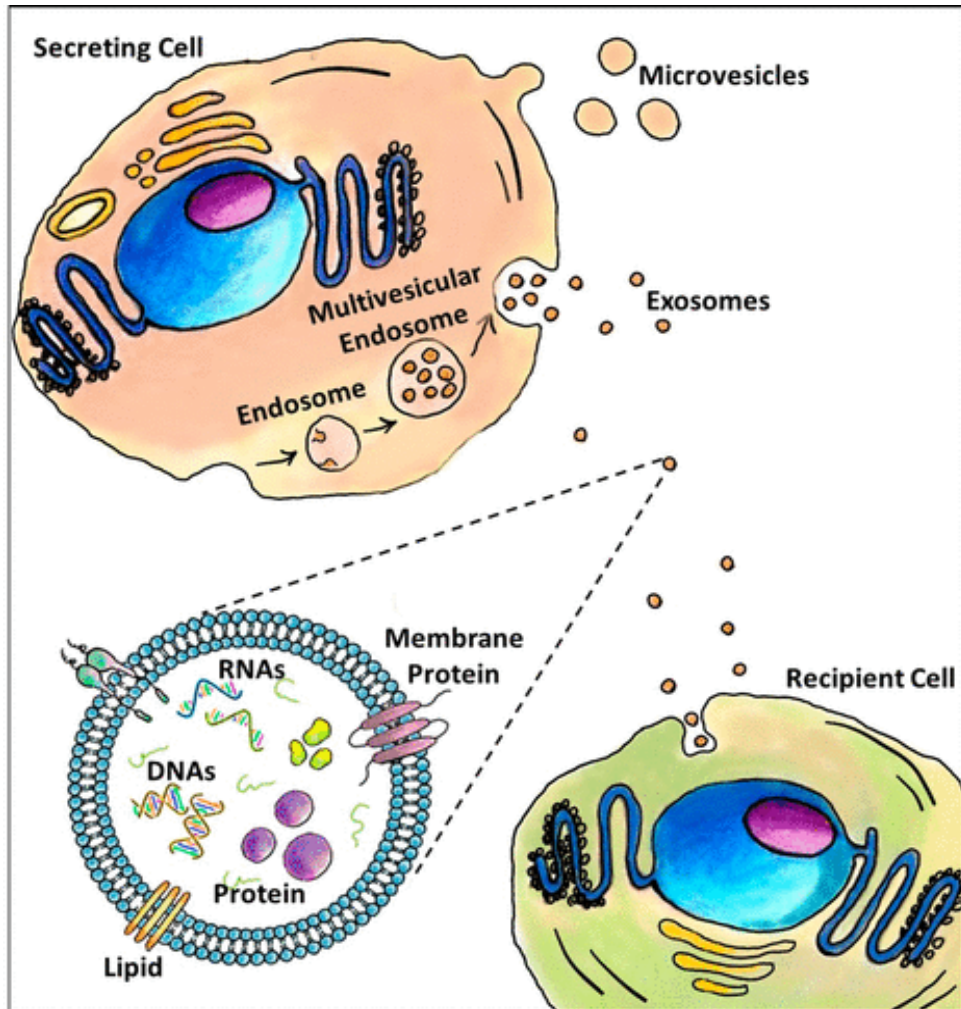


Luonnossa esiintyviä viestinnän “reppu & reissumies” (nanorakkula) välittäjiä

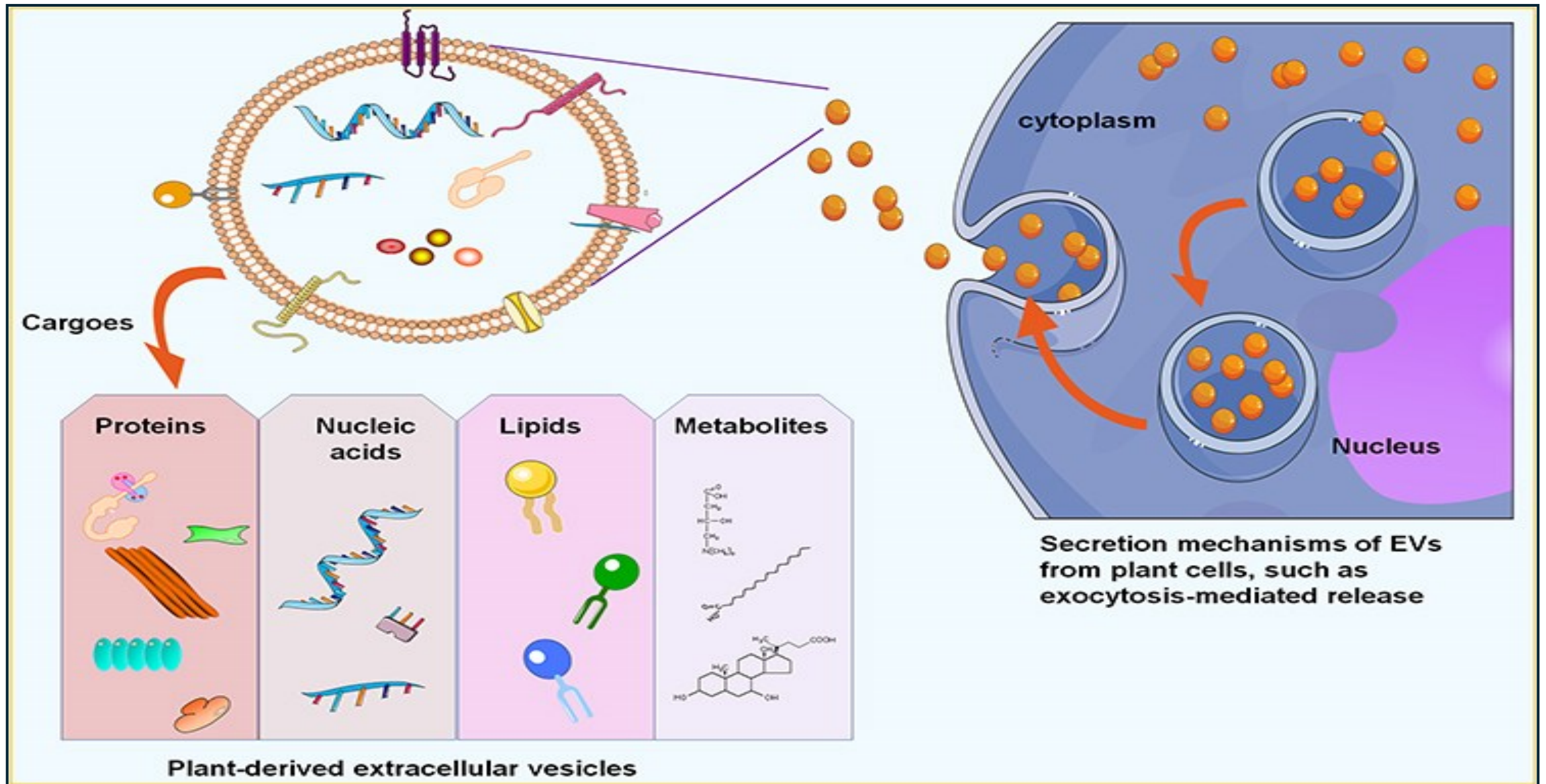


Solut kommunikoivat ei paljain simin nähtävillä rakkuloilla, luonnon nanotason postilähettyksillä!

Menneet ohi tutkijoilta, kuin *“lapsi pesuveden mukana”*

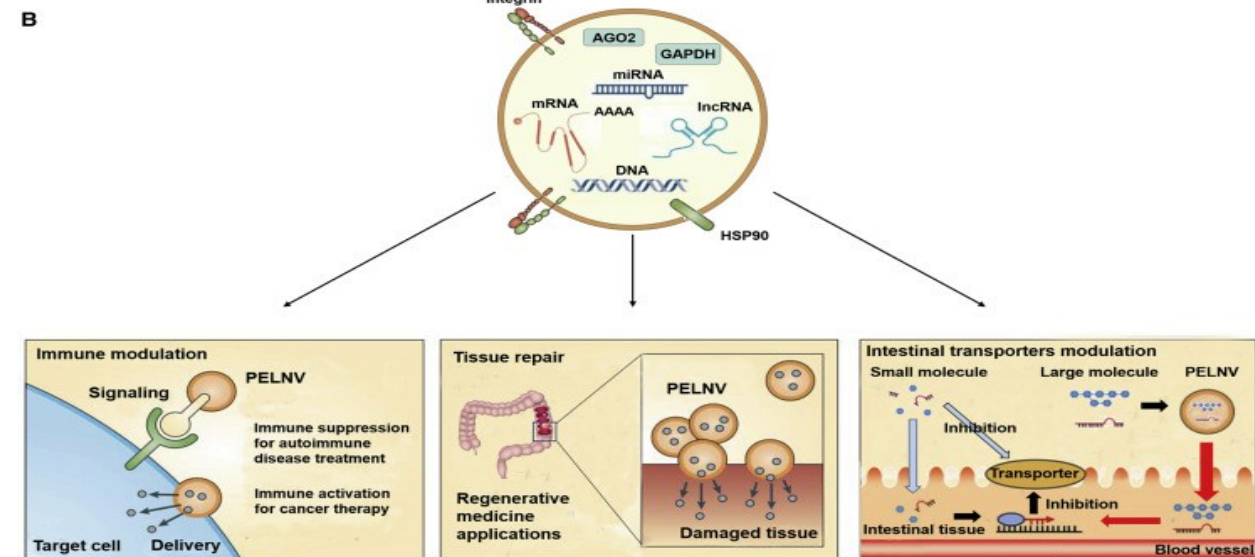
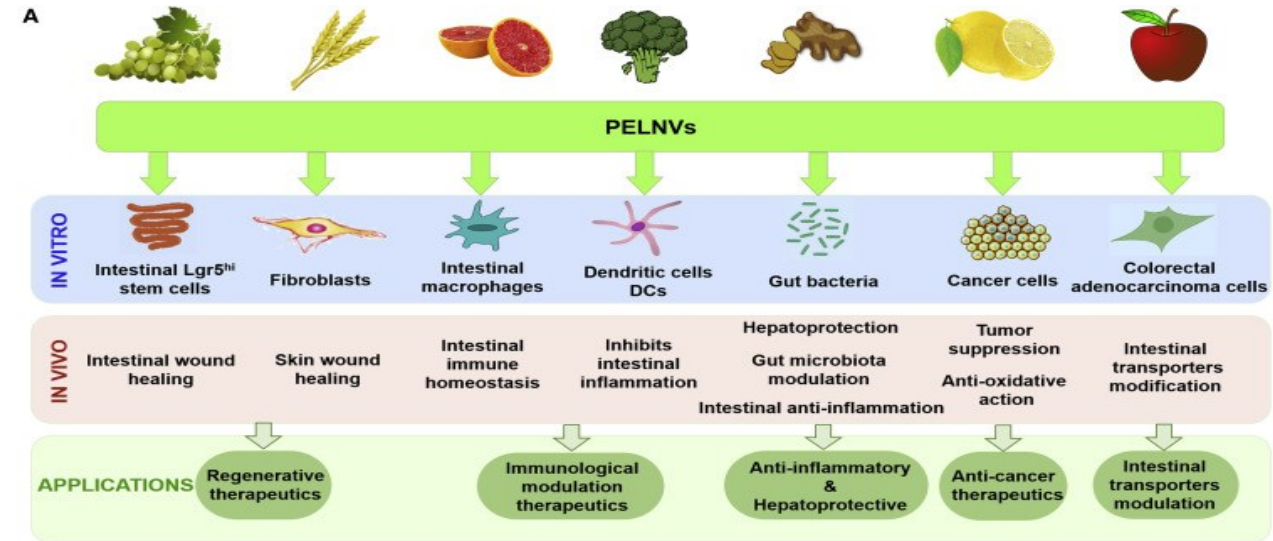
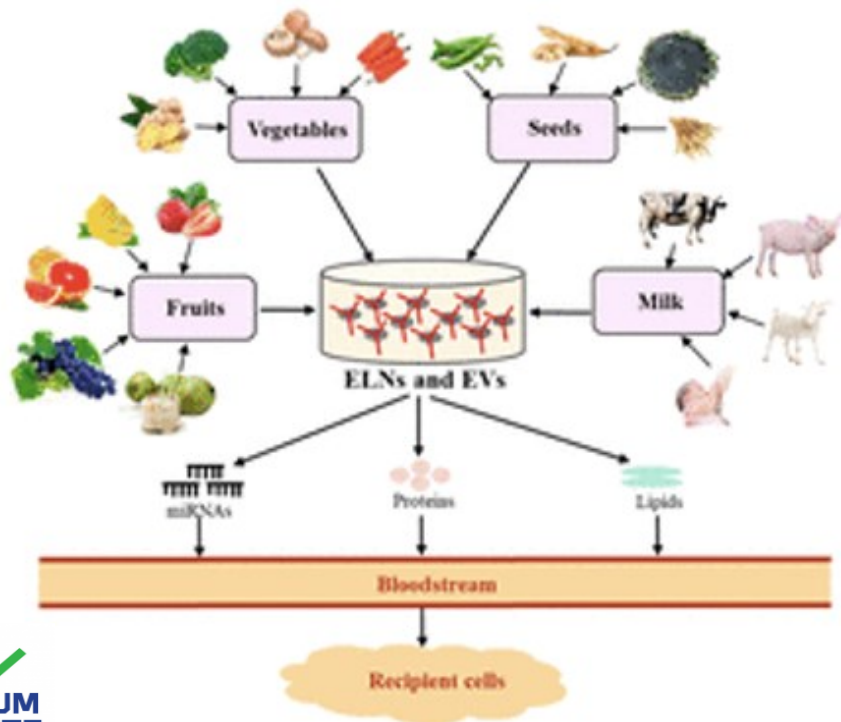


Lajien nanotason keskustelu”*BioInternet of Things*” välittyä osaltaan uudella tasolla siirtämällä molekyylejä solujen, kudosten, elimiston & lajien välillä



Luonnon tuotteet sisältävät nanorakkuloita, jotka edustavat luonnon uutta löydettyä tasoa vuorovaikuttaa elimistön kanssa

Luonnon nanorakkulaviestejä on kaikkialla elävissä organismeissa mukaan lukien tuotteet (vihannekset/marjat/hedelmät)



Cloudberry (*Rubus chamaemorus*)



ACS
FOOD
SCIENCE & TECHNOLOGY

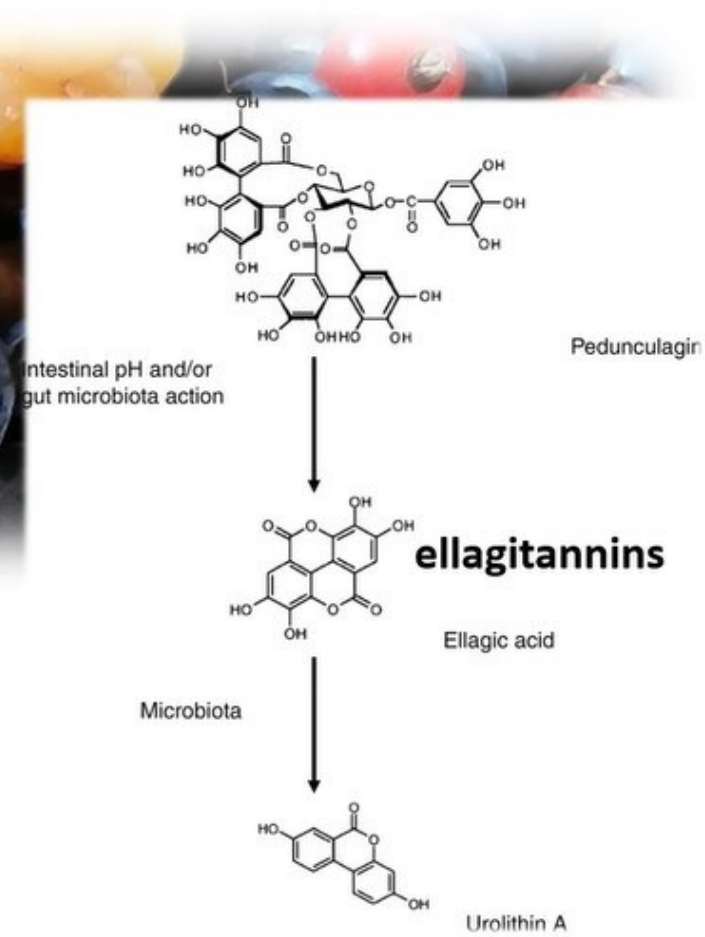
pubs.acs.org/acscitech

Natural Antimicrobials from Cloudberry (*Rubus chamaemorus*) Seeds by Sanding and Hydrothermal Extraction

Riitta Puupponen-Pimiä,* Liisa Nohynek, Jussi Suvanto, Juha-Pekka Salminen, Tuulikki Seppänen-Laakso, Juha Tähtiharju, Kaisu Honkapää, and Kirsi-Marja Oksman-Caldentey

Cite This: ACS Food Sci. Technol. 2021, 1, 917–927

Read Online

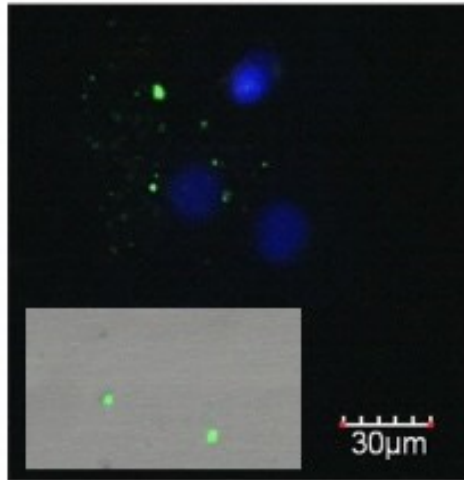


Fruit and seeds:

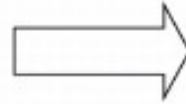
- antiadhesion activity against uro-pathogenic *E. coli*
- Antiinflammatory activity in activated macrophages
- Antifungal activity
- Antioxidant

Nutr. Cancer 2006, 54, 18–32.
Molecules 2016, 21, 908.
J. Food Meas. Charact. 2019, 13, 2265–2274.

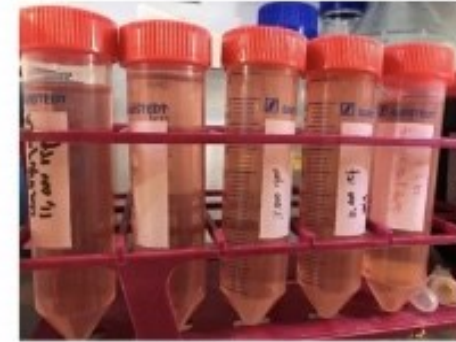
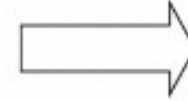
Isolation using ultracentrifugation & Characterization NV



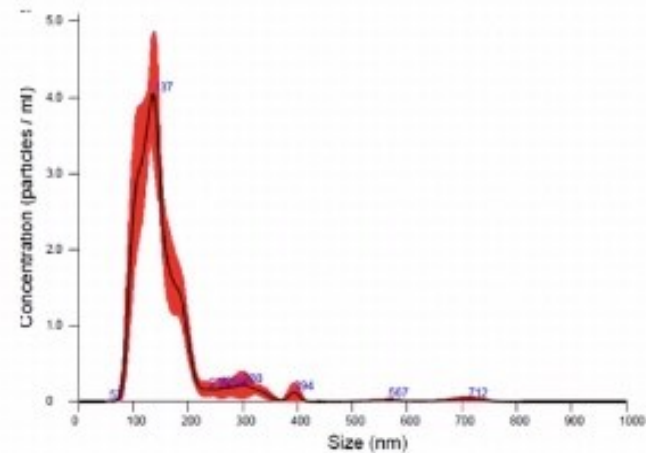
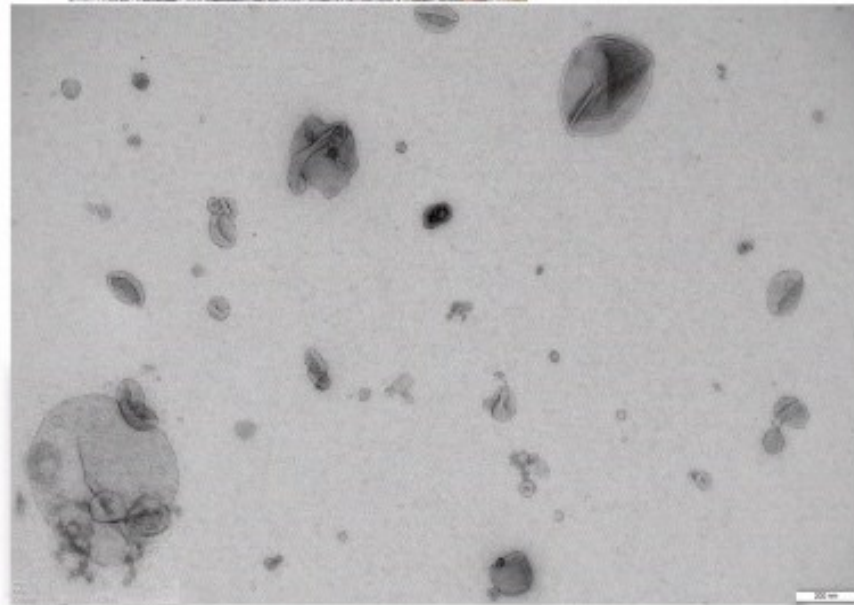
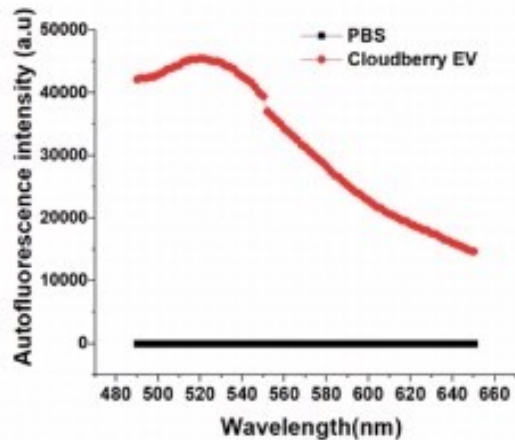
Mash the berries
In inhibitor buffer



Centrifuge 3000 rcf,
5000 rpm and 11 000 rcf



Ultracentrifuge
100,000 rcf




Scalable Purification, Storage, and Release of Plant-Derived Nanovesicles for Local Therapy Using Nanostructured All-Cellulose Composite Membranes


Feby W. Pratiwi, Reny T. Thomas, Mohammad Karzarjeddi, Marjaana Sarpola, Ilkka Miinalainen, Olha Makieieva, Soile Jokipii-Lukkari, Caglar Elbuken, Kristiina Oksman,* Seppo J. Vainio,* and Henrikki Liimatainen*


 Cite This: <https://doi.org/10.1021/acs.biomac.4c00535>

 Read Online

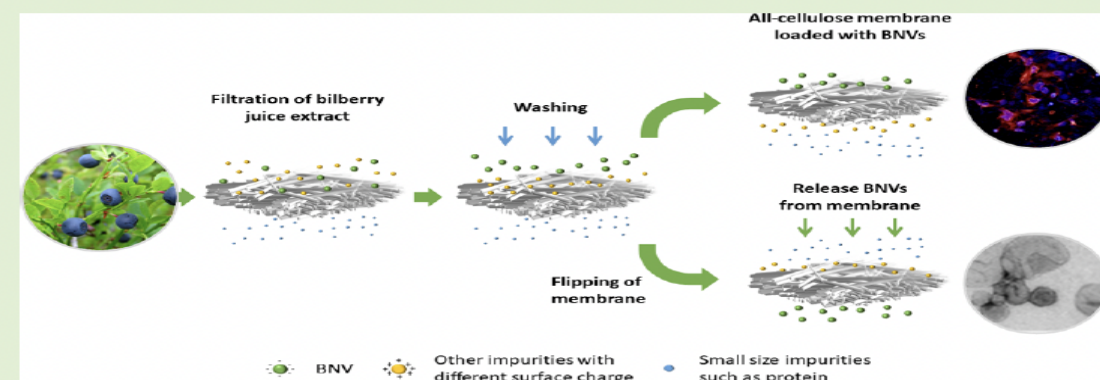
ACCESS |

 Metrics & More

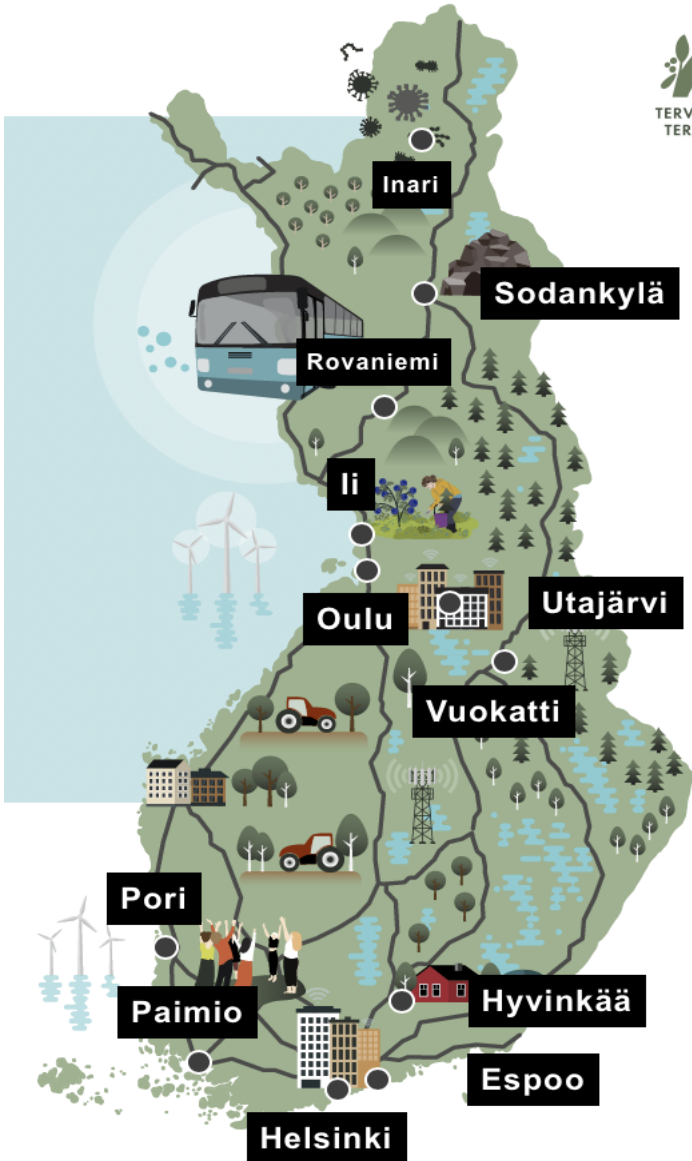
 Article Recommendations

 Supporting Information

ABSTRACT: Plant-derived nanovesicles such as bilberries nanovesicles (BNVs) show immense promise as next-generation biotherapeutics and functional food ingredients; however, their isolation, purification, and storage on a large scale remain a challenge. In this study, biocompatible and nanostructured composite all-cellulose membranes are introduced as a scalable and straightforward approach to the isolation of BNV. The membranes consisting of a cellulose acetate matrix infused with anionic or cationic nanocelluloses promoted selective capture of BNVs through electrostatic and size-exclusion-mediated depth filtration. Furthermore, the surface of the composite membrane acted as a storage matrix for BNVs, ensuring their prolonged stability at 4 °C. The BNVs stored in the membrane could be promptly released through elution assisted by low-pressure vacuum filtration or diffusion in liquid media. The morphology, bioactivity, and stability of the extracted BNVs were preserved, and the release rate of BNVs in different cell cultures could be regulated, facilitating their use for local therapy. Consequently, this approach paves the way for the scalable production, purification, and storage of nanovesicles and advances their use in biotherapeutics and functional foods.



14 Tuberkuloosi PAIMIO:n parantola



Lajien välinen nanokosmos kommunikaatio järjestelmä

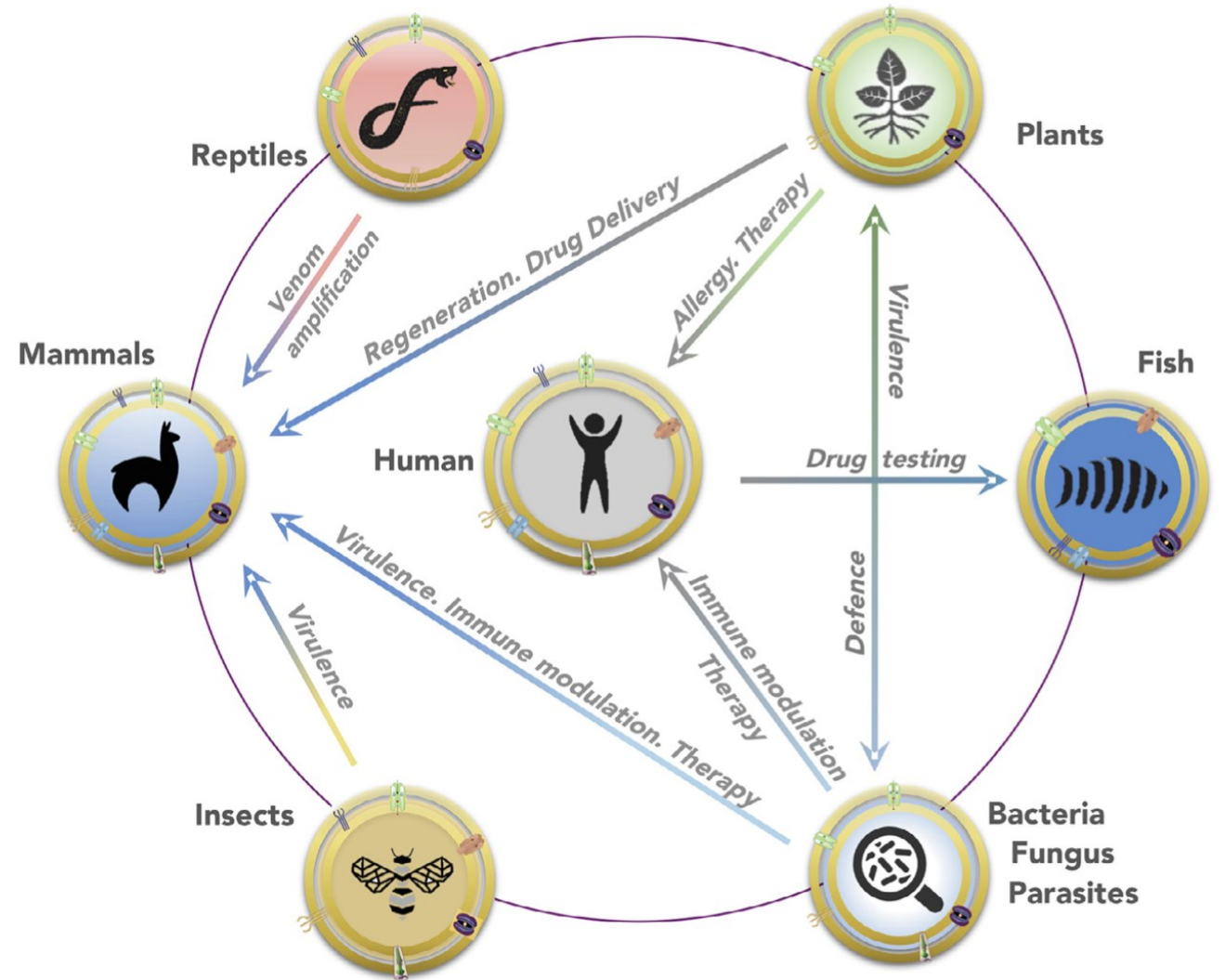


Fig 2. Overview of exosome interkingdom communication, including microbes (bacteria, fungus, parasites), plants, insects, reptiles and fish. Mammals and humans are depicted separately, to depict differences between model organism and clinical trials. Arrow origin indicates species donating exosomes, while arrow tip indicates at exosome receiving species. Arrows are accompanied by the most important effect exosomes elicit in the recipient species or most common use.

EV Eksosomi nanopallot voivat kuvata luonnon, kasvien ja maaperän tilaa lajien erittämien nanopallojen laadullisen koostumuksen muutoksen kautta

Ympäristön
Signaalit

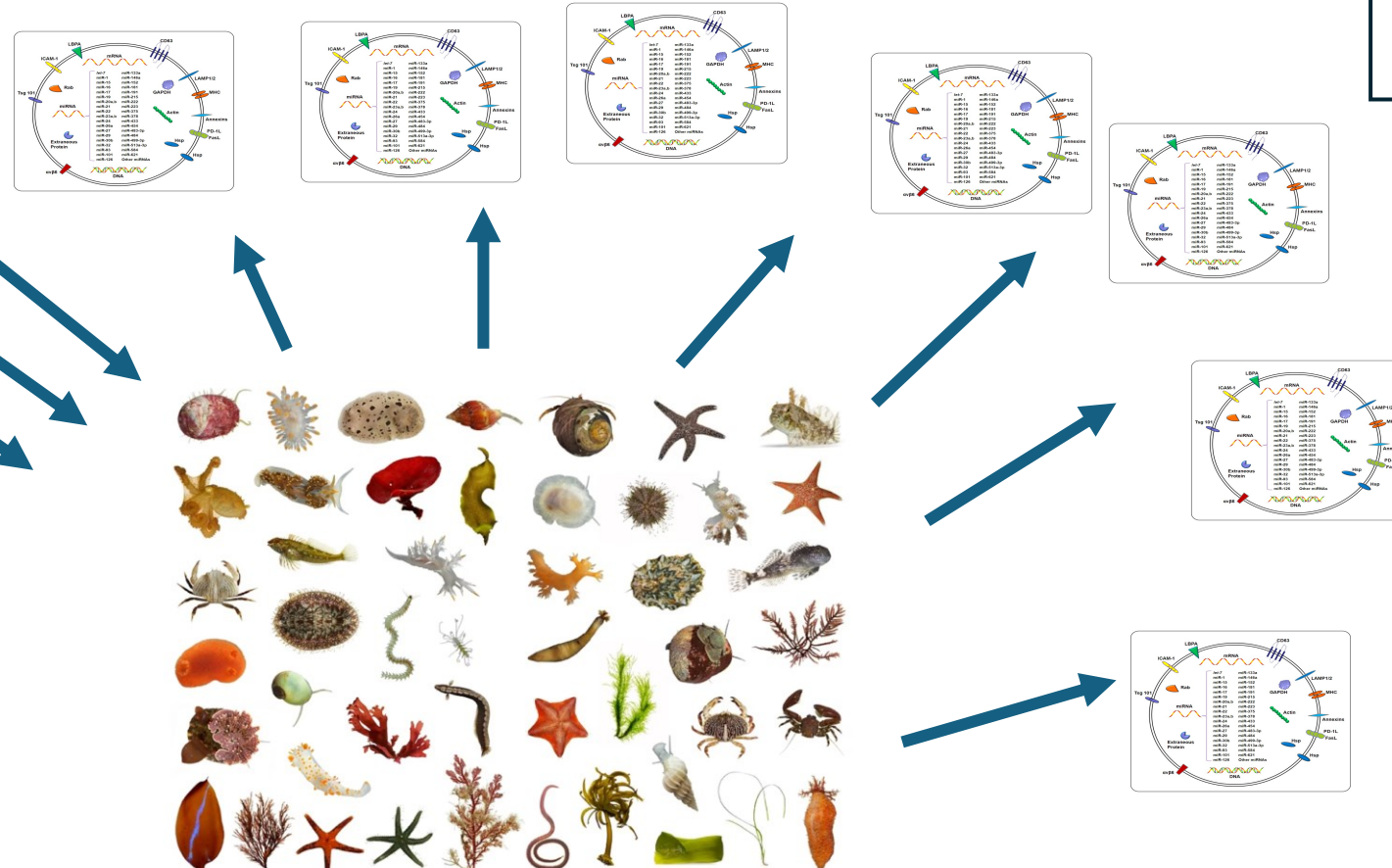
EV Eksosomit koostumuksen
muutos

Lajien vaste

miRNA/ncRNA
metaboliitit
entsyymit
Nanopalloissa

Lajien vaste

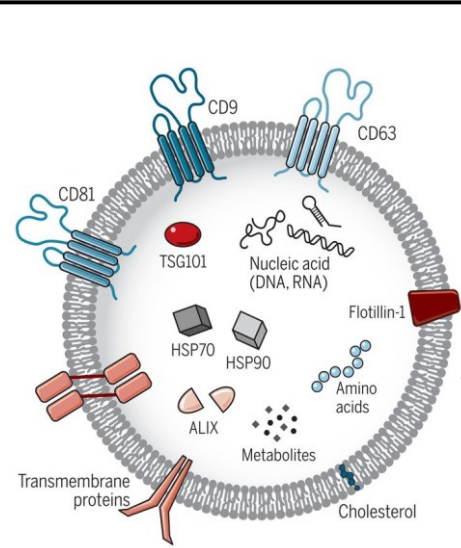
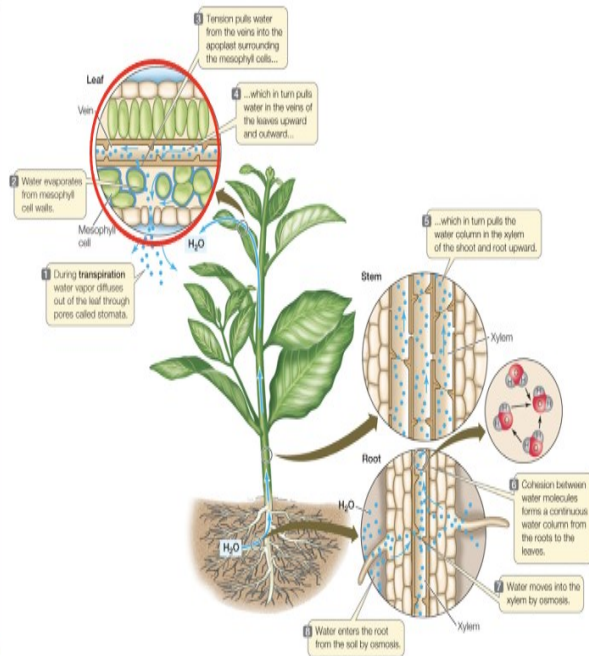
Lajien vaste



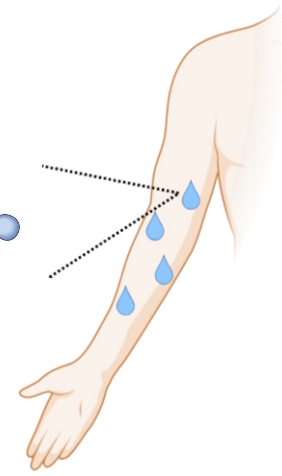
Perspiration

Transpiration

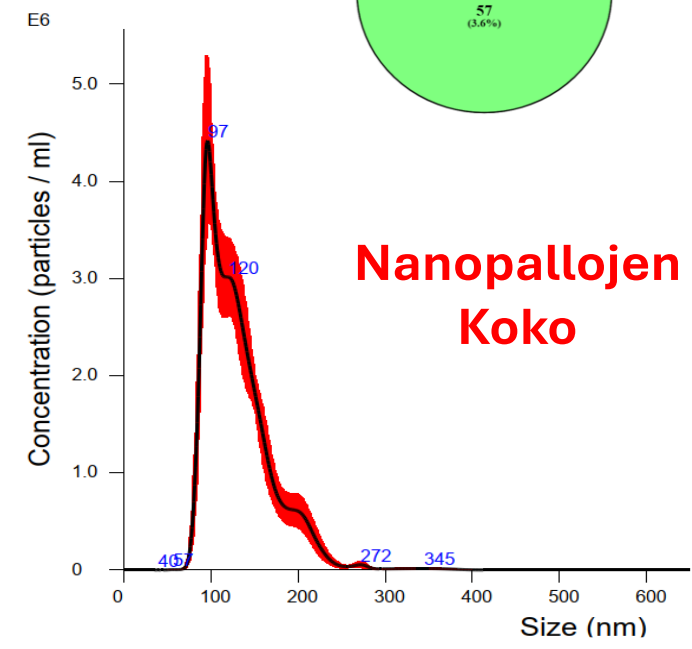
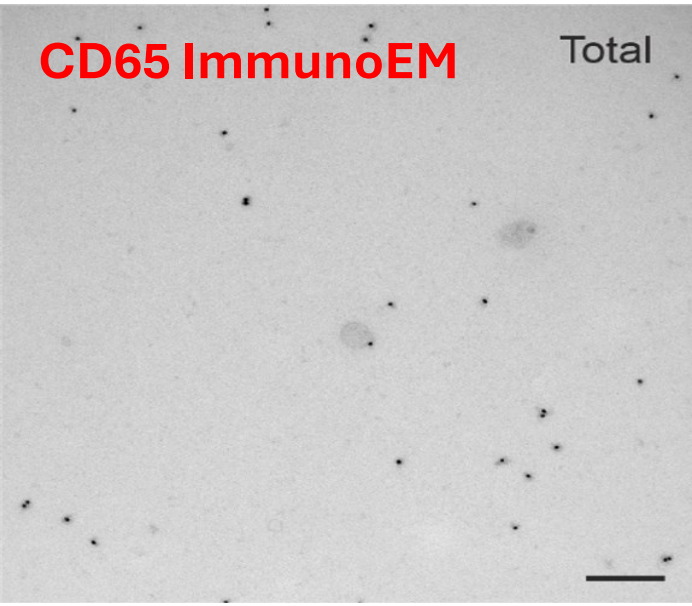
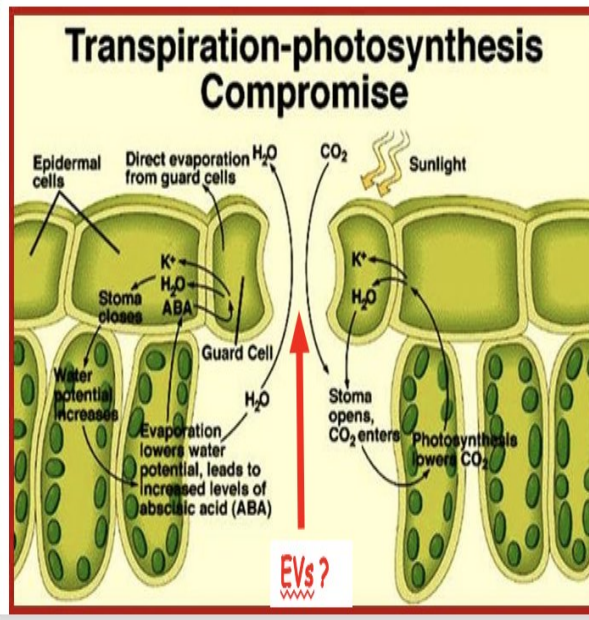
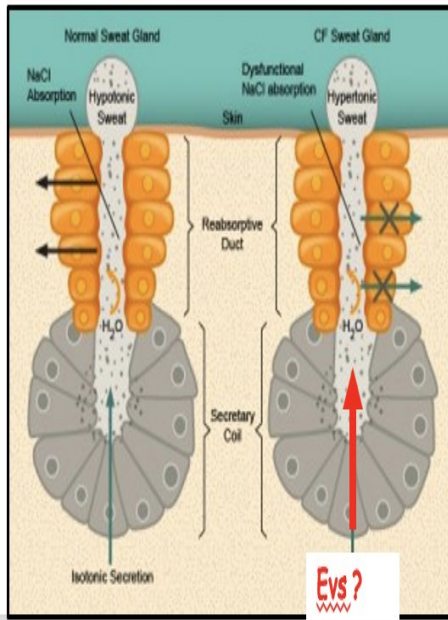
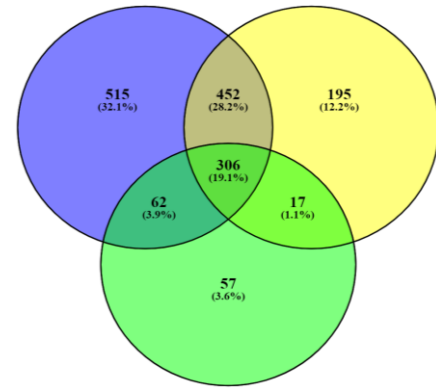
Transpiration & Perspiration



Extracellular vesicles



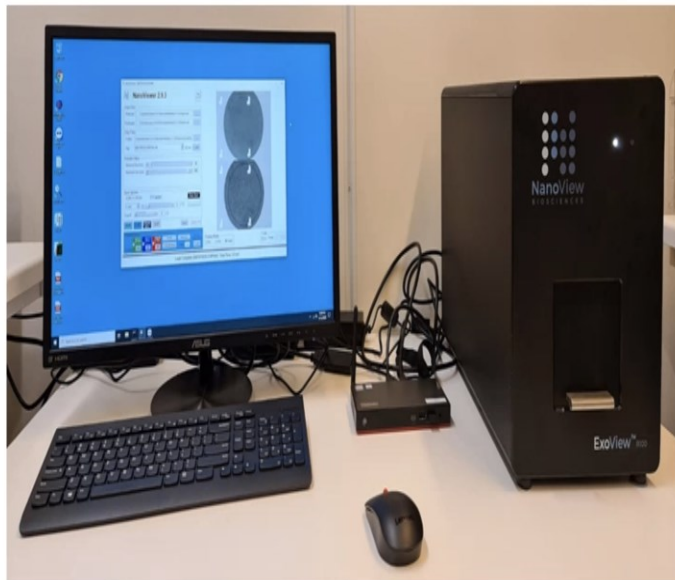
Proteomi



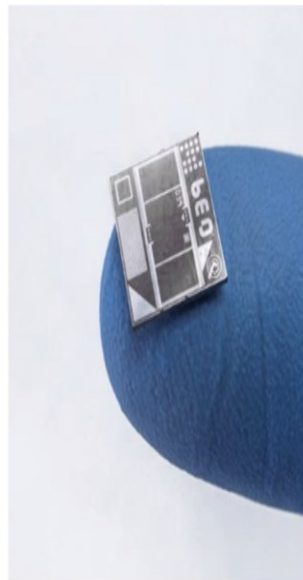
Nanopallojen Koko

Voimme analysoida joko kaikki, osan tai vain yhden nanopallon koostumuksen

NanoView

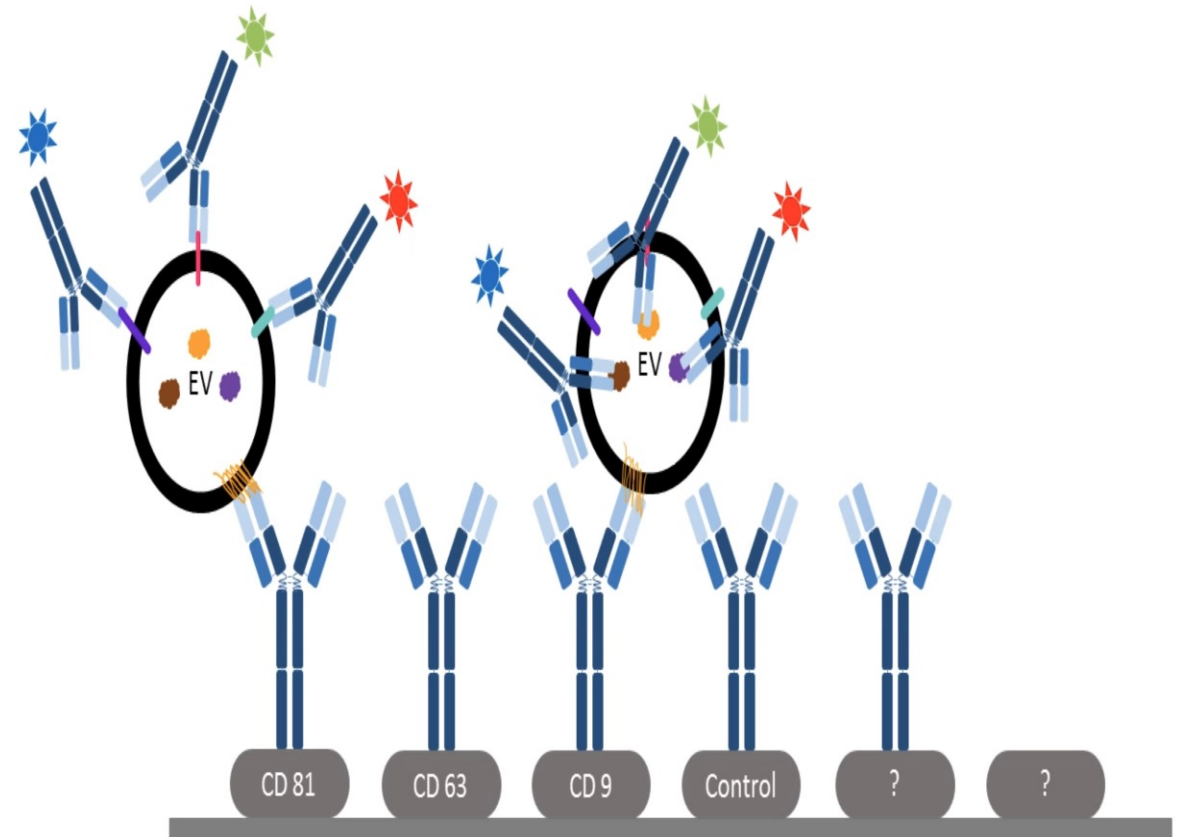


NanoView system

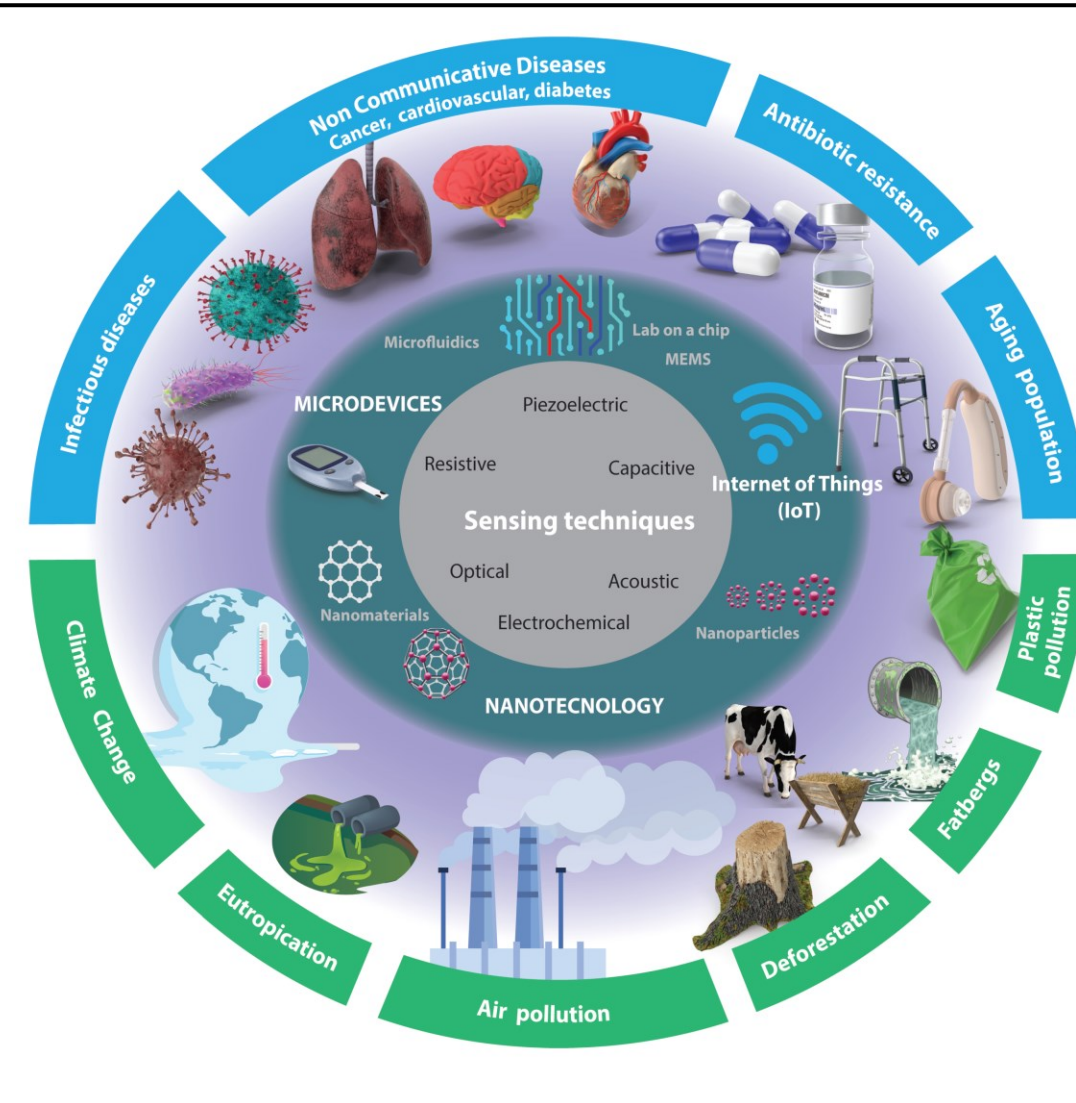
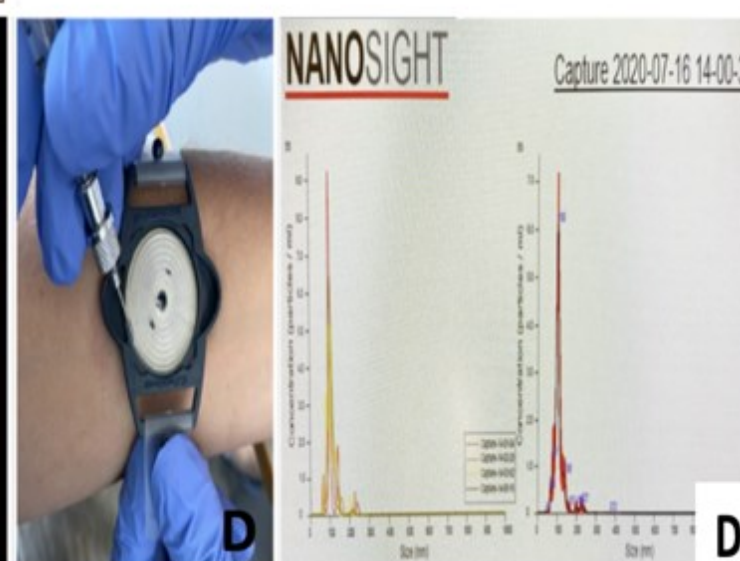
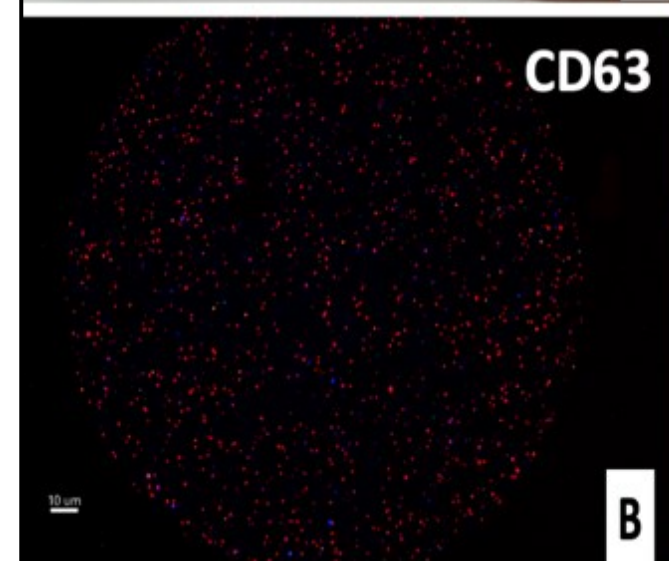
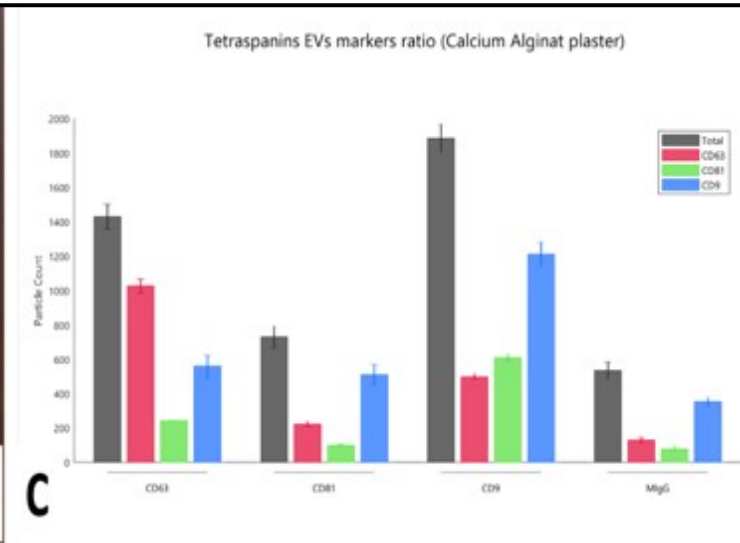


Chip

NanoView



Luonnon vaikutusta ihmiseen voidaan mitata eri keinoin mm. ihon nanorakkuloiden kautta





KIITOS !

Professori Seppo Vainio,
Kvantum Instituutti, Oulun yliopisto

Tel. 040 747 0939

E-mail: Seppo.Vainio@oulu.fi