



# BIOMIMETIIKKA

**Justus Reunanen**

22.5.2025

FMT-päivät

Kerttu Saalasti Instituutti, Nivala



# BIOMIMETIIKKA

muinaiskreikka:

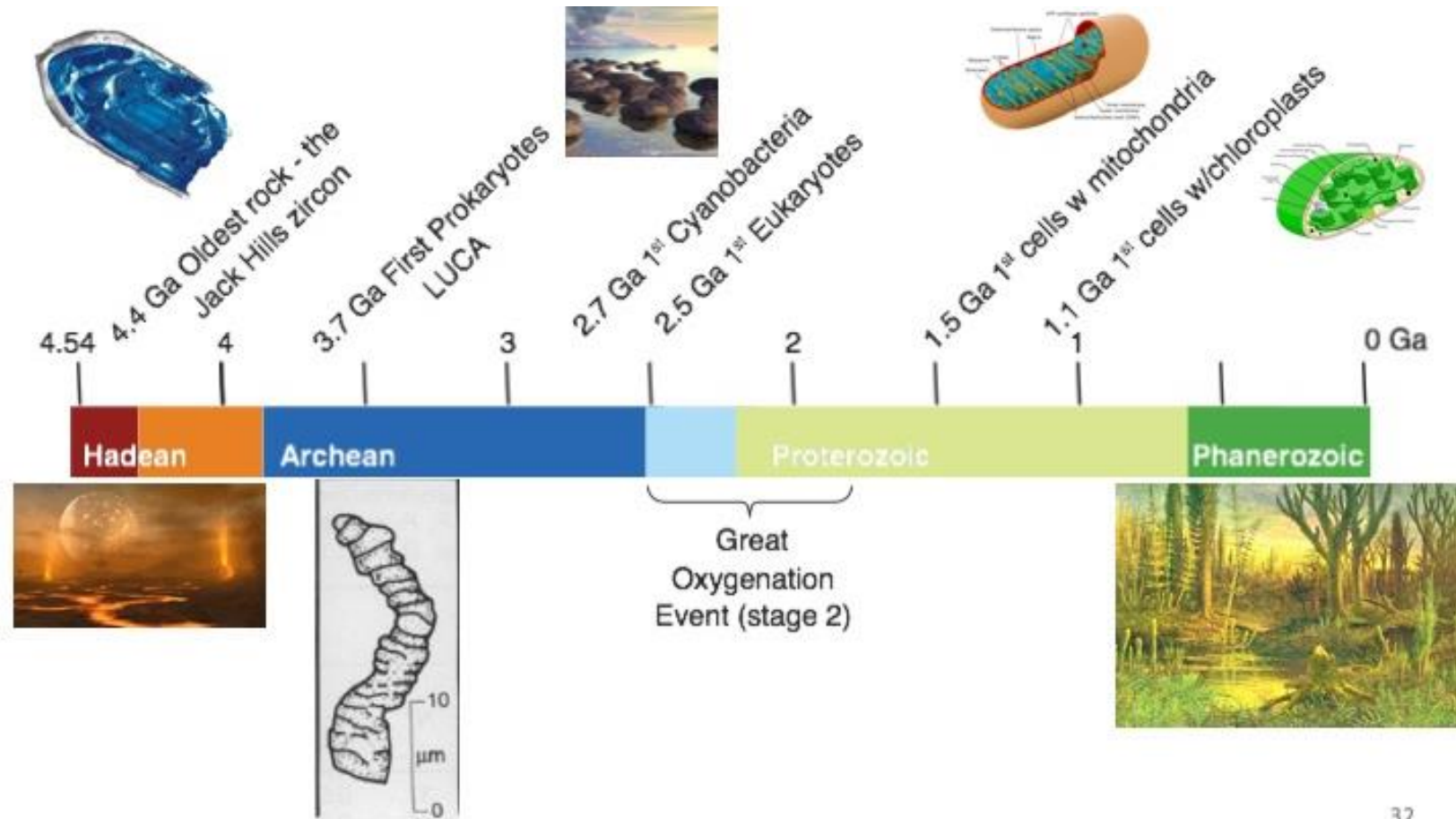
βίος (*bios*), elämä  
μίμησις (*mīmēsis*), matkiminen

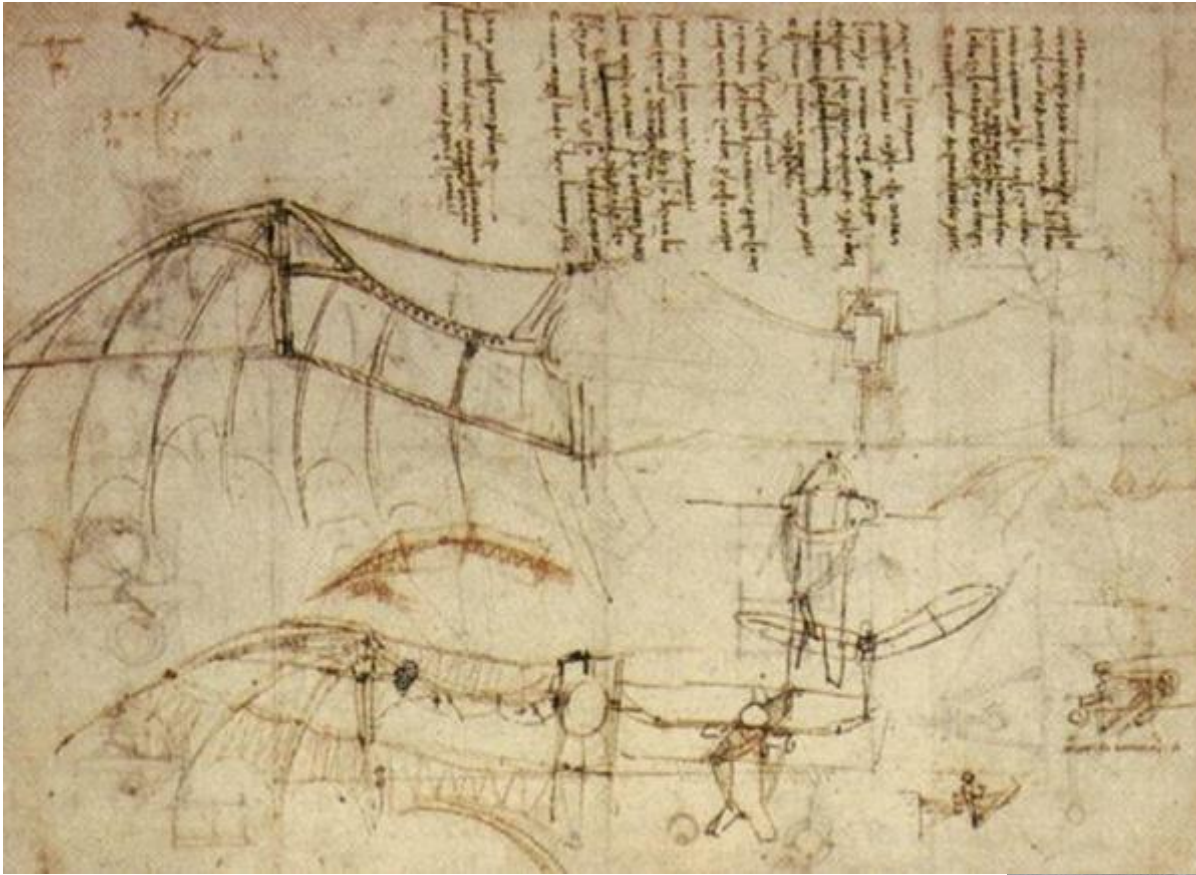
synonyymejä:

Biomimiikka, bioniikka



# ELÄMÄÄ 3,7 mrd VUOTTA

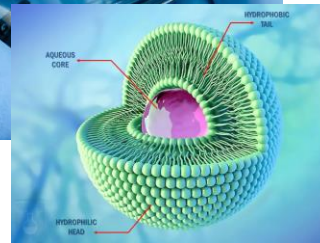
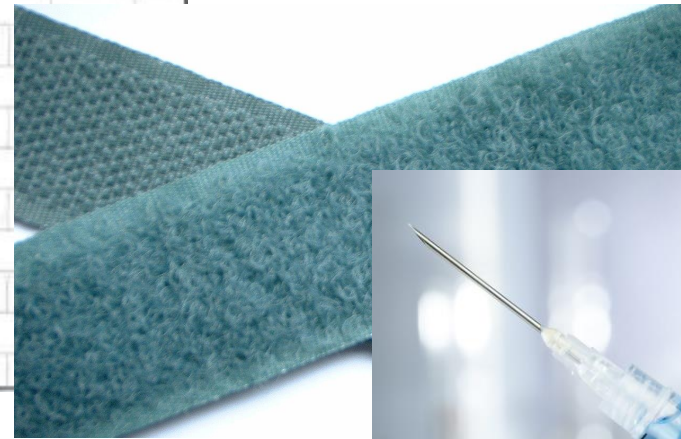








# MAKRO/MIKRO/NANO



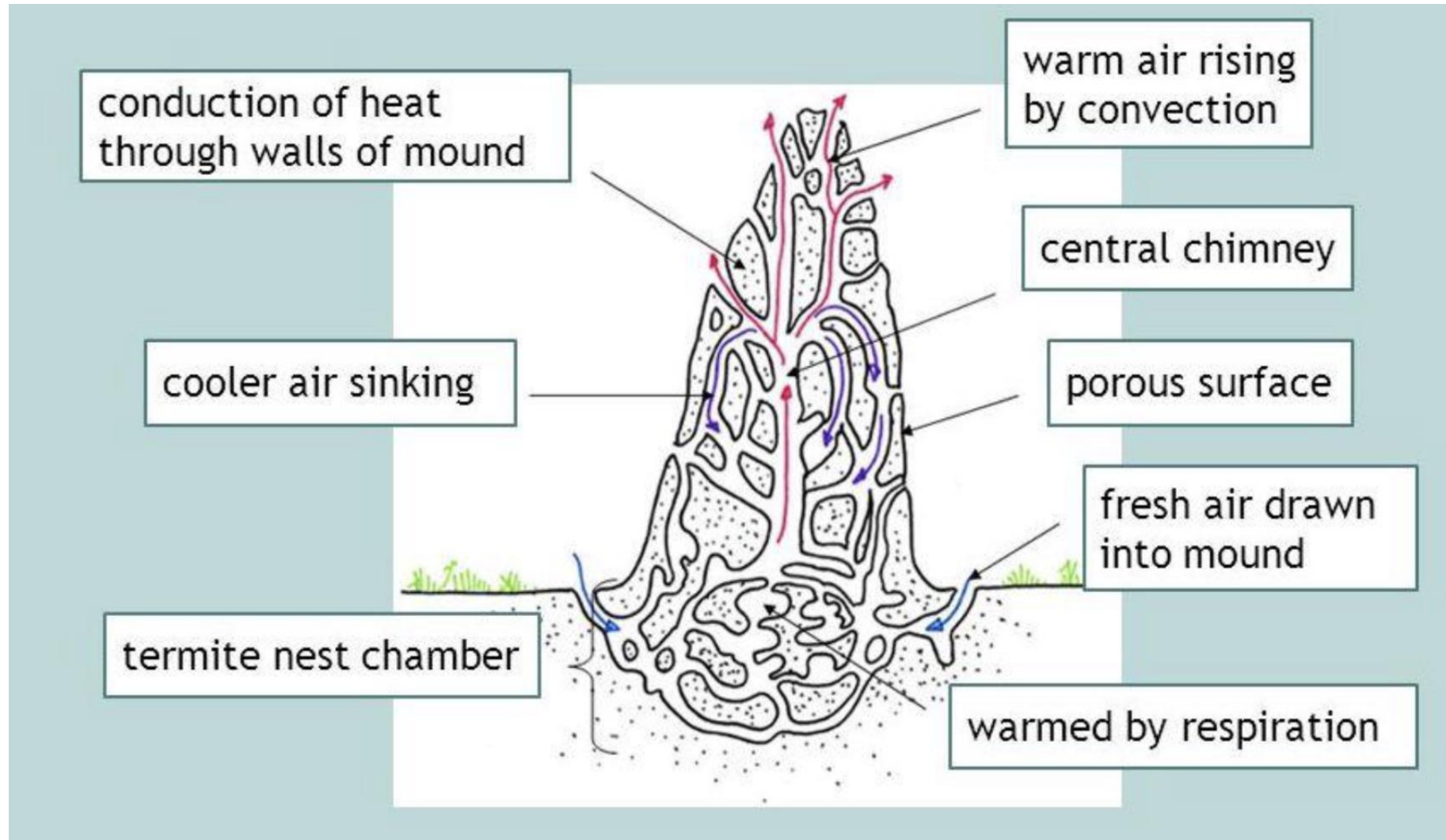


# MAKRO: termiittipesä





# MAKRO: termiittipesä

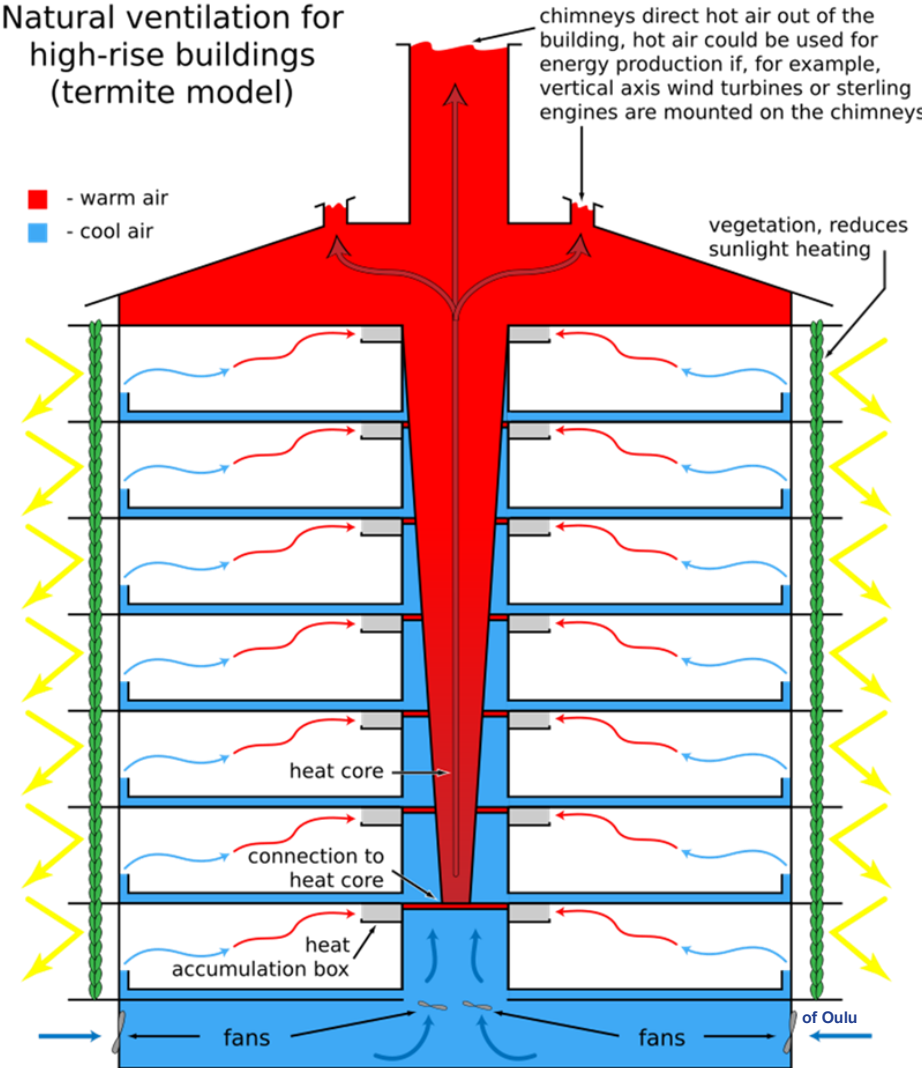




# Eastgate Center, Zimbabwe



Natural ventilation for high-rise buildings (termite model)



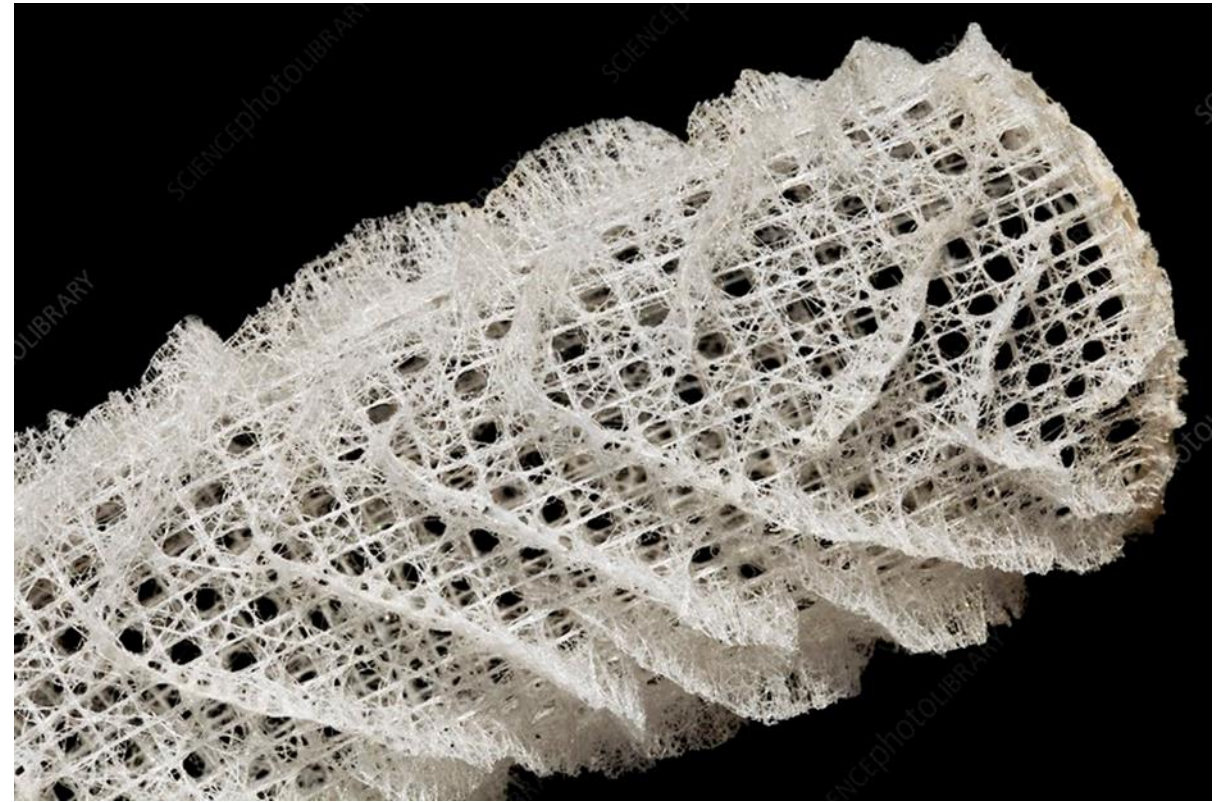


# MAKRO: lasisieni





# Gherkin Building, London

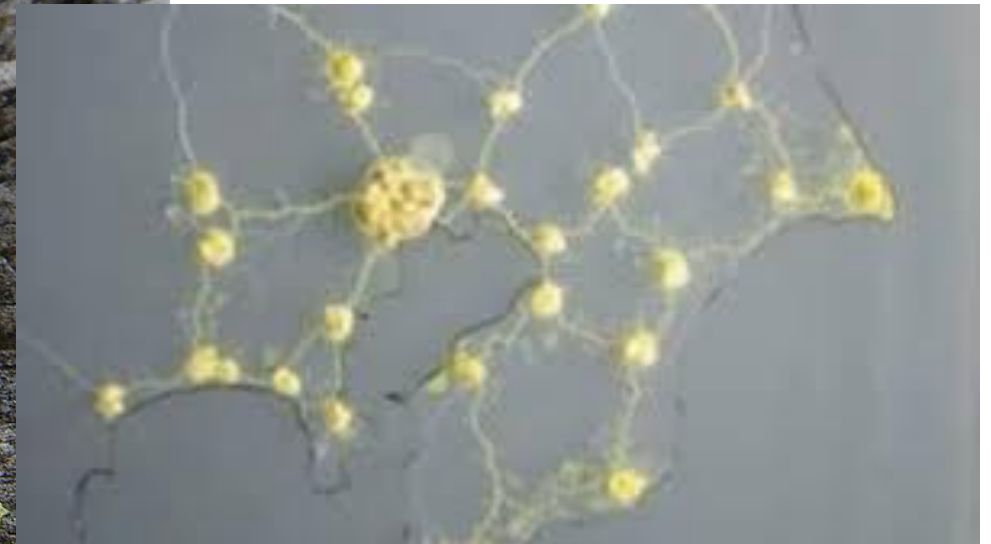




# MAKRO & MIKRO



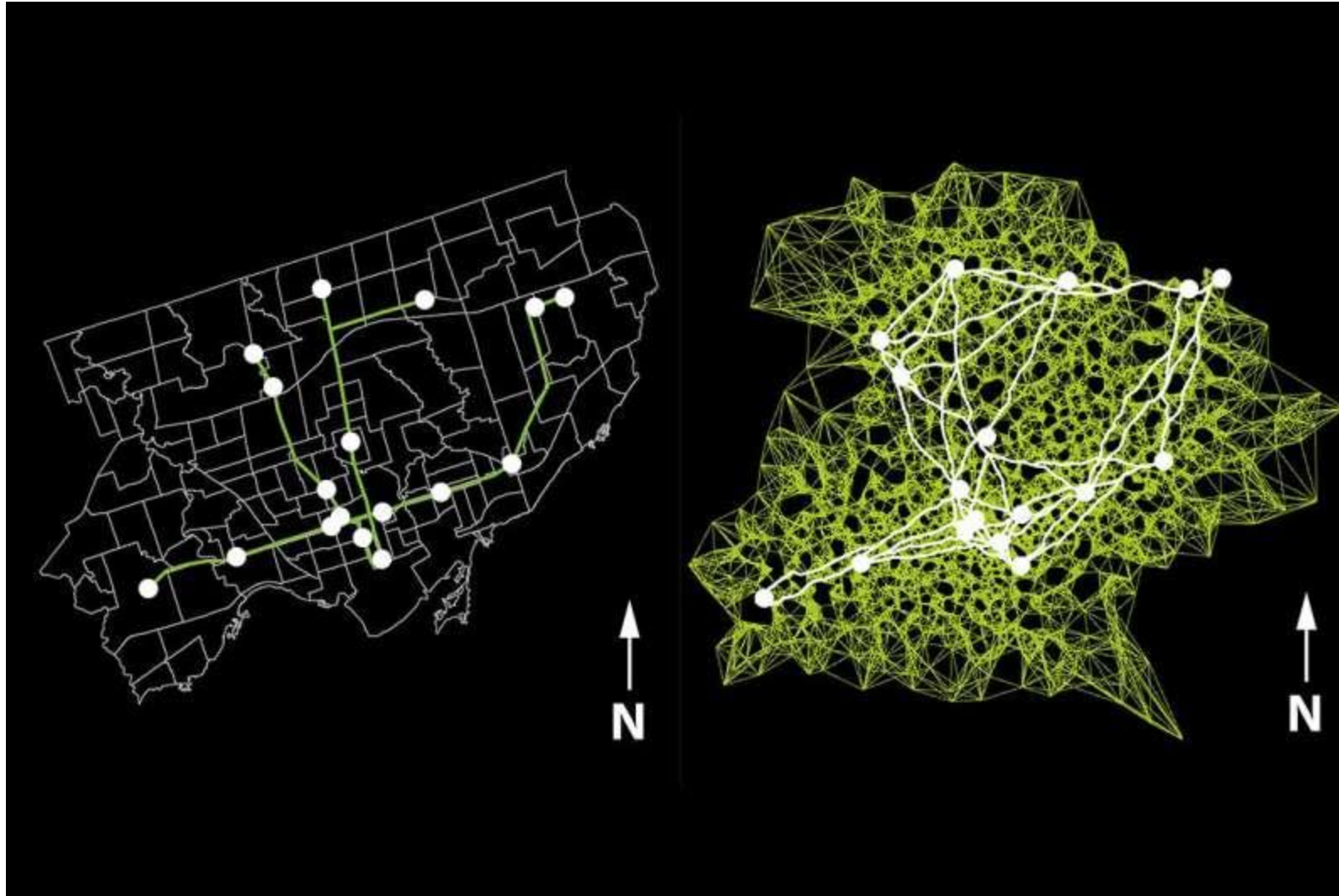
# LIMASIENI & KAUPUNKISUUNNITTELU







# SIMULOITU LIMASIENI





# MIKRO



# MIKRO: takiaainen



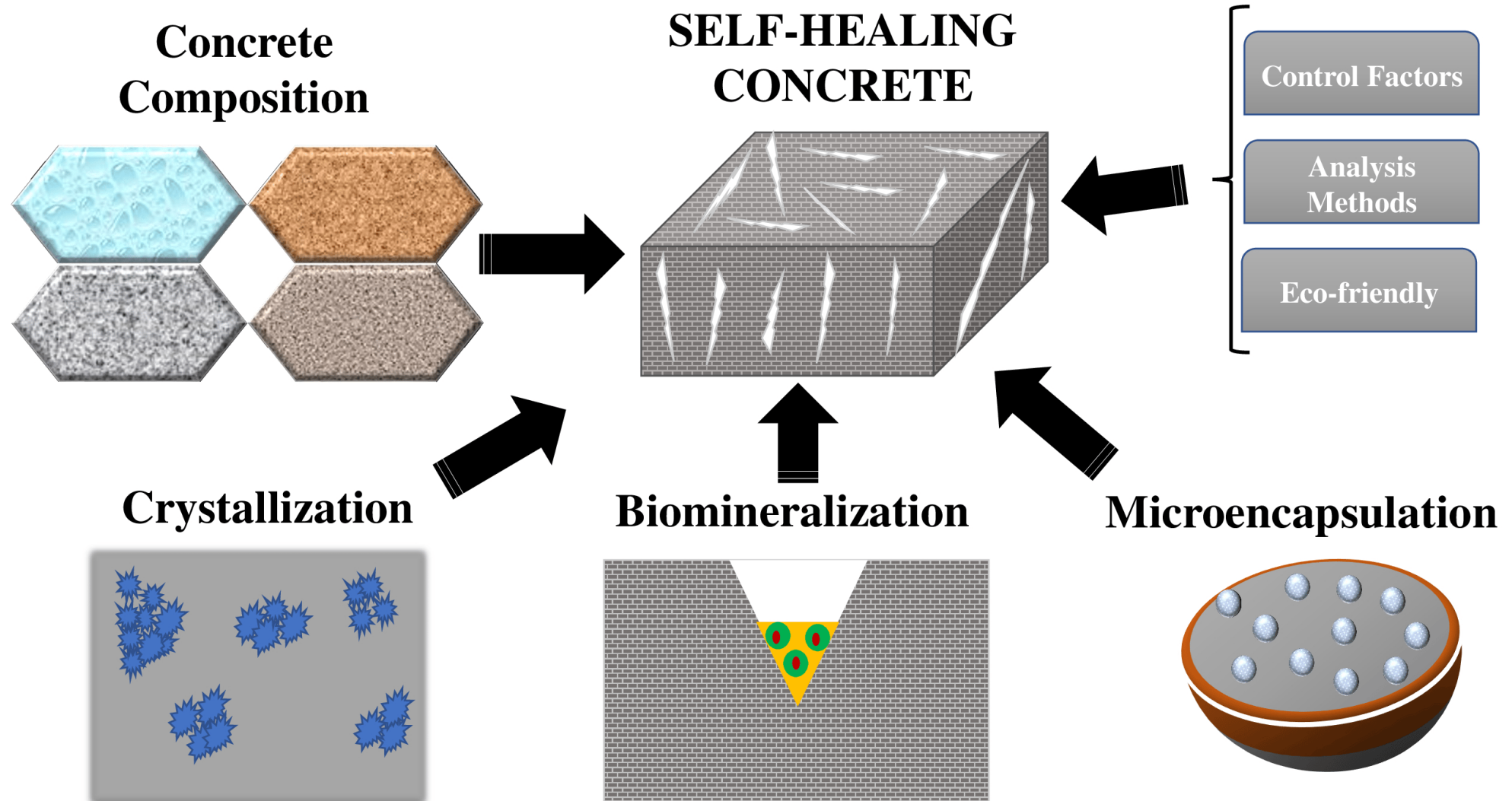


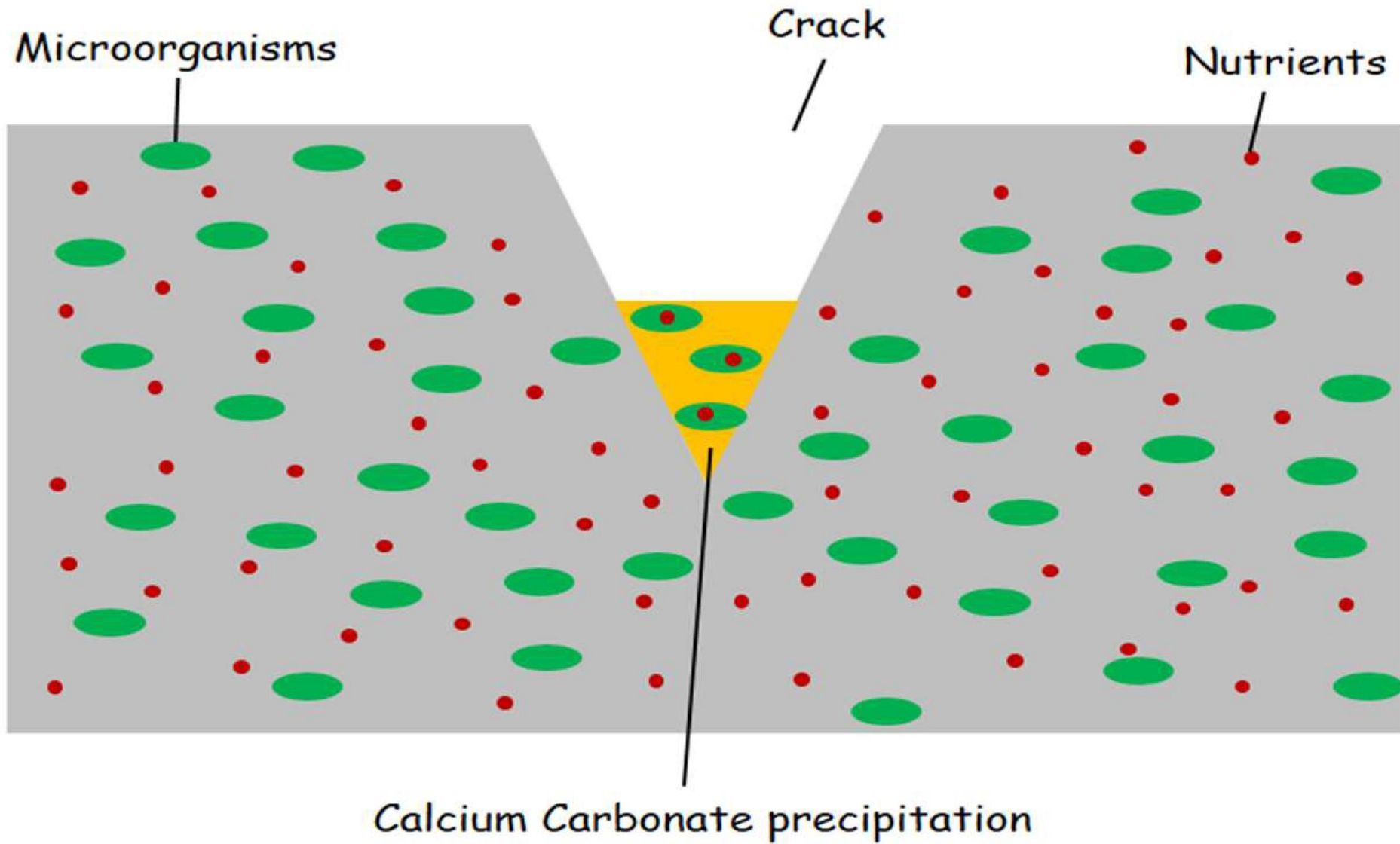
# MIKRO: Velcron





# MIKRO: itsekorjautuva betoni







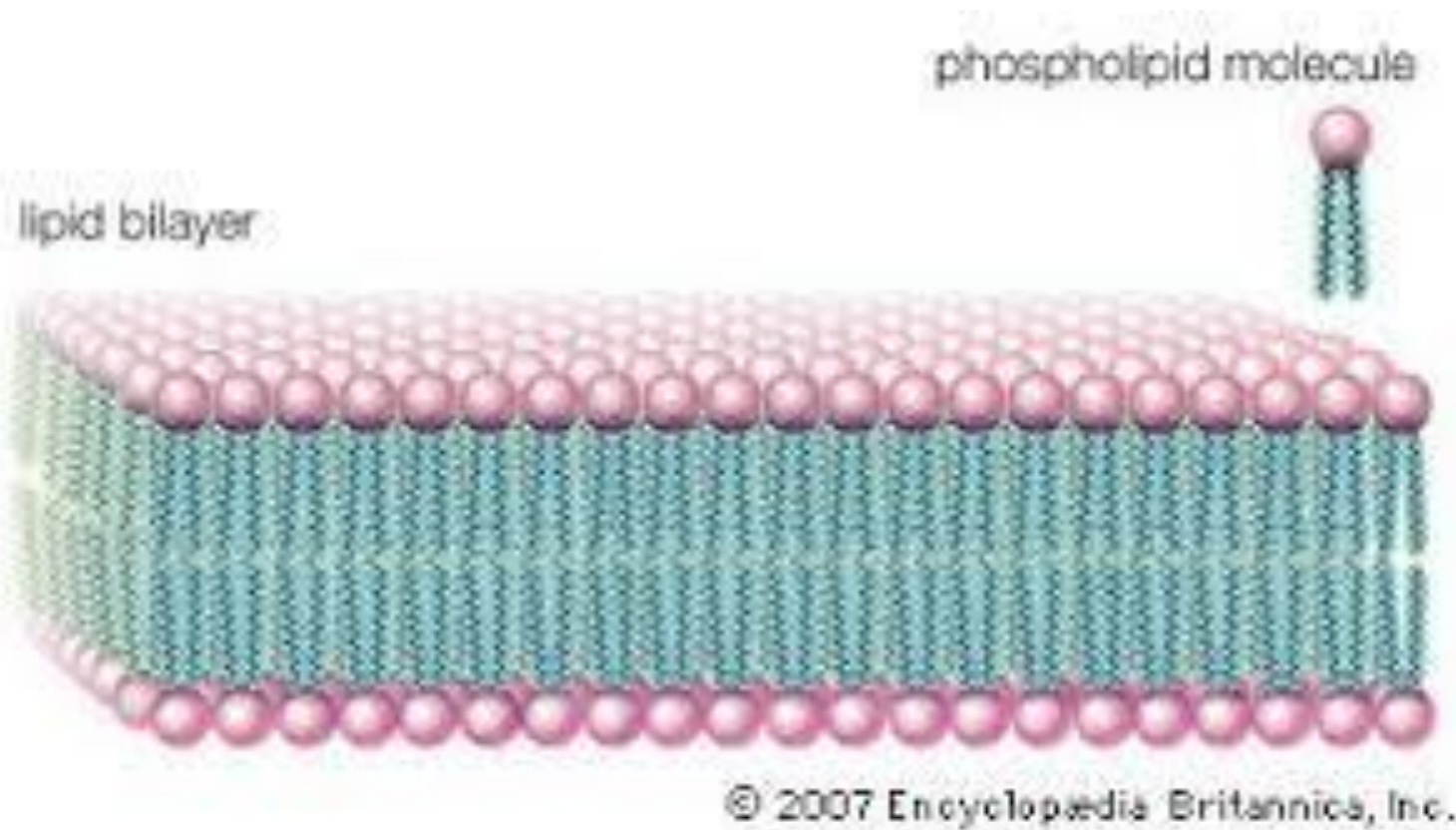
# NANO



# NANO: biologinen membraani

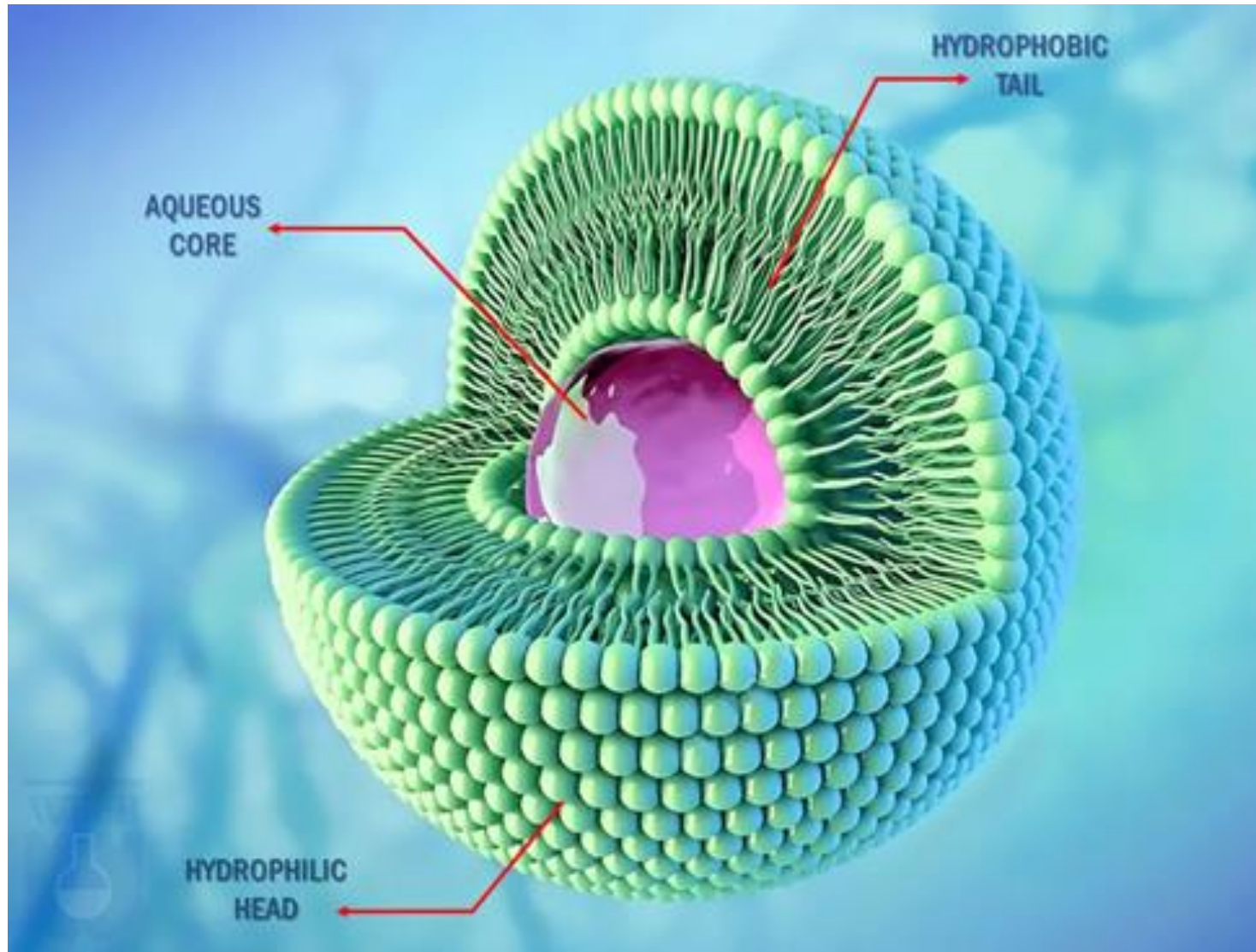


# NANO: biologinen membraani





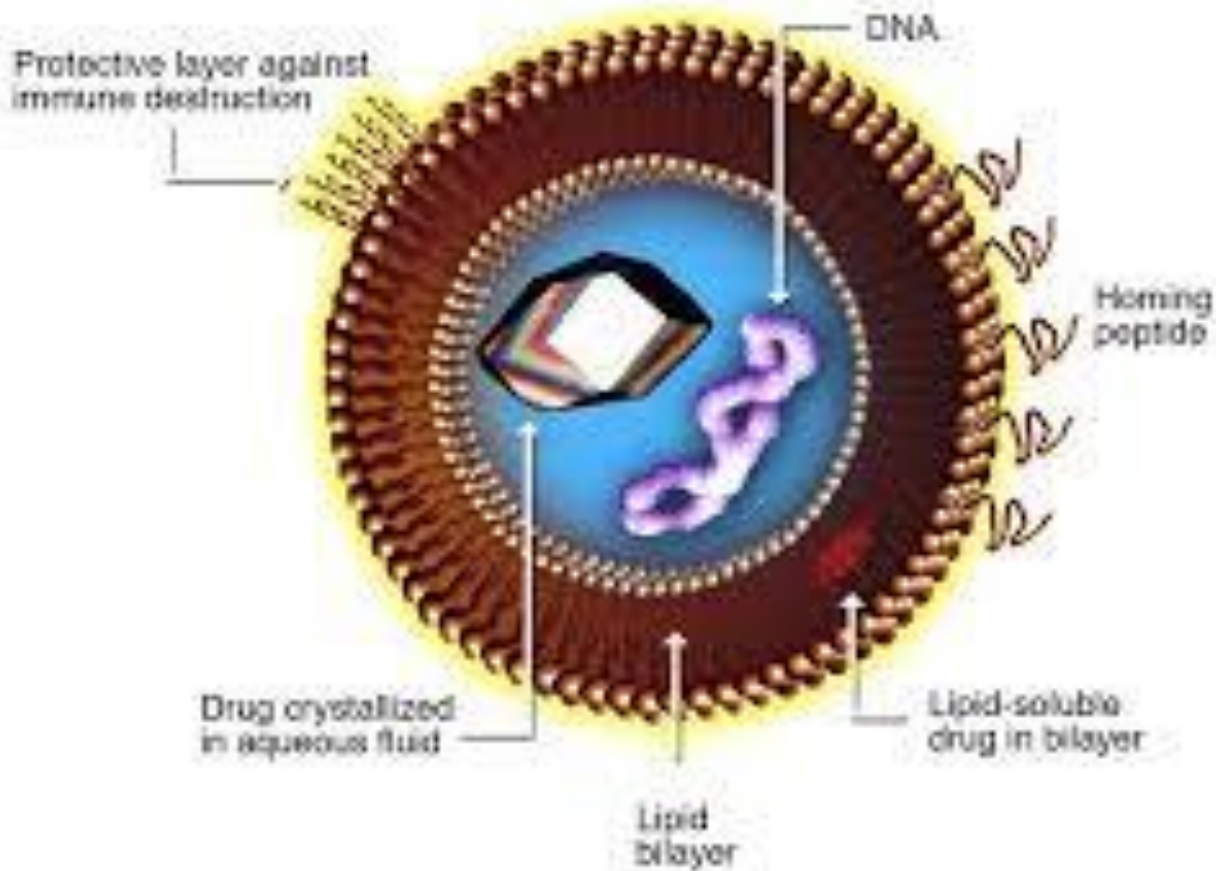
# NANO: vesikkelit ja liposomit





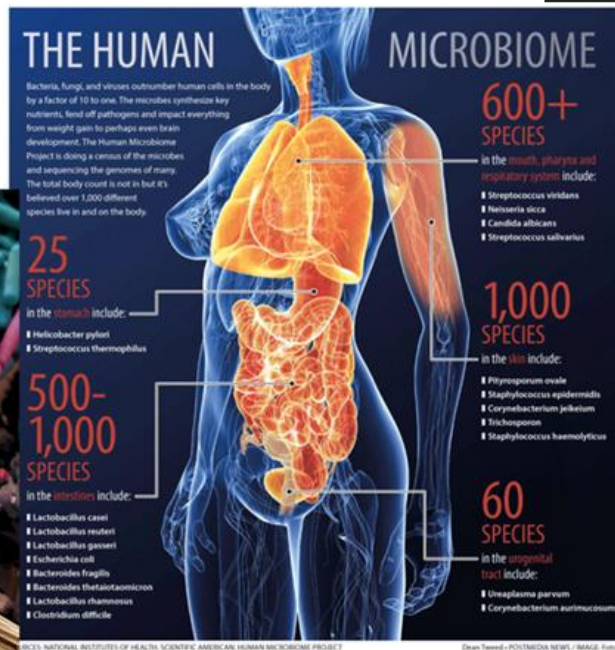
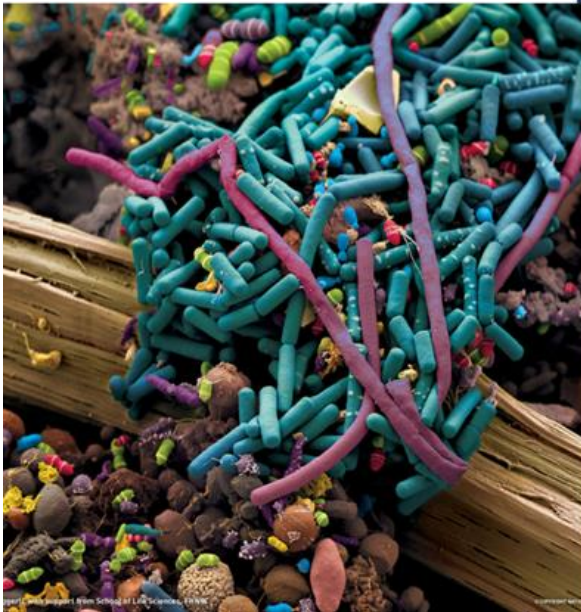
# NANO: liposomit lääkekuljettimina

Liposome for Drug Delivery





# IHMISEN MIKROBISTO INSPIRAATIONA



**10,000**

Species of microbes that healthy people can share their bodies with

**2-6 lbs.**

Weight of bacteria on a 200-pound human

**200**

Scientists from 80 research institutions worked together for five years on 242 sub

**WALL STREET JOURNAL July 14<sup>th</sup>**





# BAKTEERIVESIKKELIT

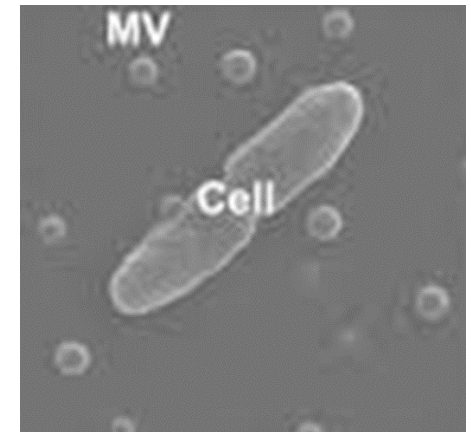
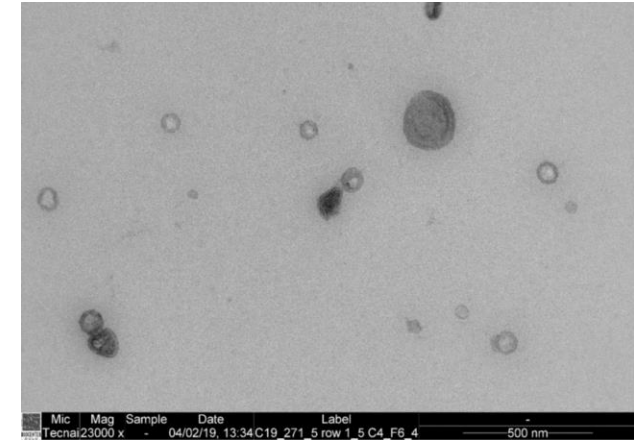
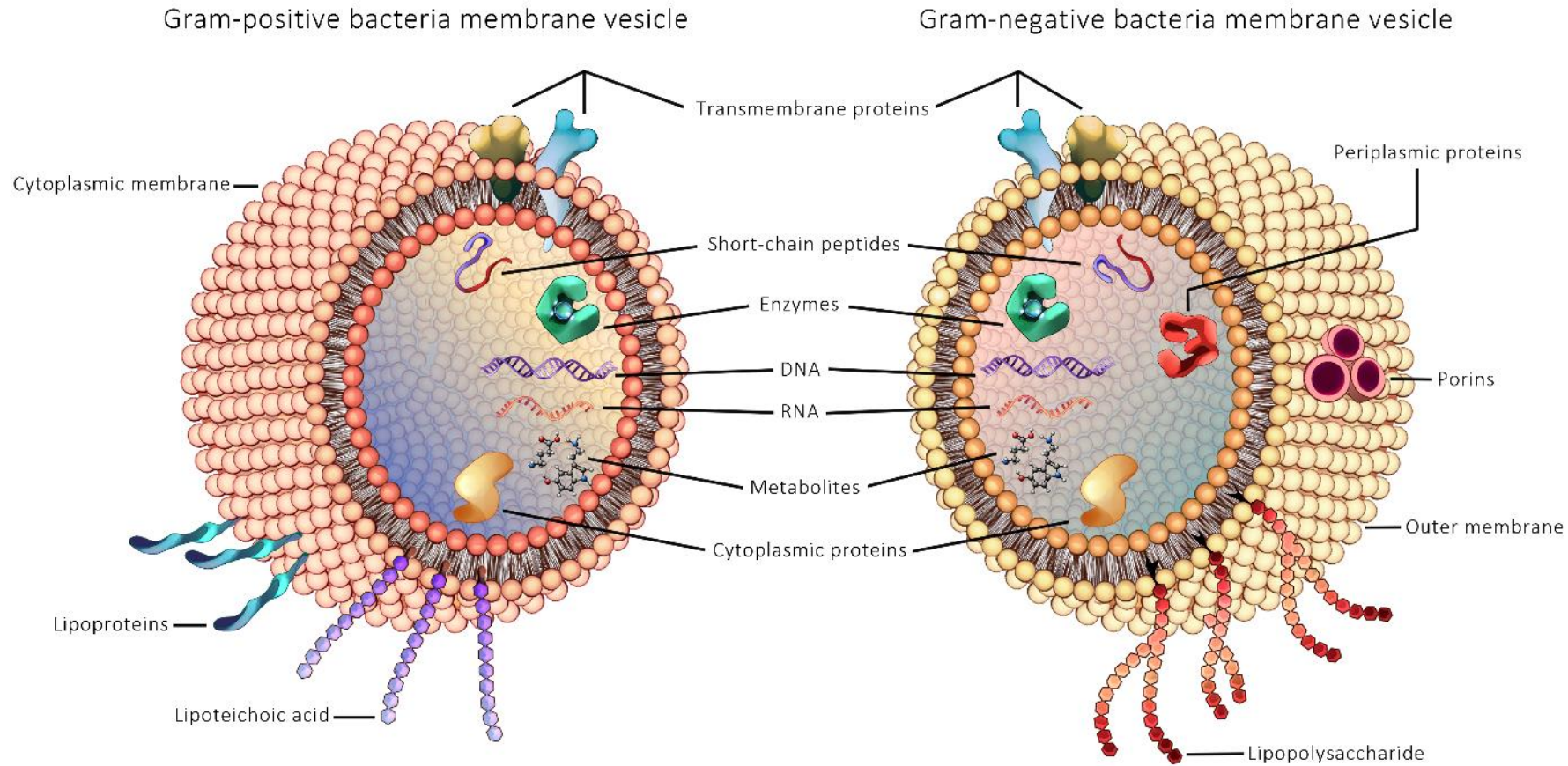
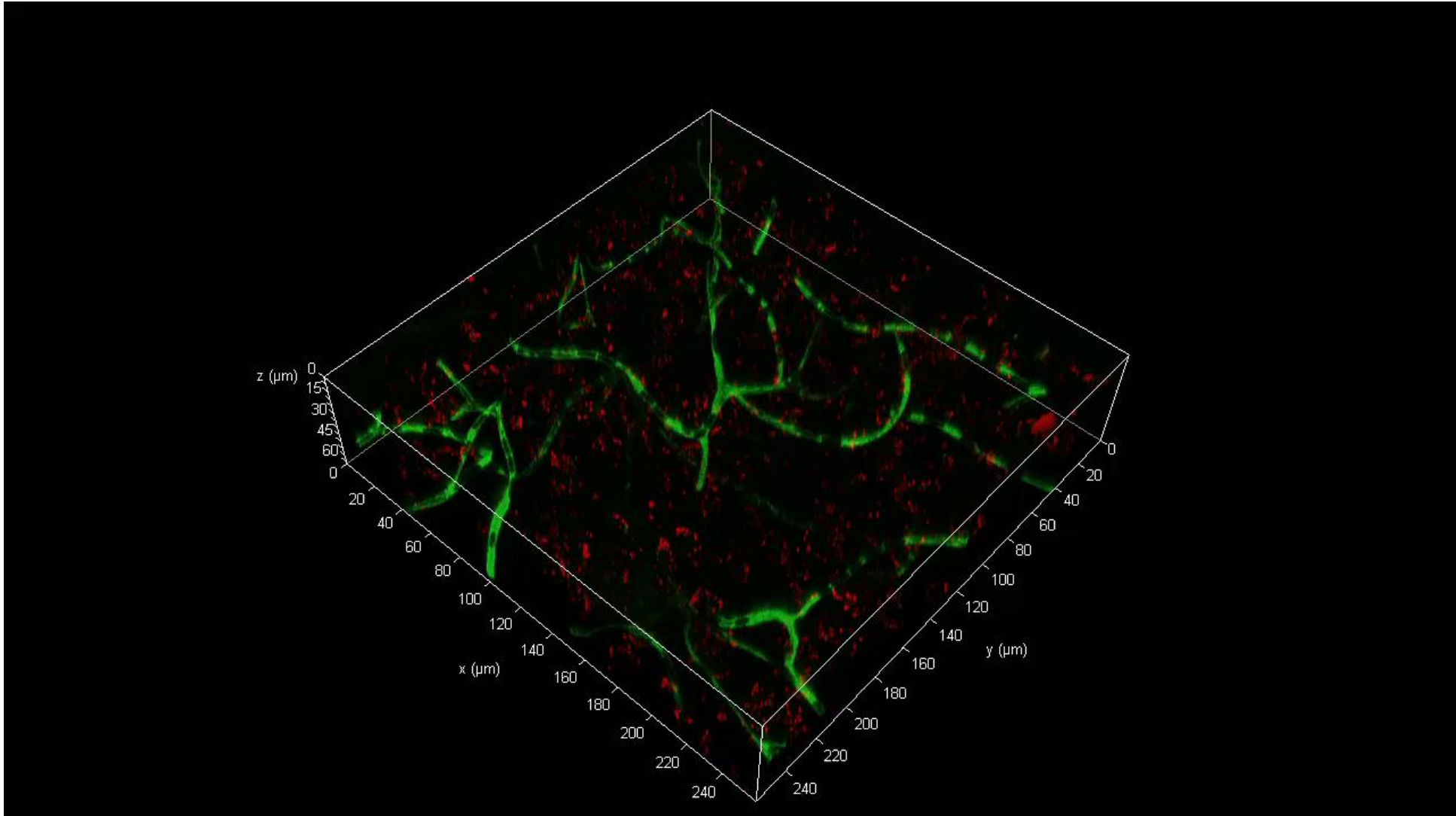


Image from: Amatya et al., 2021



# BAKTEERIVIVESIKKELIT





# TAVOITTEITA

- Uusia liposomikonstruktioita
- Uusia targetointimolekyylejä
- Biologisten esteiden ylitys
- DNA- vs RNA-liposomit

*Liposomien syntetisointi & pakkaaminen & funktionalisointi*

