Medicines from the Sea – Microbial Natural Product Discovery

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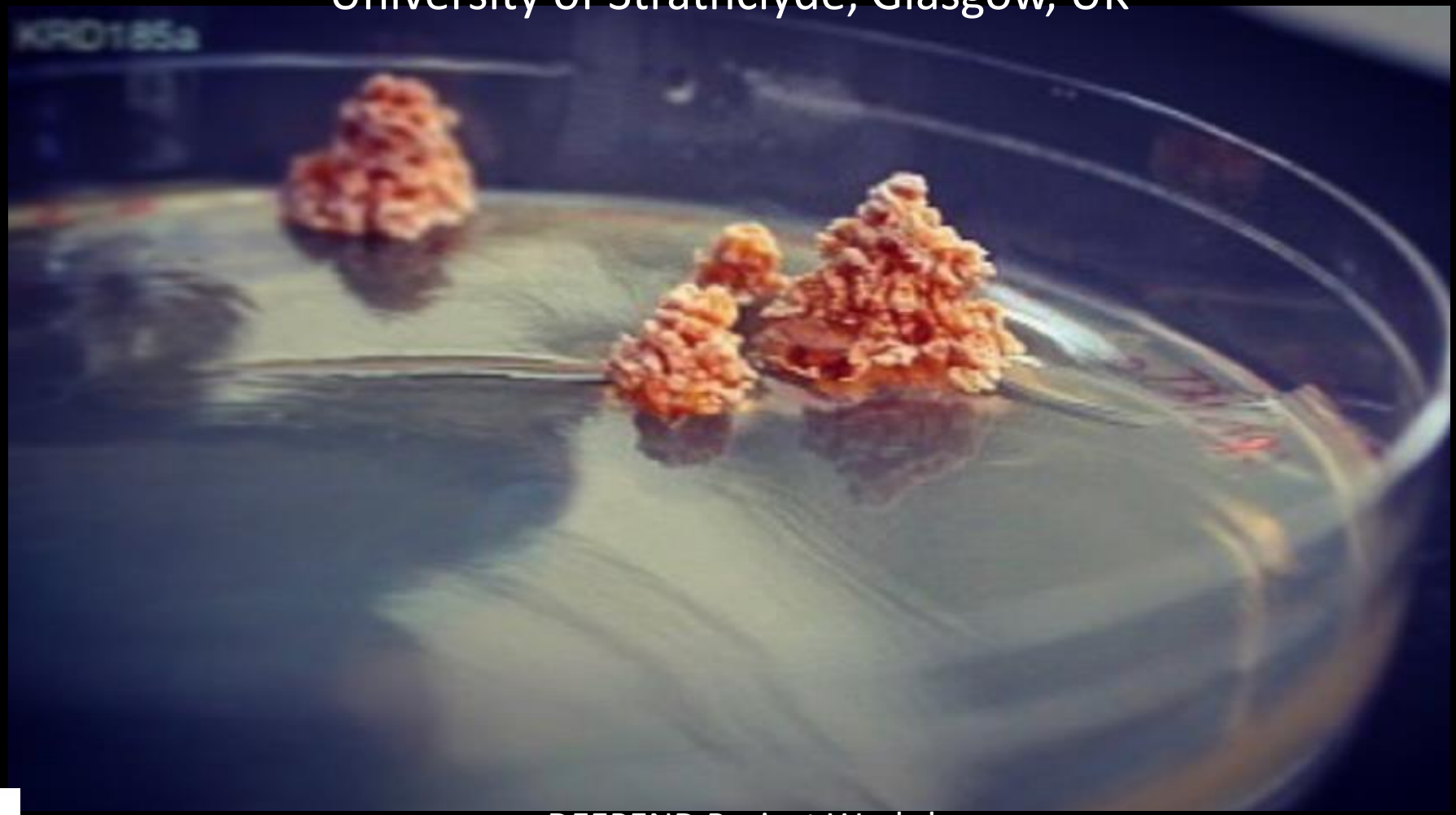

DEEPEND Project Workshop
5-6 December 2022 in Aitutaki, Cook Islands

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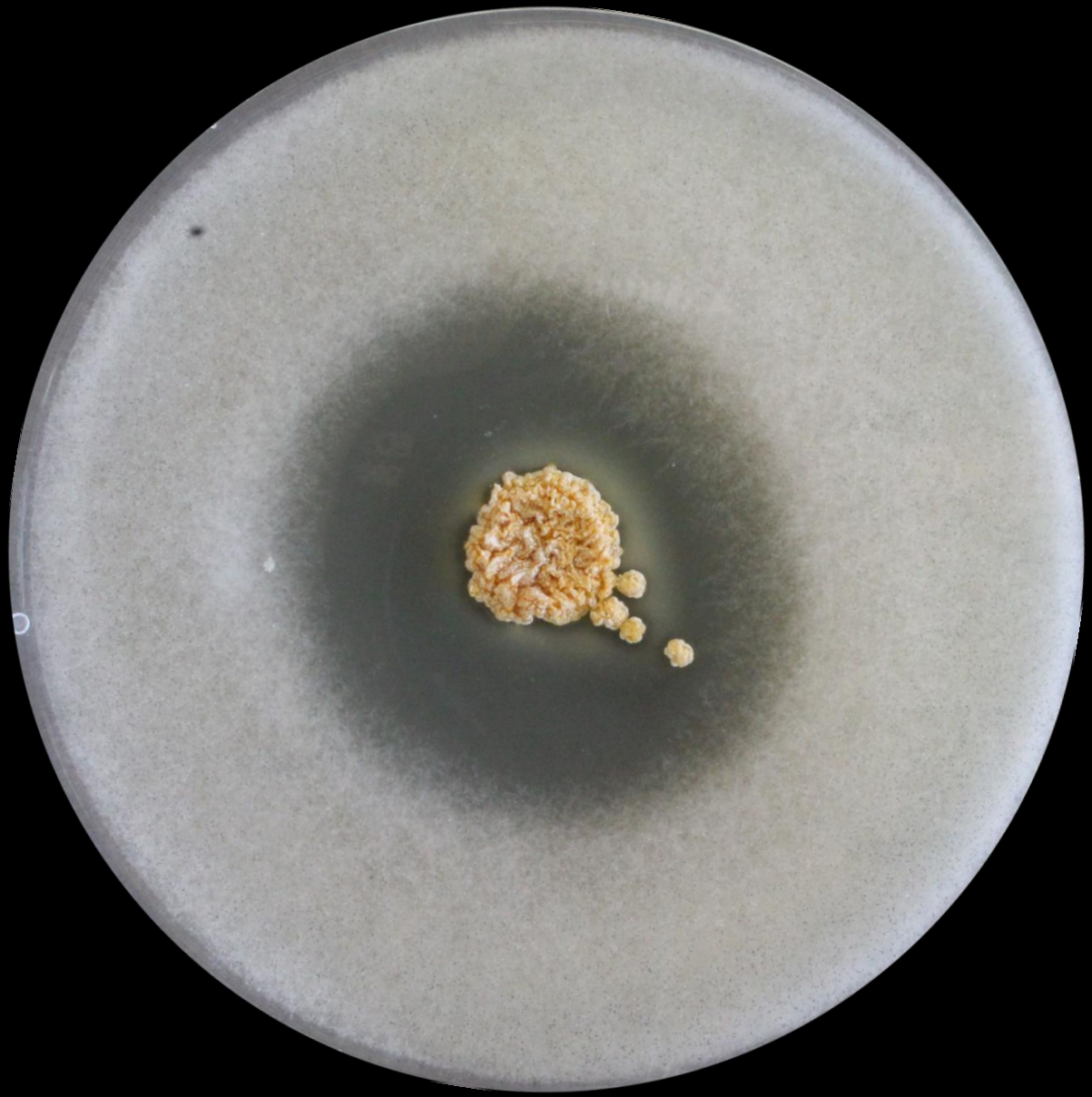
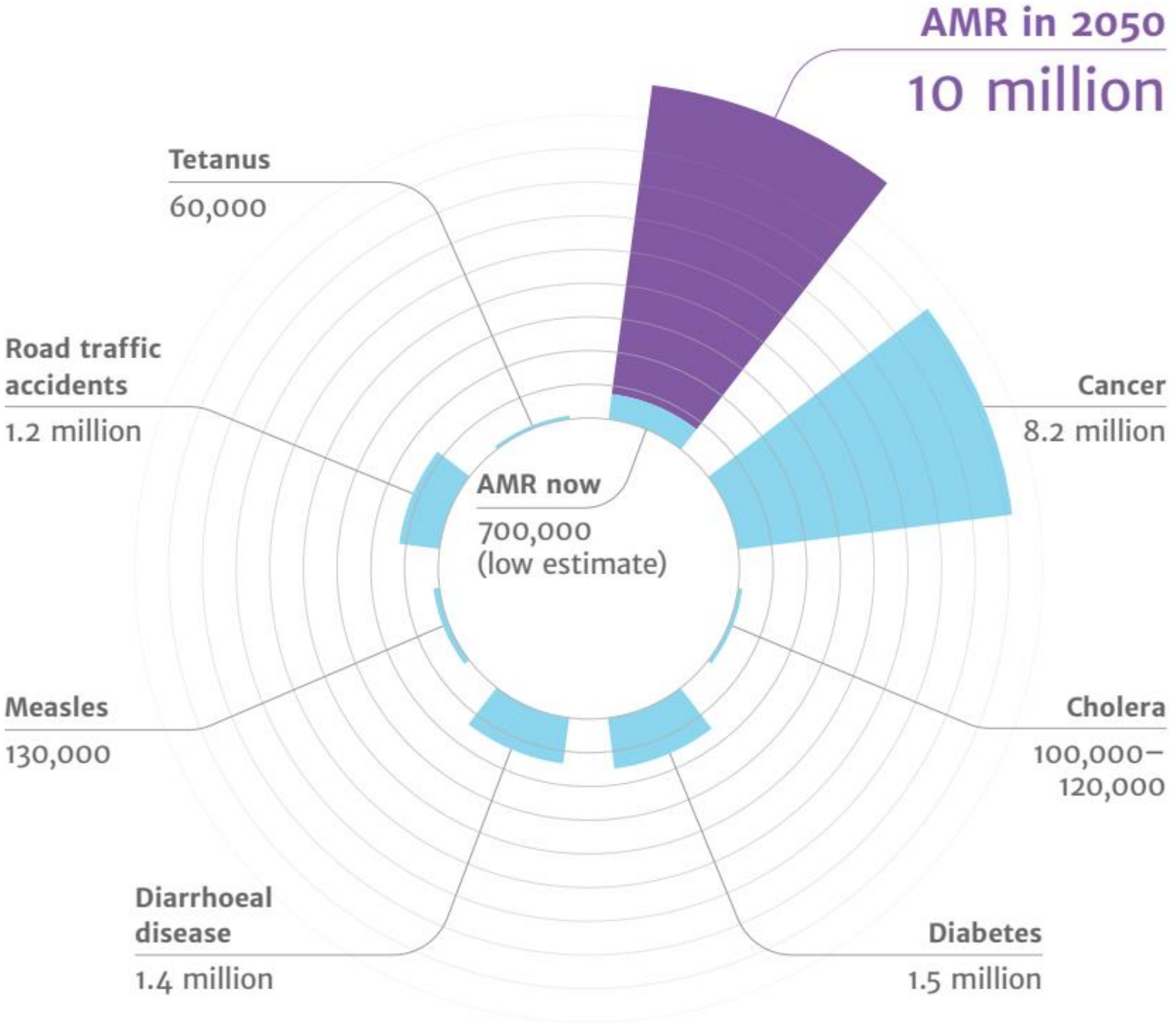
University of Strathclyde





O'Neil Report, 2016

Discovery

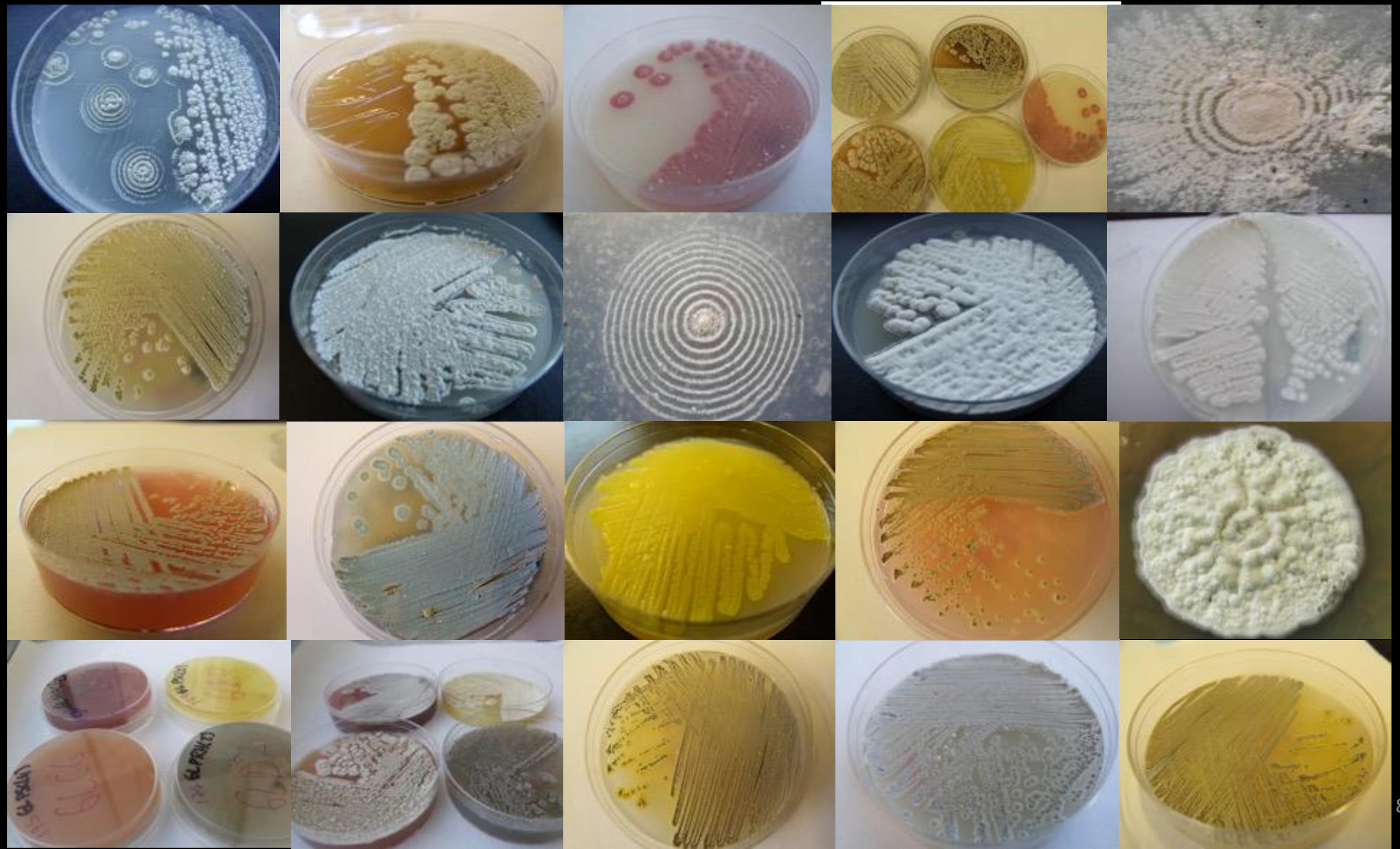
1,500 to 27,000 years ago
Up to 4,500m below sea level

Photo: K. Duncan

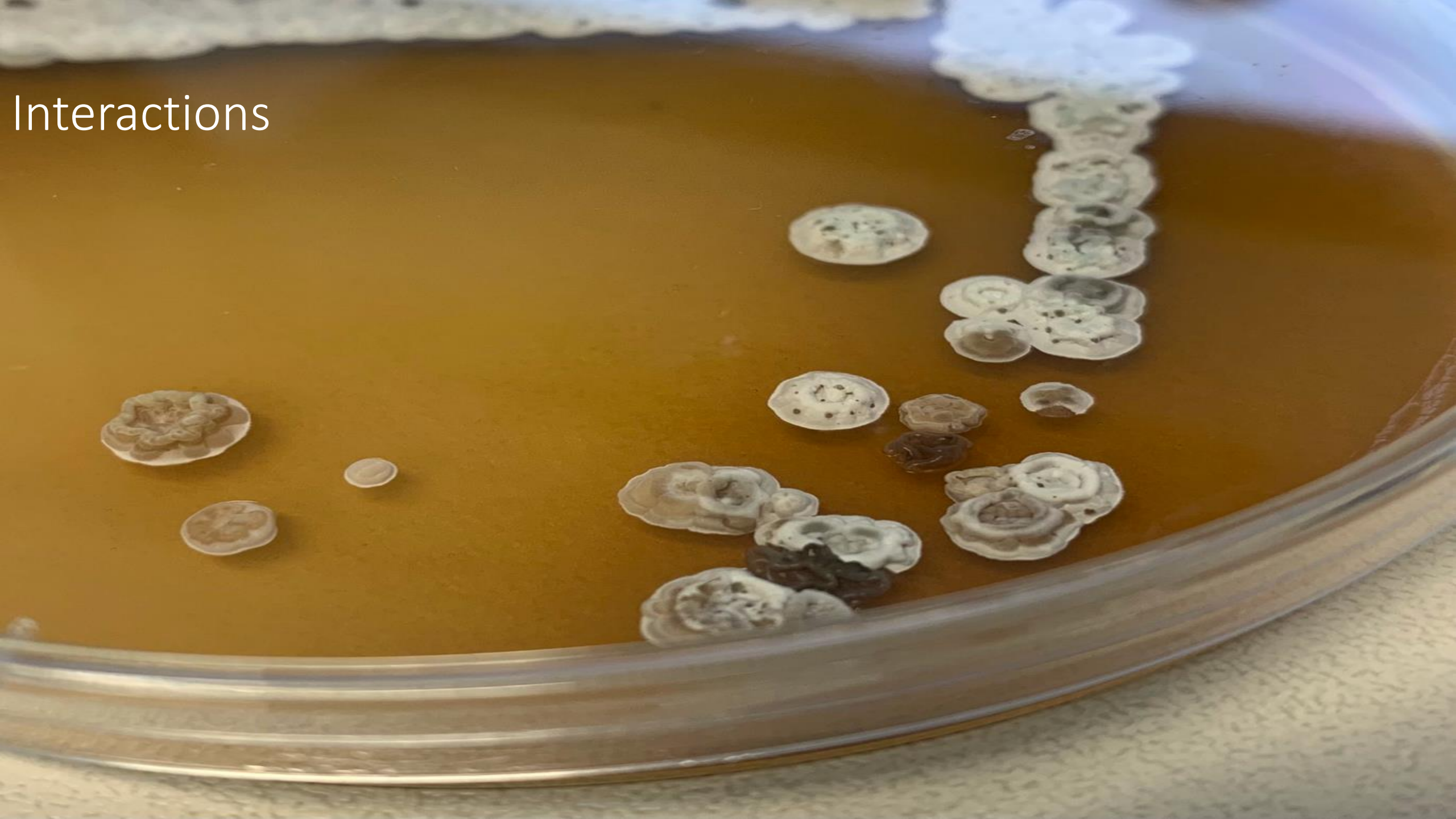

Caledonian MacBrayne

Microbial Biodiversity

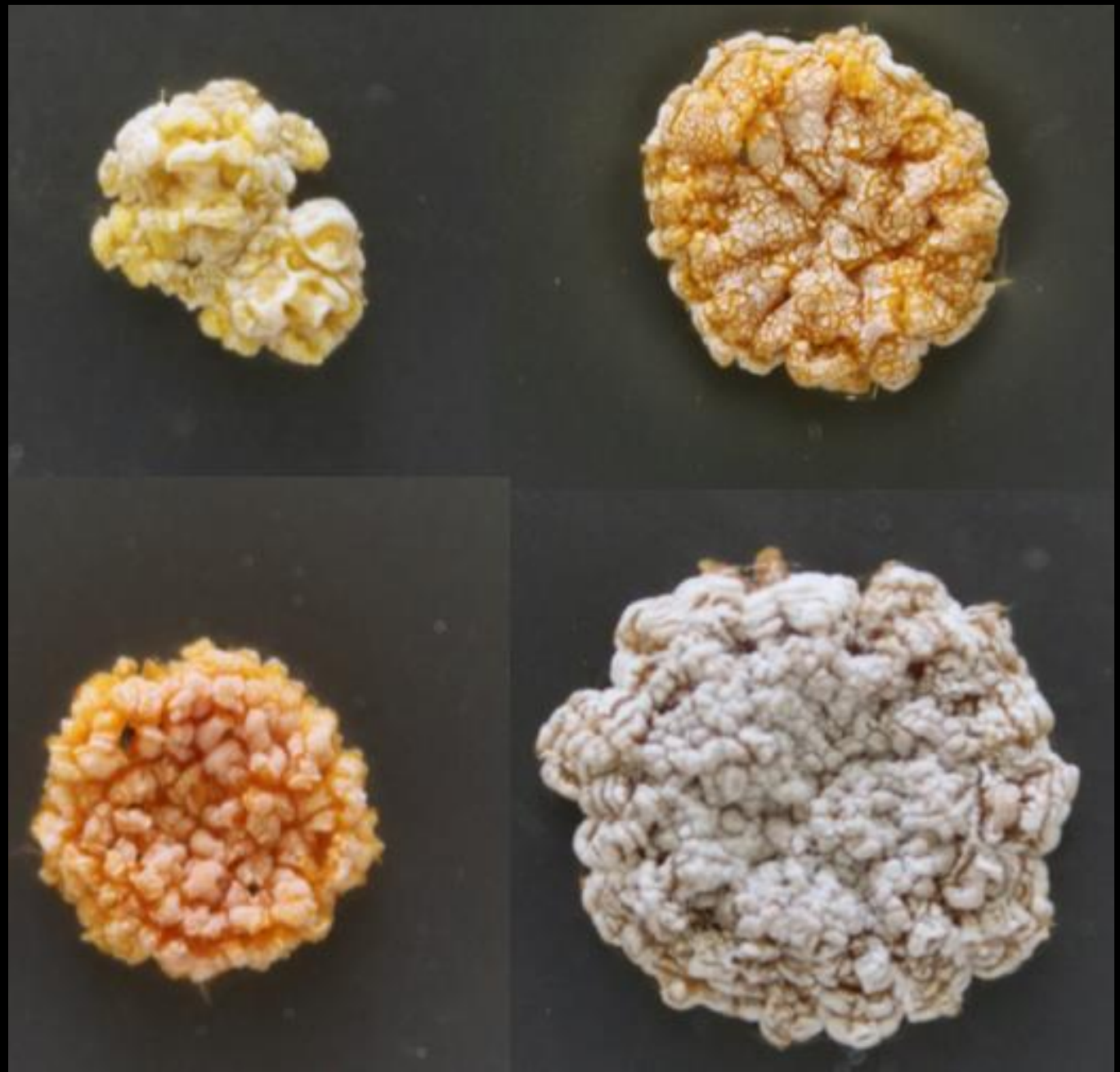
Microbial Chemists: *Streptomyces*



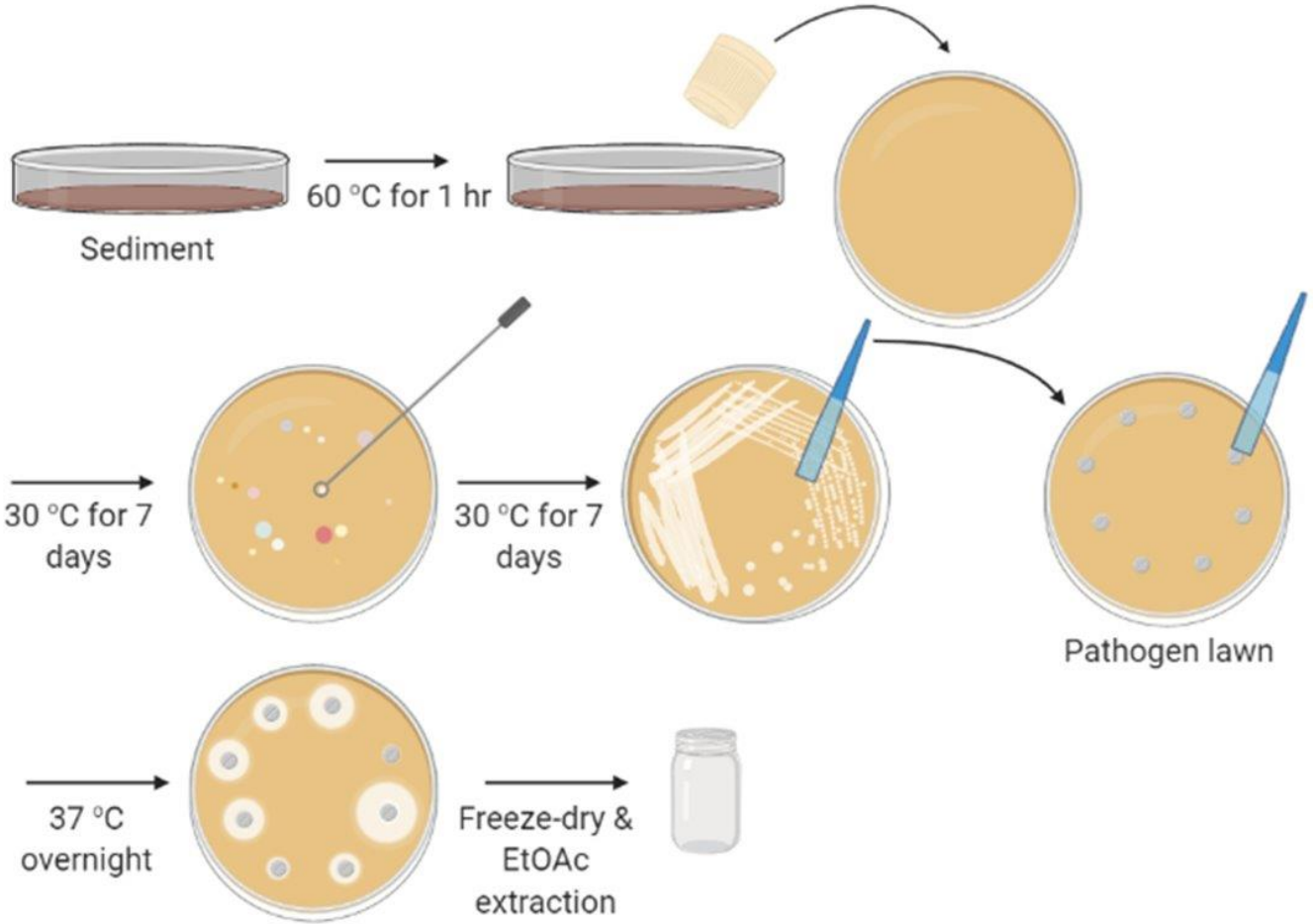
Interactions

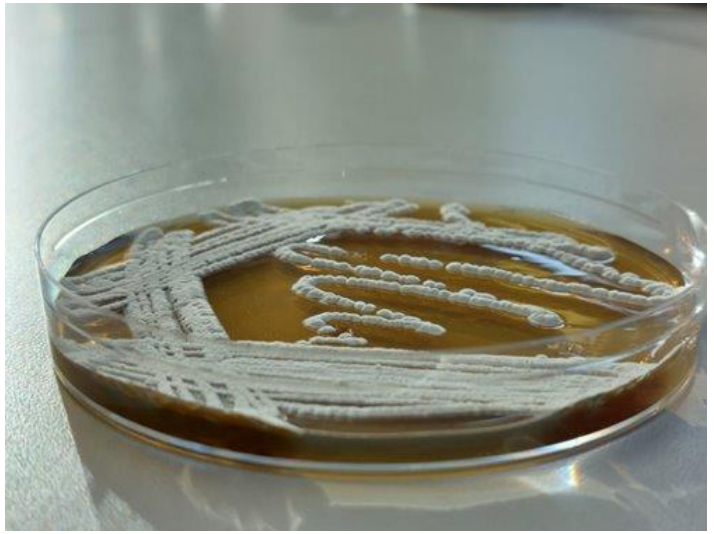


Microbial Chemists: ‘rare’ actinomycetes

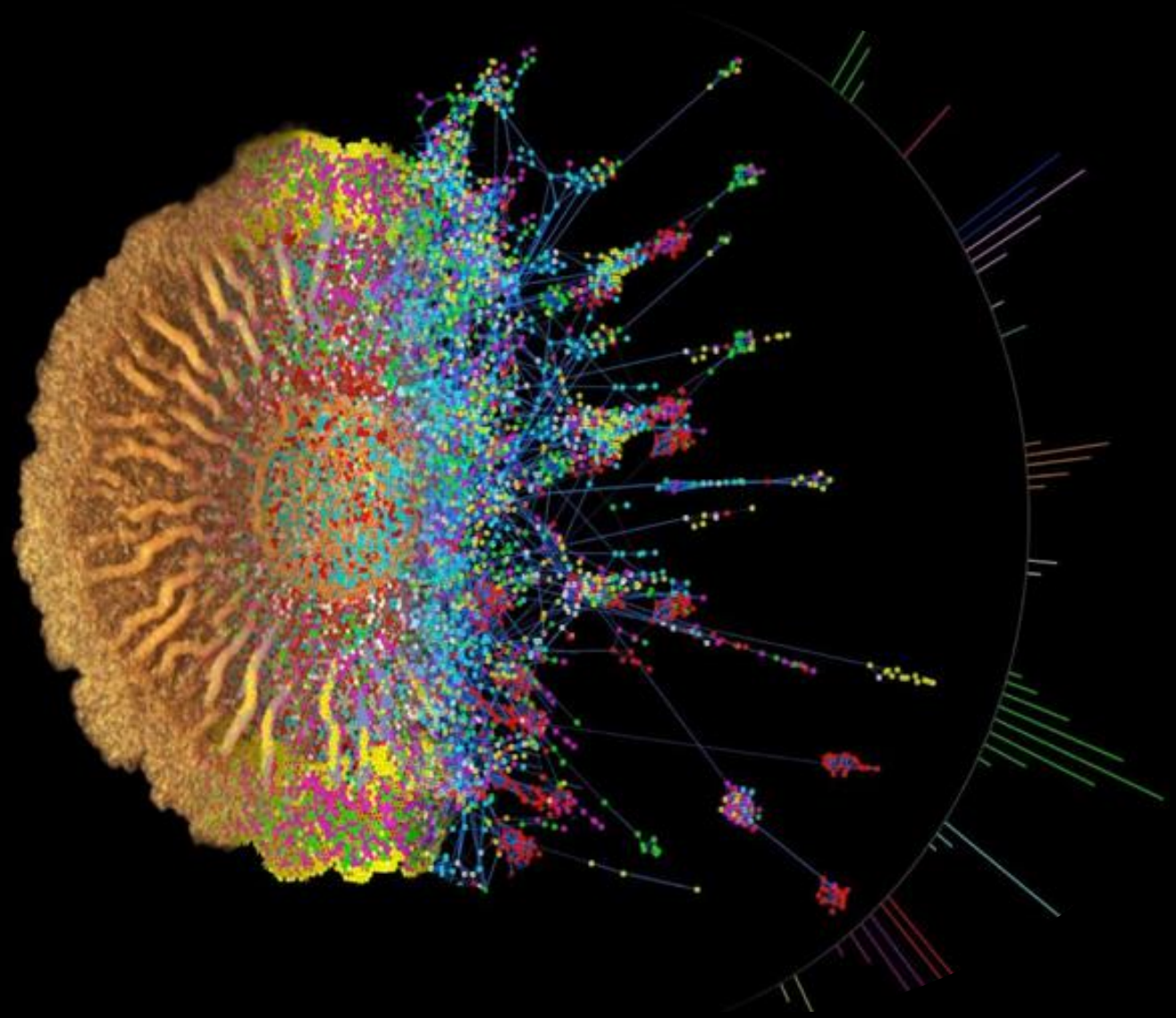


Isolating bacteria





Microbial Chemistry (in Nature)



Phylogeny

Community (biotic)

Biogeography

Environment (abiotic)

Spatial resolution

Timeframe

What Influences Chemistry?

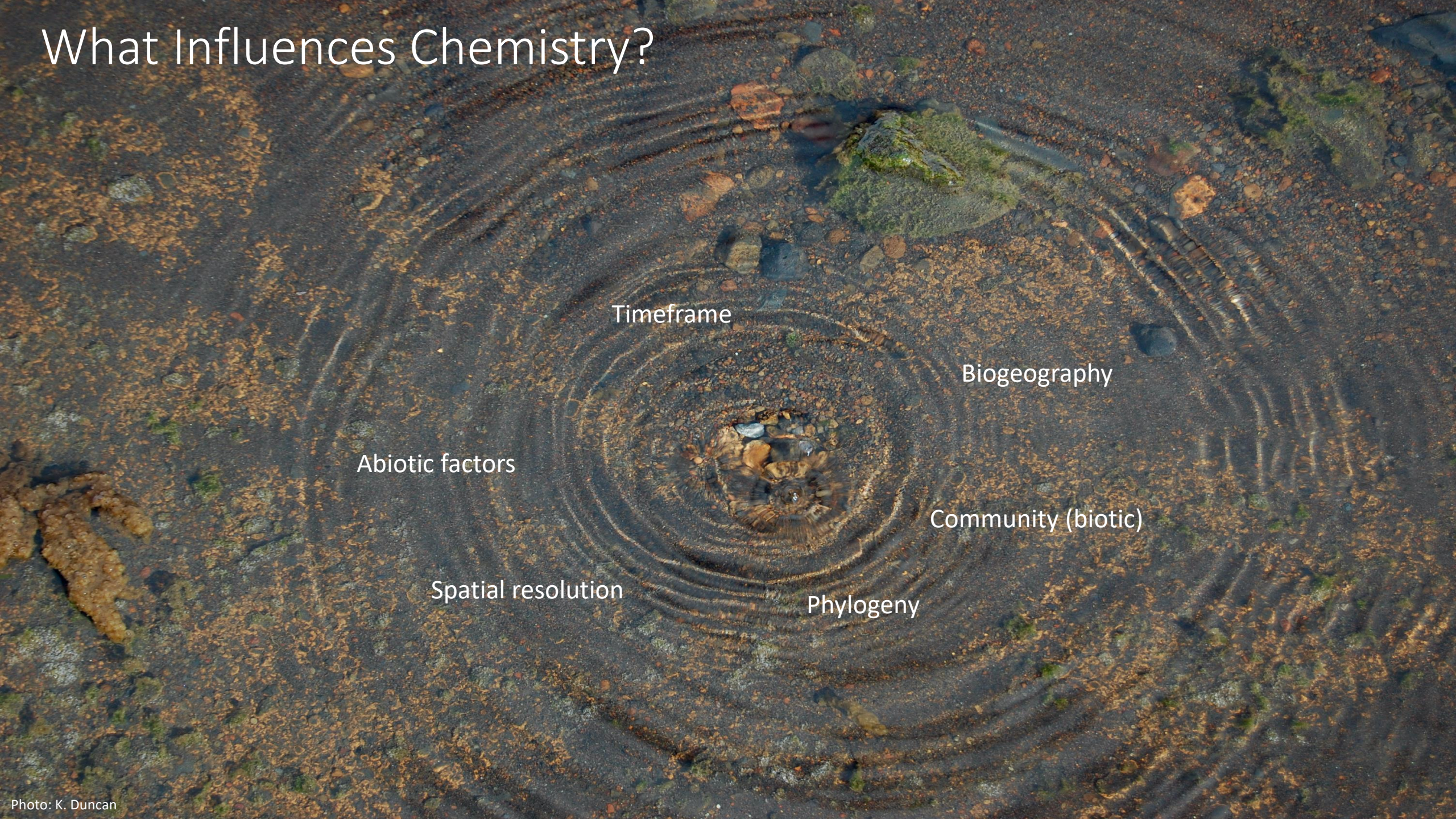
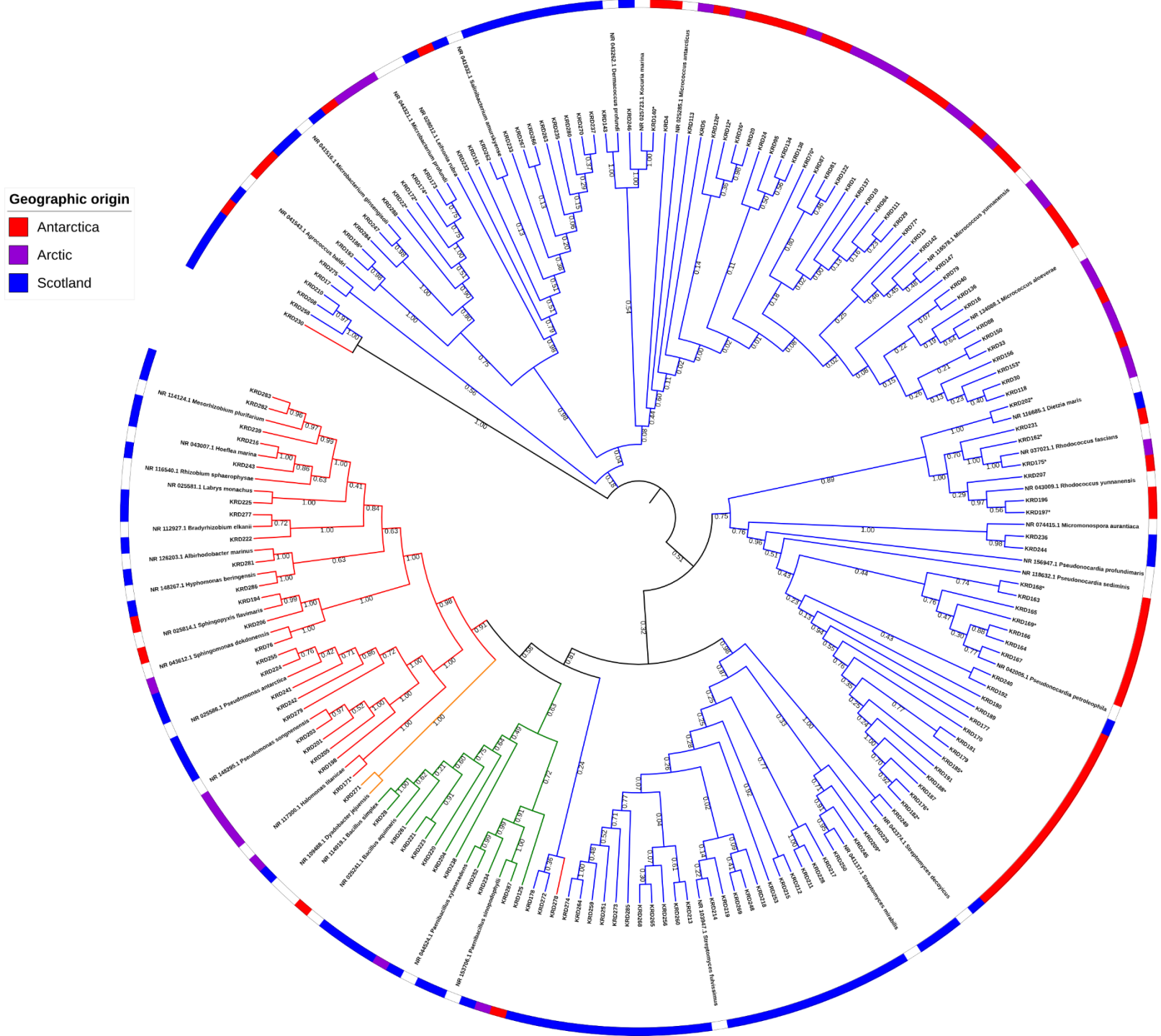
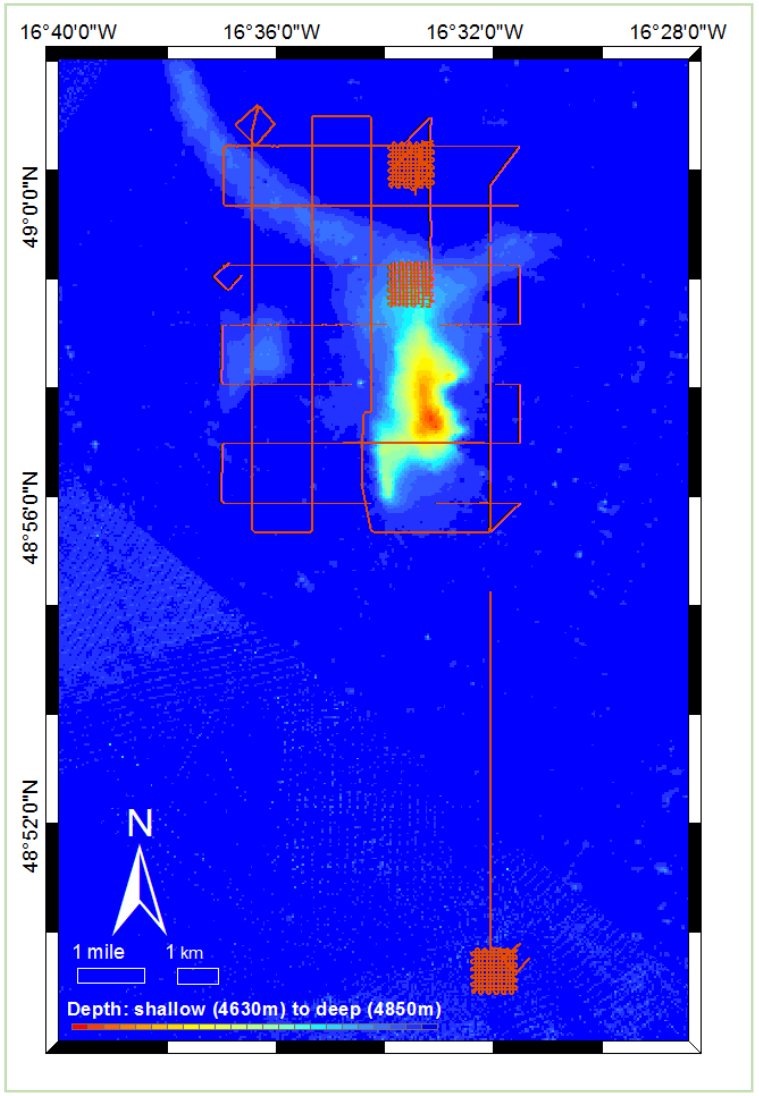
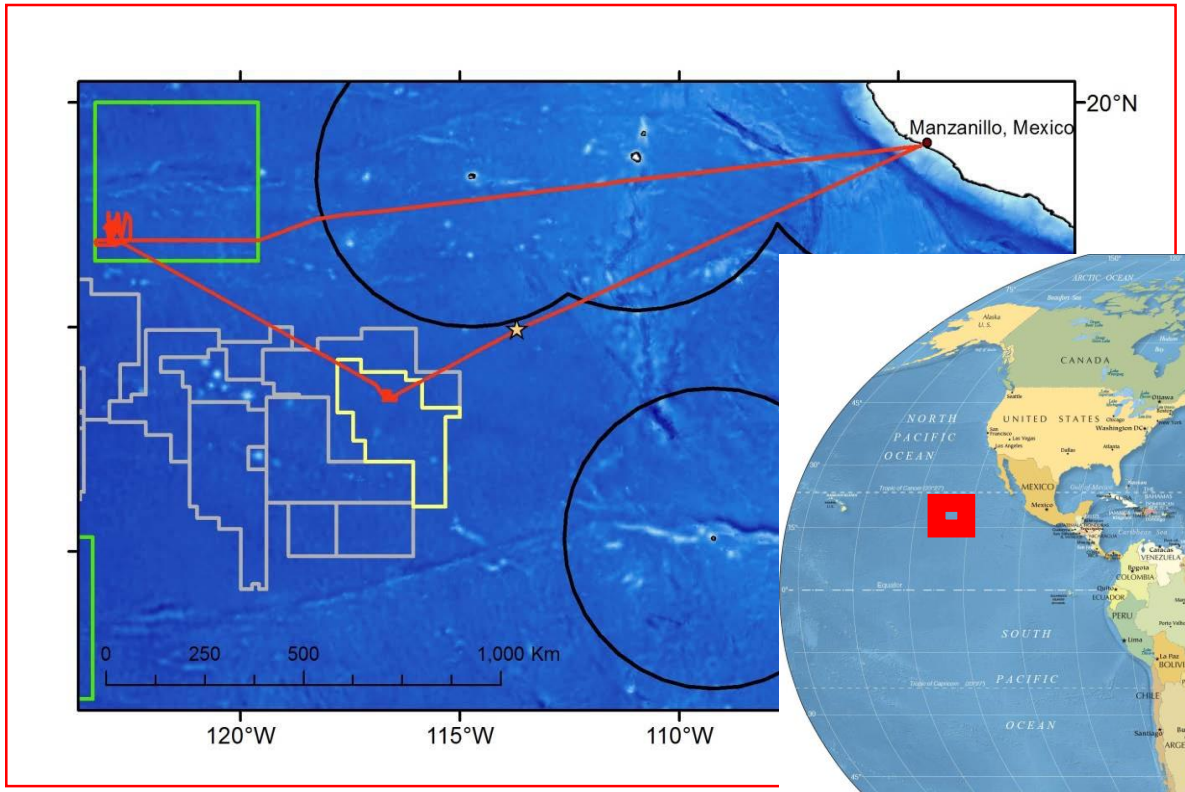


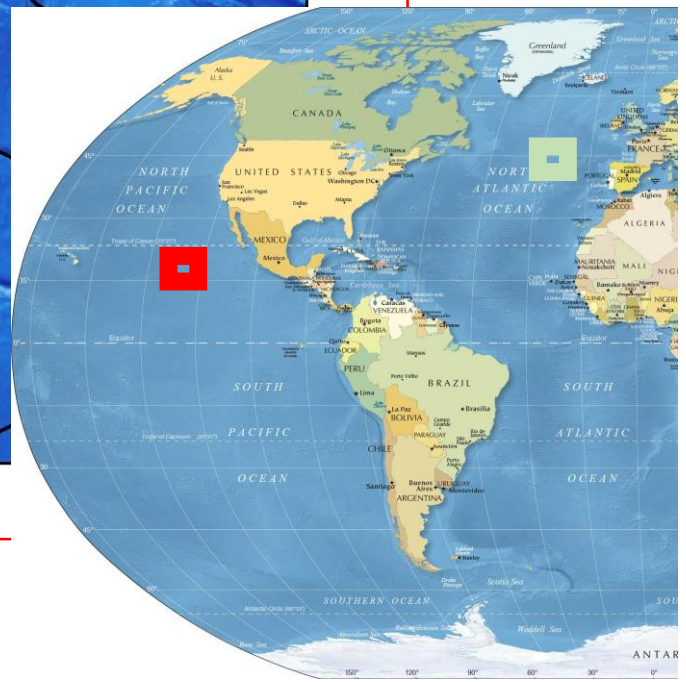
Photo: K. Duncan


Geographic origin
Antarctica
Arctic
Scotland

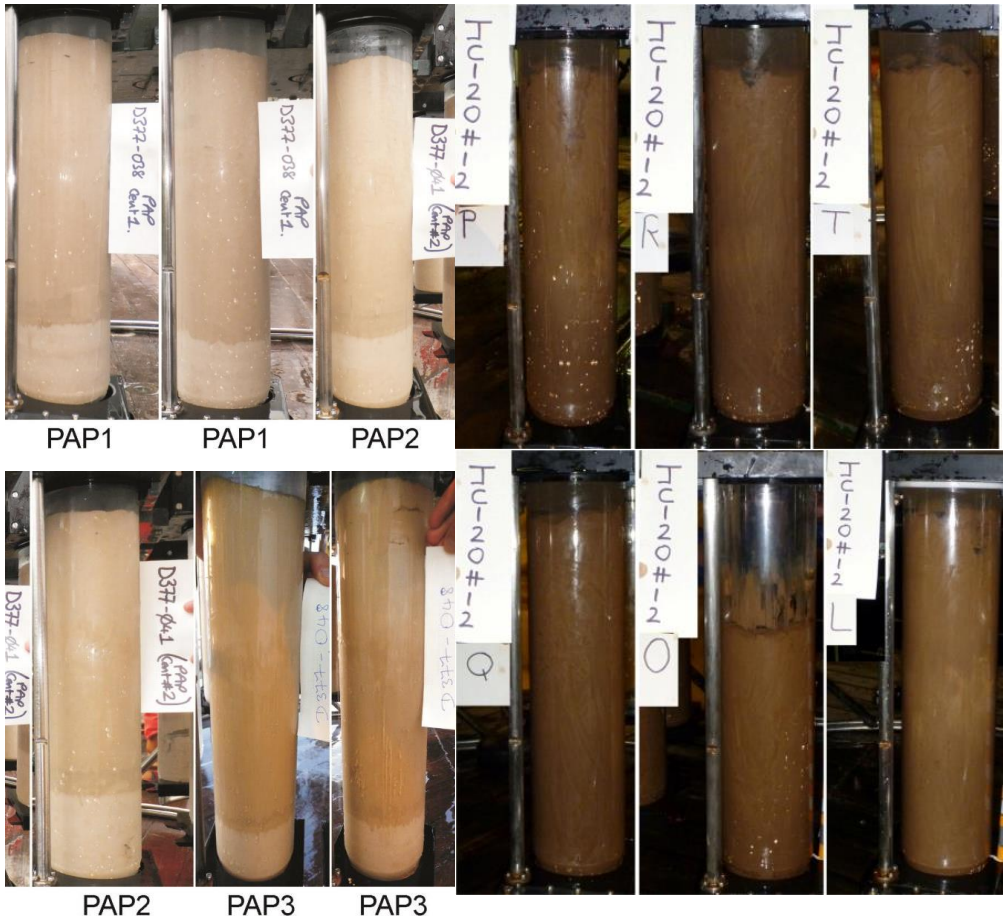
Sediment from the Discovery Collections

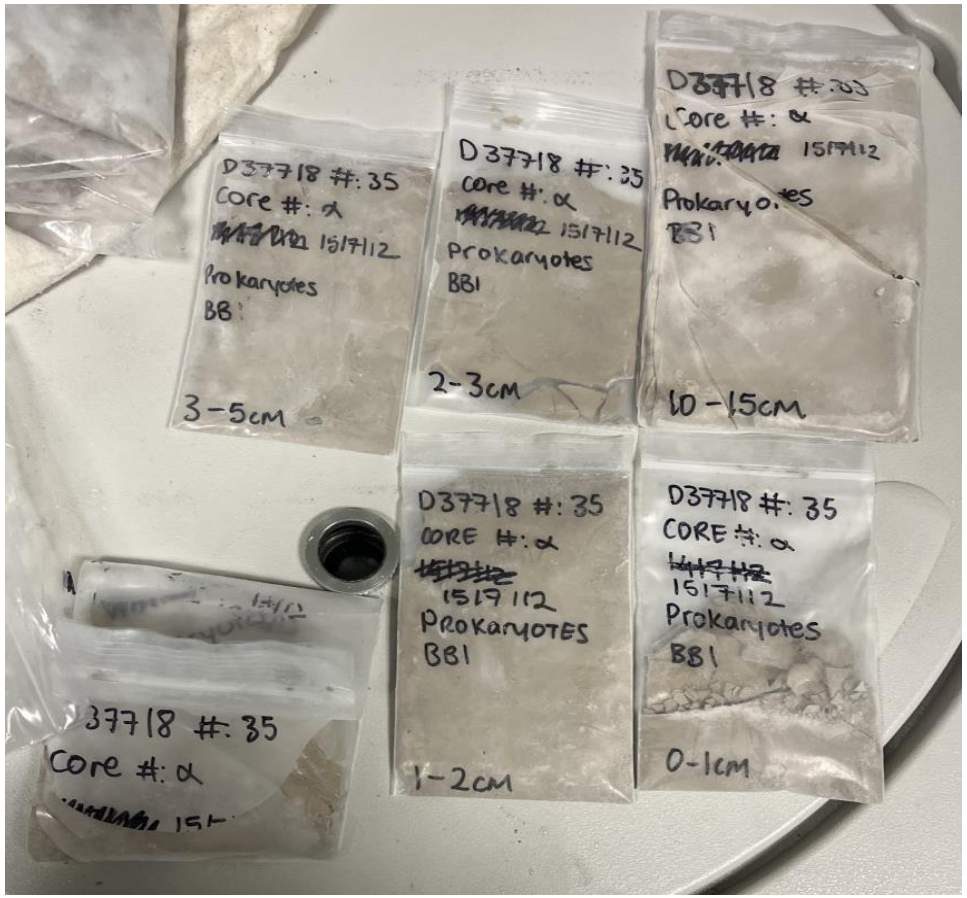






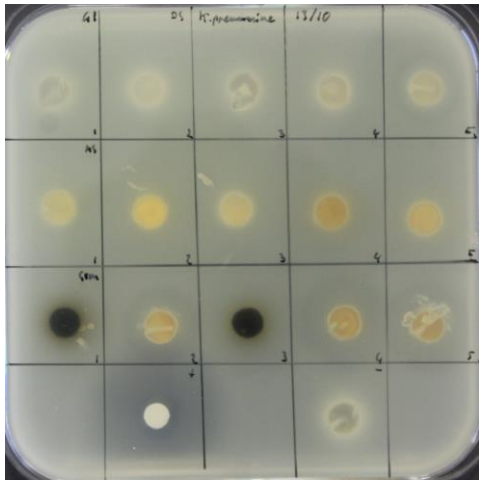
Sediment

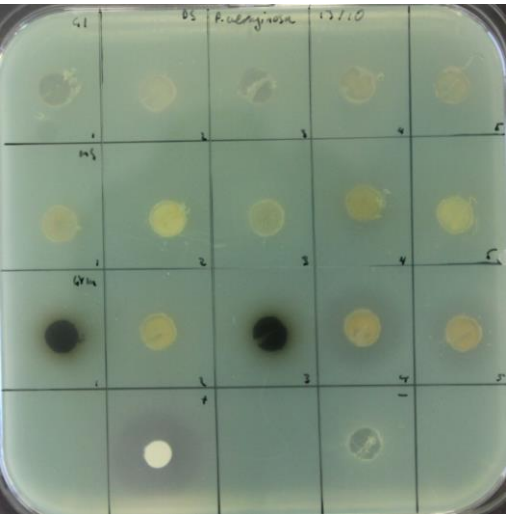

PAP1
PAP1
PAP2
PAP2
PAP3
PAP3


D37718 #: 35
Core #: α
Prokaryotes
BB1
3-5cm
2-3cm
10-15cm
1-2cm
0-1cm

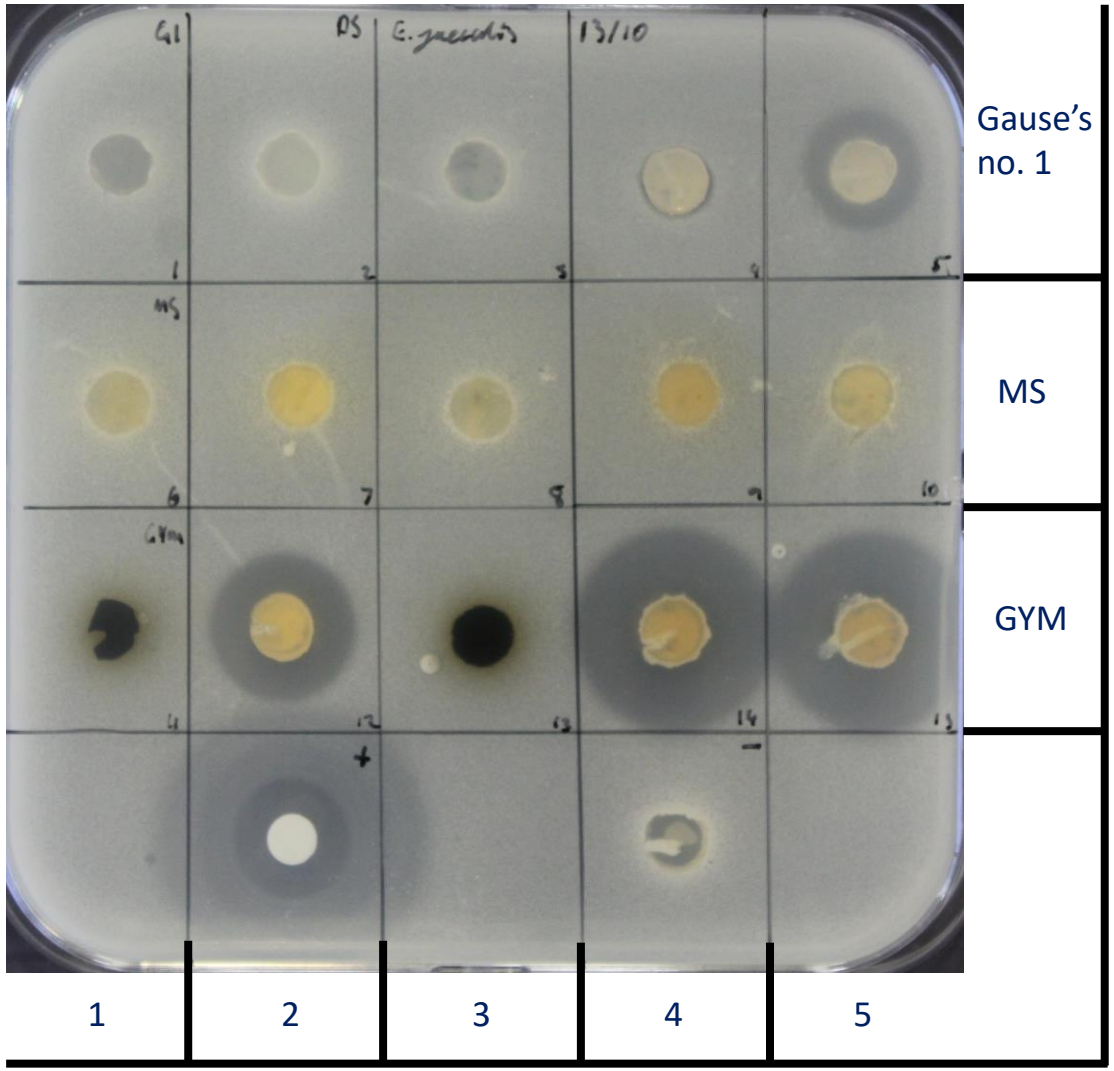
Actinomycetes from Deep Ocean Sediment

Antibacterial Activity Profiling / Media

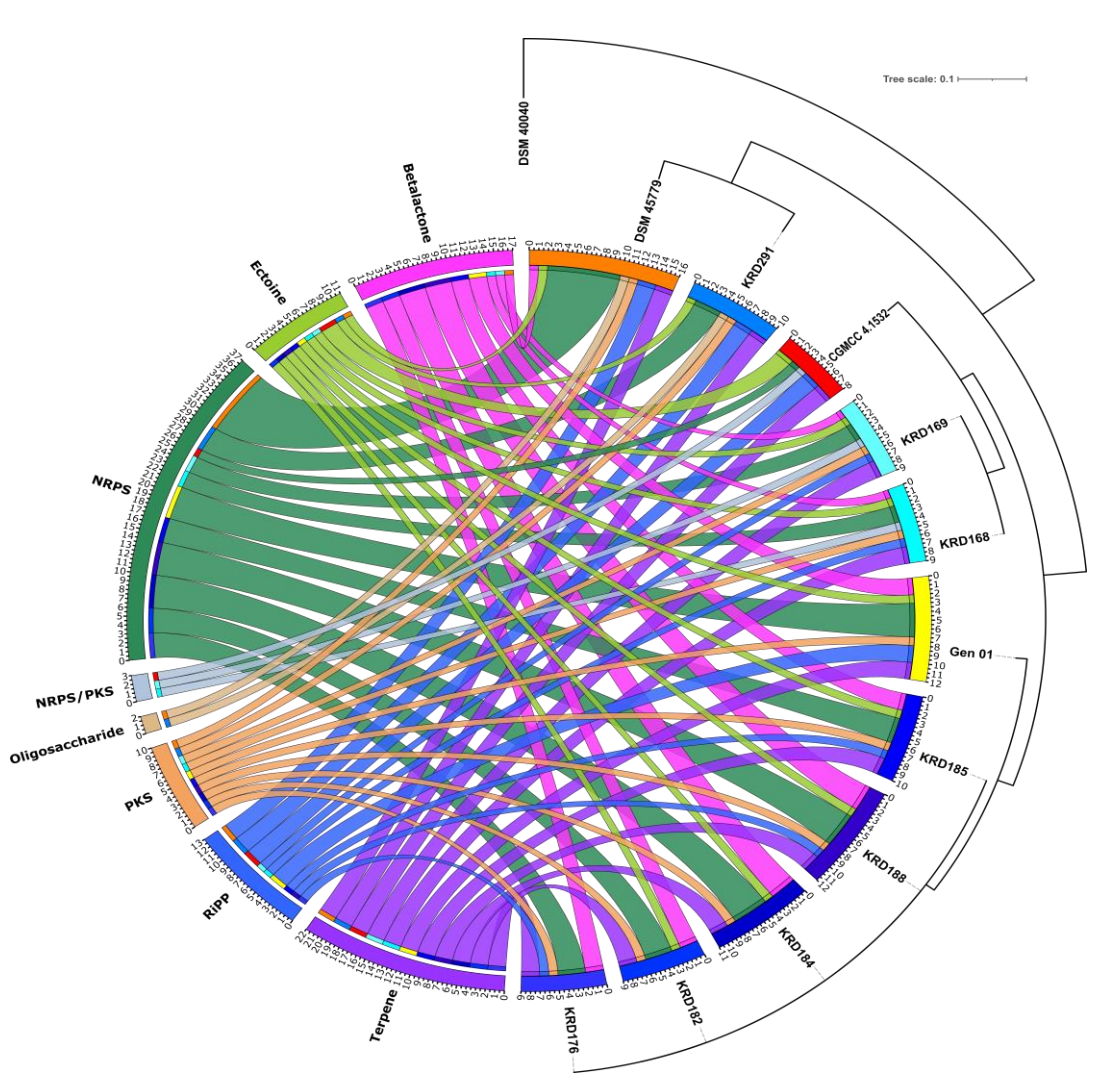




***E**nterococcus faecium,*
***S**taphylococcus aureus,*
***K**lebsiella pneumoniae,*
***A**cinetobacter baumannii,*
***P**seudomonas aeruginosa*
***E**nterobacter* spp.

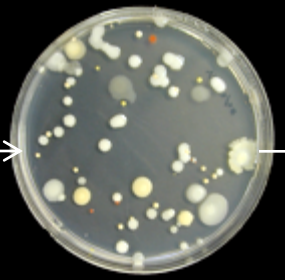


Biological & Chemical Potential

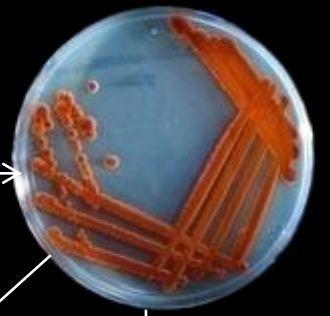


Samples

Microbial isolation

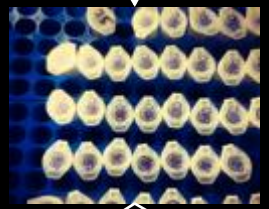


Bacteria

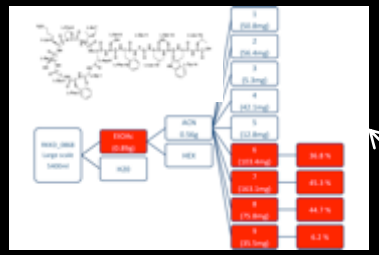


Marine

Fermentation

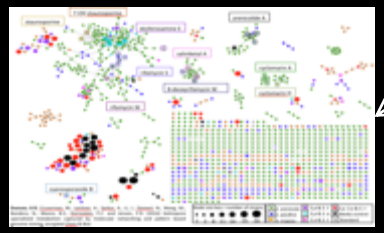


DNA

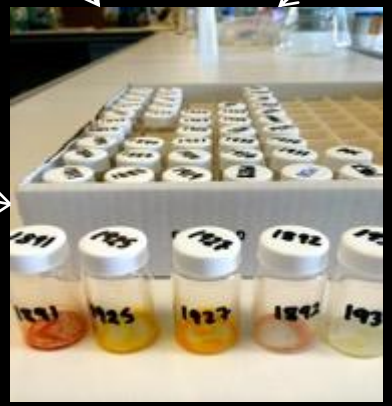


Bioactivity

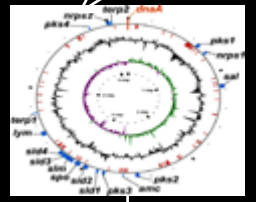
Chemistry



Metabolomics



Chemical Extraction



Sequencing

Genome Mining

Taxonomy/ Phylogeny

DUNCAN LAB

MARINE MICROBIAL ANTIBIOTIC DISCOVERY