



A Core Facility at KBC

<https://www.umu.se/forskning/infrastruktur/pep/>

From Idea to Gene to Protein

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Dept. of Chemistry

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PEP is a founding member of the distributed Protein Production Network Sweden (PPNS) (founded in 2013)

The members are:

PEP - Protein Expertise Platform (UmU)

PSF - Protein Science Facility (KI)

DDD - Drug Discovery & Development Platform (SciLifeLab)

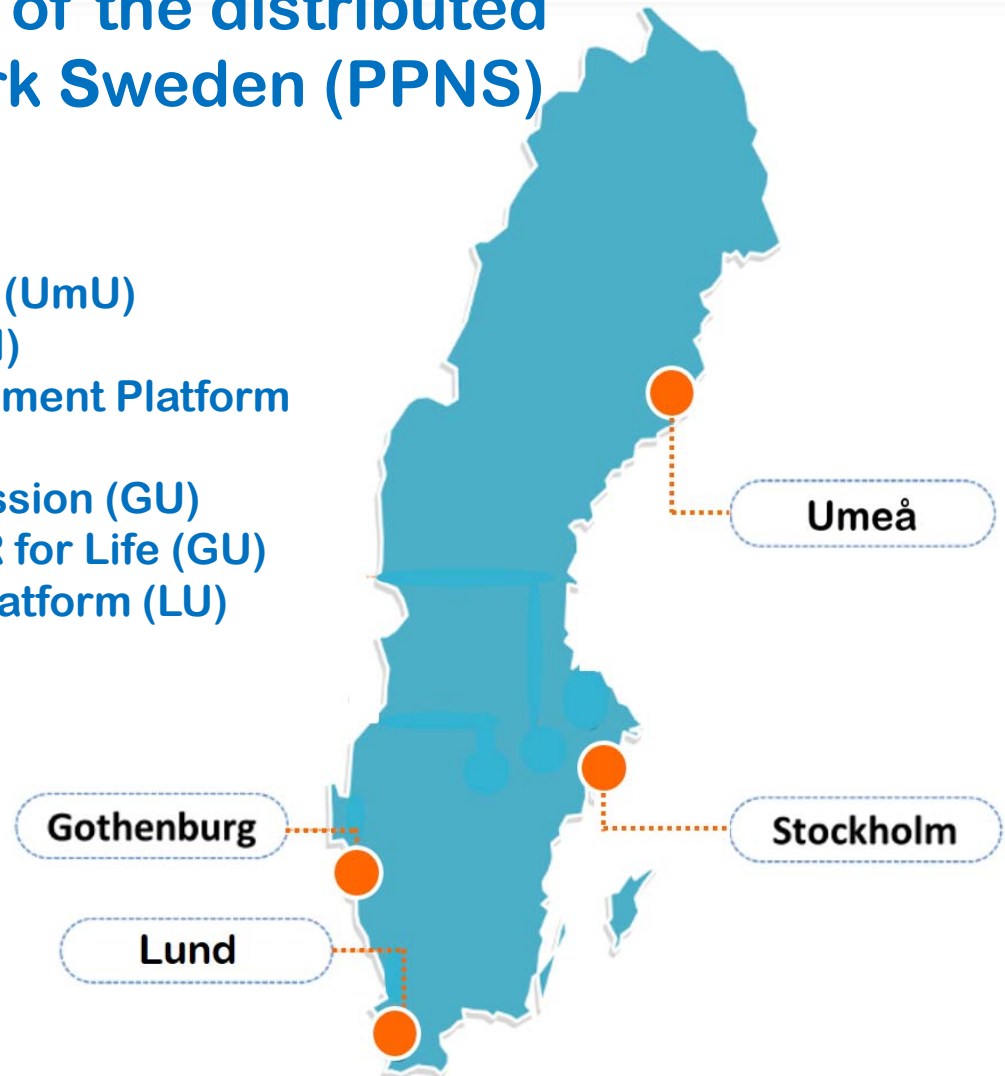
MPE - Mammalian Protein Expression (GU)

SNC - Swedish NMR Centre/NMR for Life (GU)

LP3 - Lund Protein Production Platform (LU)

PPNS Goals:

to provide the Swedish life science community with high quality proteins and expert competence in protein production methodologies.



<https://ppns.ki.se/>

Cryo-EM National facility

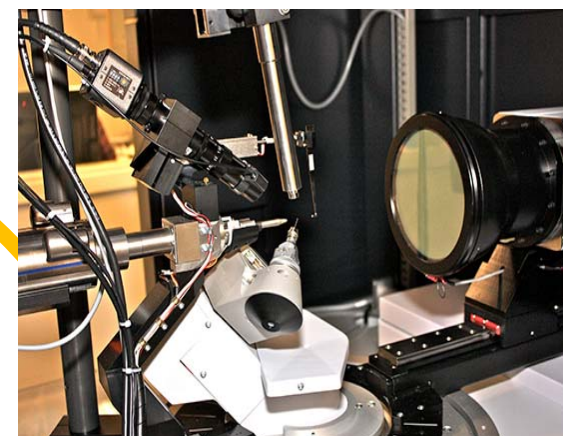


UCEM
Umeå Core Facility
Electron Microscopy
a node of
SciLifeLab

NMR
for Life
SWEDISH NMR CENTRE
Umeå node



X-Ray Diffraction Facility

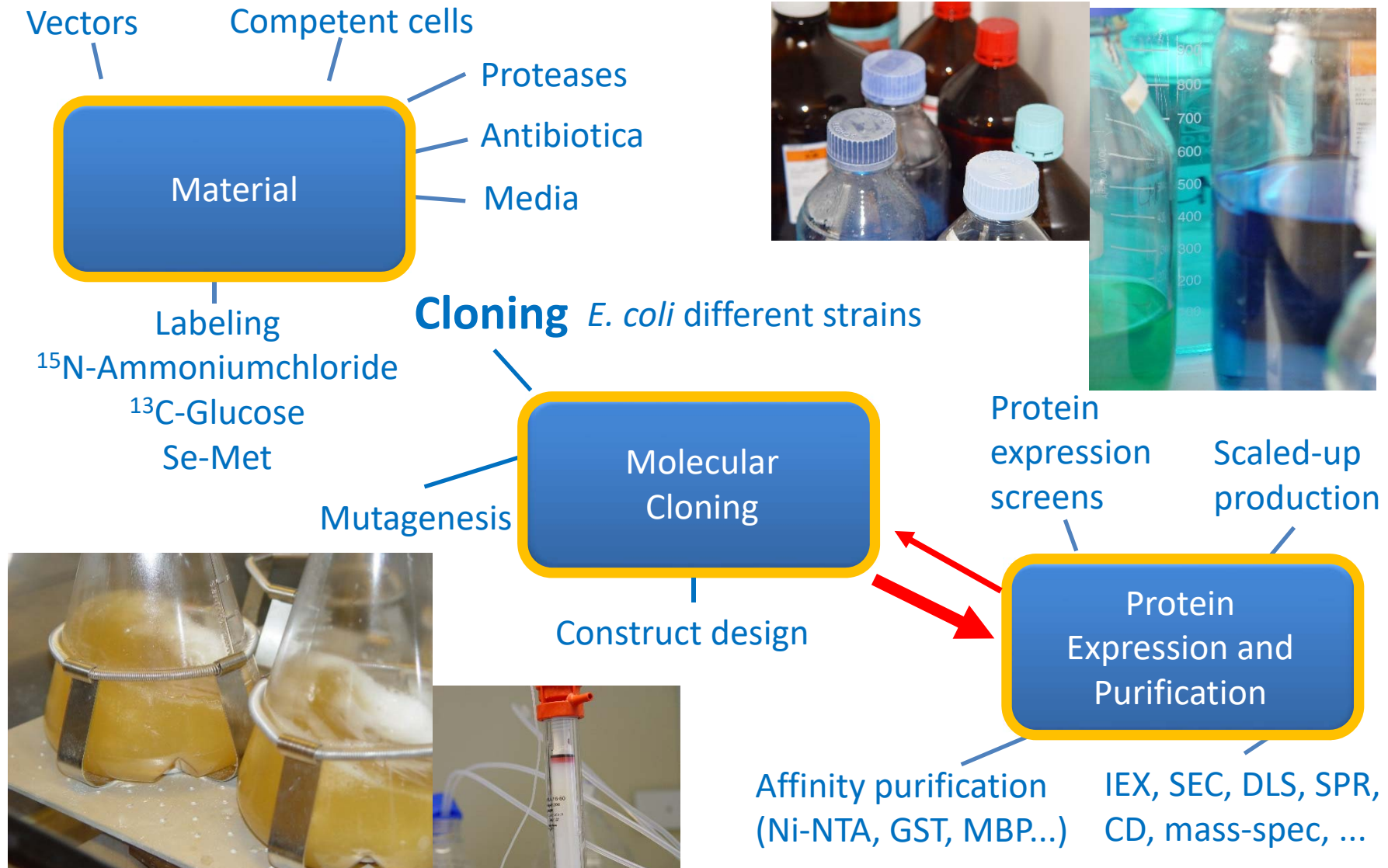


KBC Core Facility

Bioinformatics
CLiD
Computational
Life Science
Cluster
Umeå University
research.education.support

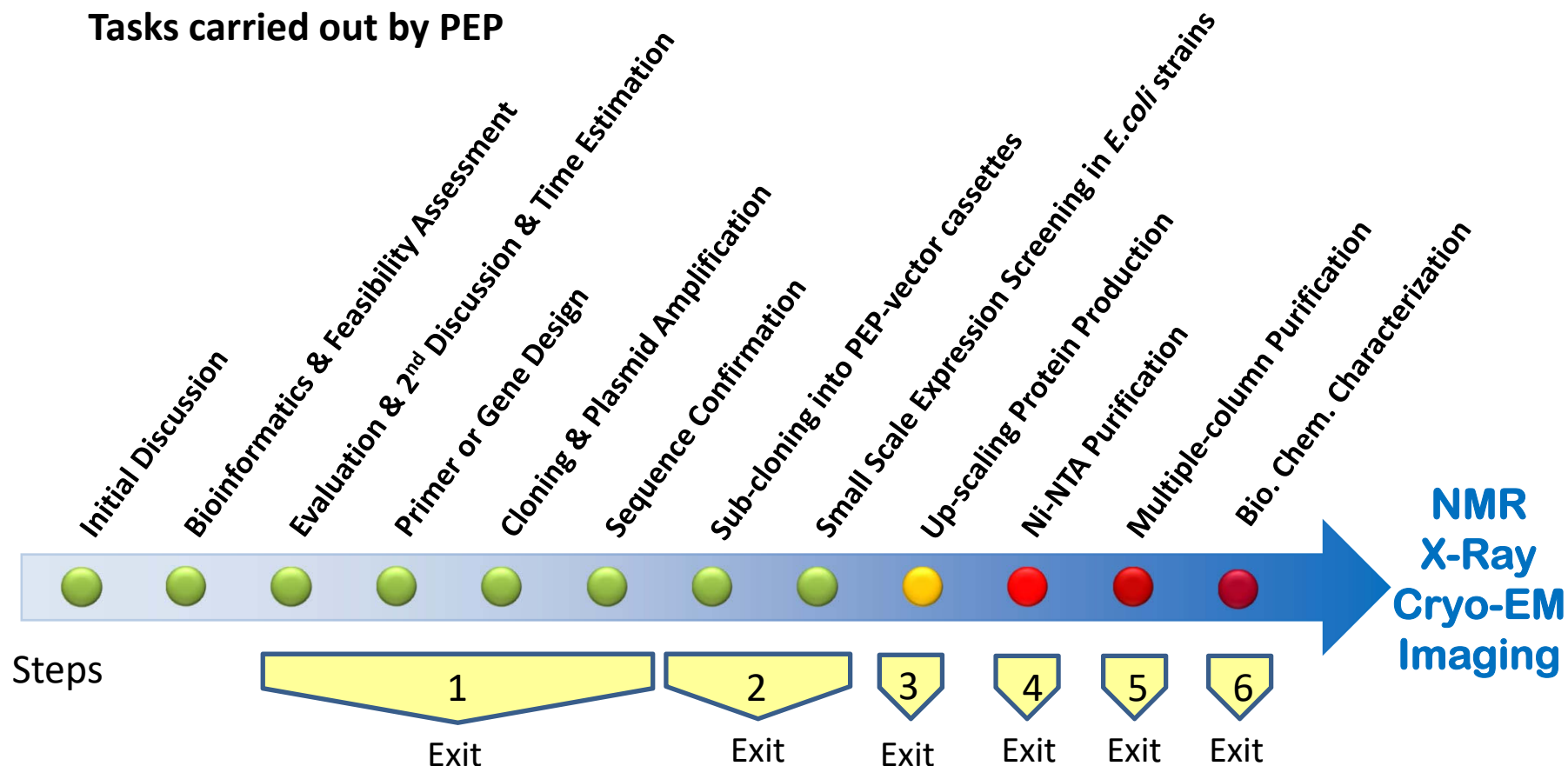
NBS
NATIONAL BIOINFORMATICS
INFRASTRUCTURE SWEDEN

PROTEIN
Expertise Platform
Umeå University
PEP



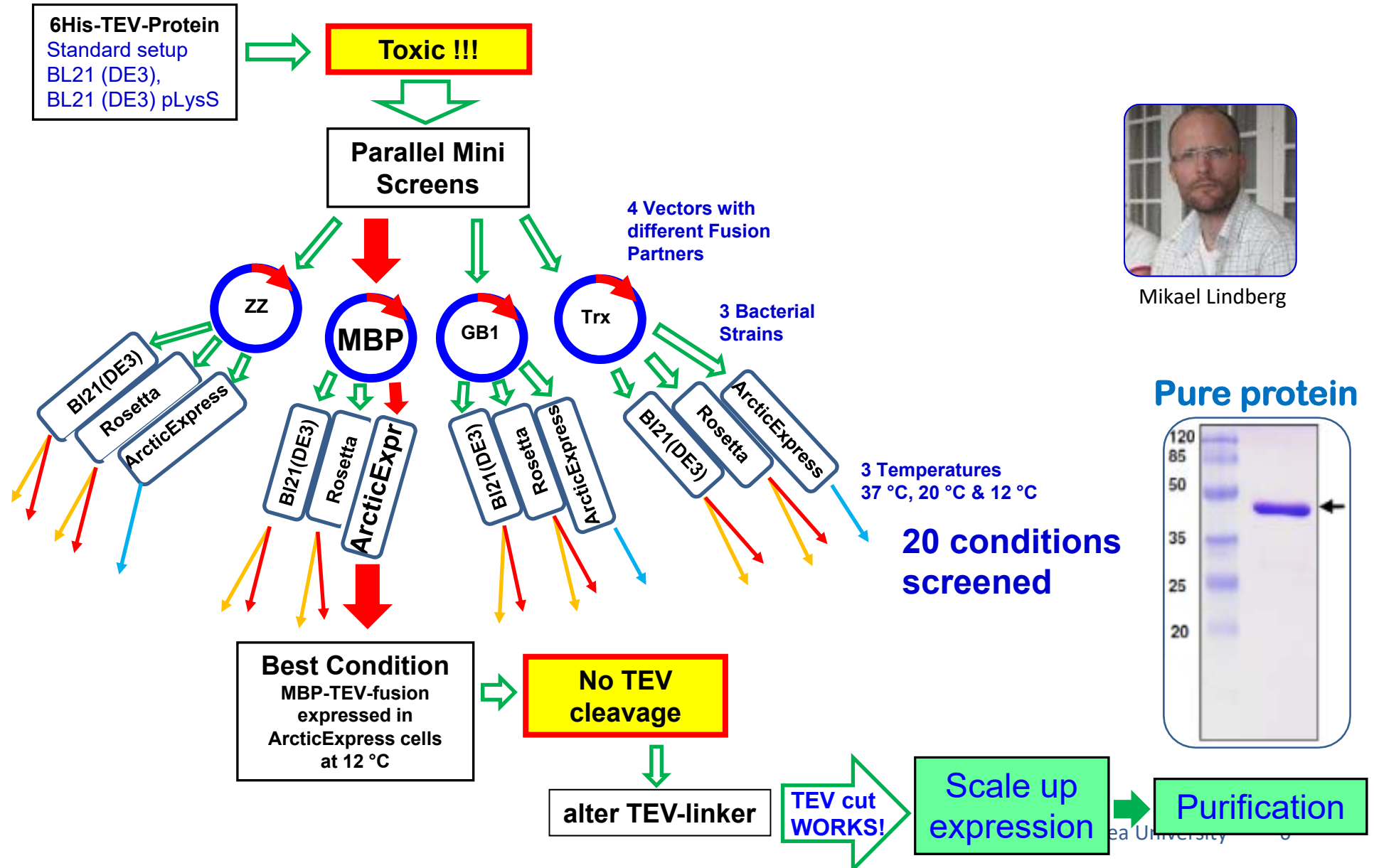
Close customer contact is essential at all stages

Tasks carried out by PEP



The customers decide when to exit

Upon request: Protein labeling
¹⁵N, ¹³C, Se-Met



PEP participates in and produces proteins for:

FragCor – Fragment based NMR screen targeting SARS-Cov-2 proteins

PI: Göran Karlsson, Swedish NMR Centre/NMR for Life, University of Gothenburg

Collaborators: UmU: Gerhard Gröbner, Mattias Hedenström (NMR), Uwe Sauer, Mikael Lindberg (PEP), Erik Chorell (CBCS), Anna Överby-Wernstedt (MIMS), GU: Ulrika Brath, Kristina Nyström

FragCor objective:

- find suitable drug candidates against the SARS-CoV-2 virus.
- focus on two essential viral mechanisms, viral processing and viral binding.

PEP's contribution:

SARS-CoV-2 main protease (MPro)

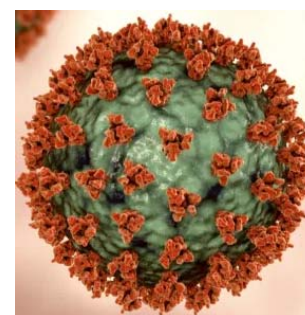
- production, purification, ^{15}N single and ^{13}C , ^{15}N double labelling

SARS-CoV-2 spike protein Receptor Binding Domain (RBD)

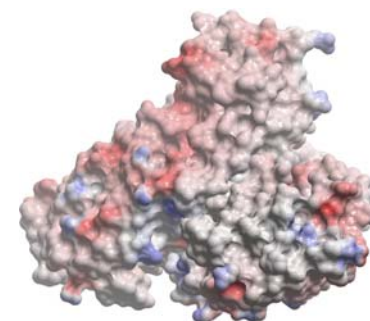
- production, purification

Results so far:










- screened MPro with > 1500 fragments for binding
- identified 11 hits



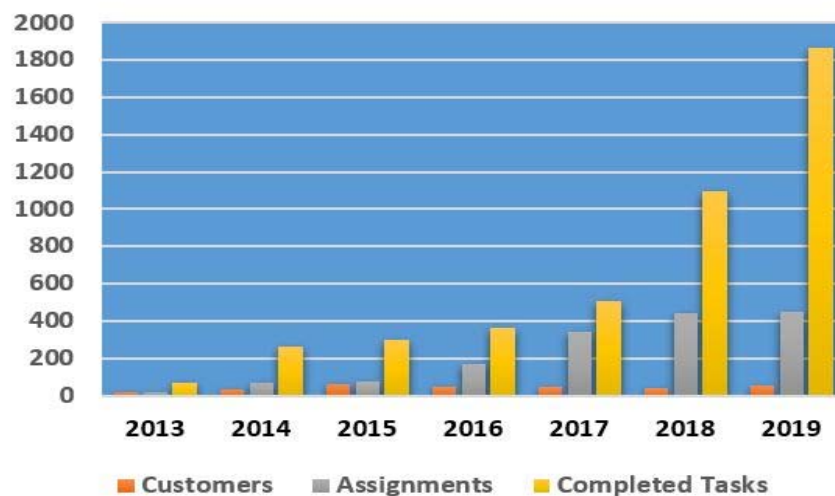
SARS-Cov-2 virus



SARS-Cov-2 Mpro (7jvz)

Structure	Name	Structure	Name
	12R-0262		P5-6845
	T5-03154		T5-1046
	A5-2705		17W-0086
	P5-6493		D6-0854
	P5-6605		

PEP Statistics



Year	PI:s	Customers	Assignments	Completed Tasks	Departments
2013	10	16	20	70	
2014	31	36	65	260	
2015	28	60	75	300	
2016	33	48	168	365	14
2017	34	50	340	509	14
2018	35	38	439	1100	14
2019	36	51	451	1864	13

Total of 21
unique dept.:
15 at UmU
9 external
University 8



PEP Support for Research



Umeå University:

54 unique PI:s from 2 faculties and **12** departments / institutions / research centres (MIMS, UCMR, UPSC, incl. KBC facilities (NMR, X-Ray, UCEM))
~50% of the PI's are from TekNatFak and ~50% from MedFak

15 unique PI:s from **6** Swedish Universities:

SLU, Lund Univ., Uppsala Univ., Gothenborg Univ. and Chalmers Univ. of Tech.

PEP had **2** customers from
FOI, Umeå Biotech Incubator

and **1** customers from
The University of Turku, Finland

PEP's contributions are acknowledged in scientific publications:

2019 – 9 publications

2018 – 7 publications

2017 – 20 publications

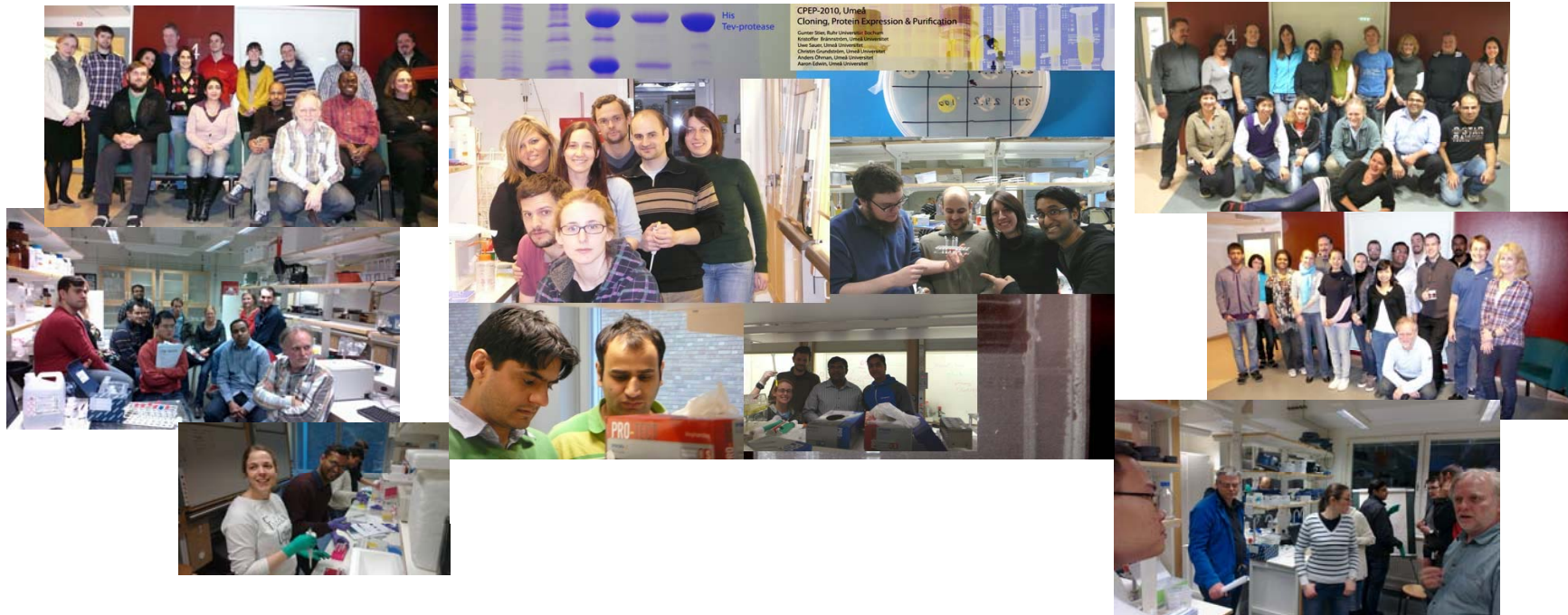
2016 – 11 publications

2015 – 3 publications



6 PhD theses and 7 Master's theses acknowledge PEP

14 courses were held, the latest from Jan. 29 – Feb. 07, 2020



184 PhD students and post-docs have taken the CPEP course.

PEP Funding

In 2019, PEP generated ~ 1.1 M SEK income from services and material sales.

PEP has received 200 kSEK from the KBC (2017 – 2019)

PEP has received ~140 kSEK from Chemistry (20% FTE) (2017 – 2019)

In 2020, PEP received 400 kSEK from the Med. Fak. infrastructure support

PEP spends about 1.1 M SEK on consumables, sequencing, gene synthesis, over-head and salary

PEP is obviously a success and essential
for Life Science Research at Umeå University!

- We will do our best to increase PEP support.
- We will hire a new co-worker
- But: funding is uncertain ...
- To continue we **need basic support** from the departments and the faculties.
- Please "lobby for PEP" at your department!
- Thank you!

PEP steering board members:

Prof. Niklas Arnberg (Clin. Mikrobiol. & MIMS)

Prof. Stefan Björklund (Med. Chem. & Biophys.)

Prof. Richard Lundmark (IMB & MIMS)

Assist. Prof. Linda Sandblad (Chem., MIMS & UCEM)

Prof. Åsa Strand (Phys. bot.)

Prof. Magnus Wolf-Watz (Chem.)



Uwe Sauer

Coordinator (Bioinformatics, CPEP courses)

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Mikael Lindberg

Manager, (Cloning, protein purification)

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PEP needs a new co-worker

Christin Grundström

(Protein purification, materials)

Recently left PEP



PEP-LAB

KBC-E Floor 4

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