

NorStruct

The Norwegian Structural Biology Centre



Norwegian Structural Biology Centre University of Tromsø

“A national research and service centre in structural biology”

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The Norwegian Structural Biology Centre



Hosted by the University of Tromsø – the Arctic University of Norway

Located in the Barentz BioCentre – Tromsø science park in Breivika



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NorStruct history

2003-2012: A national research and service centre under the FUGE-program of NFR

2013->: A national research and service centre financed by the University of Tromsø

2011: Relocated into the Barents
BioCentre at Tromsø Science park

•2000 sqm

•Co-localized with Biotec/pharma industry

2014: About 55 employees at NorStruct



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Structural biology

“Understanding the relation between the structural build
up (3D-structure) of biologically active (macro)-
molecules and their function”

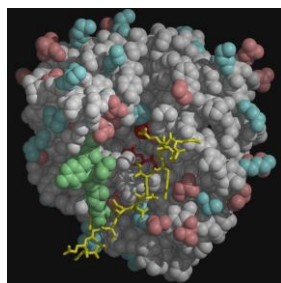


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Understanding ligand binding



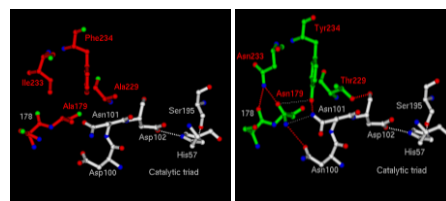
- Drug design
- Metabolic pathways

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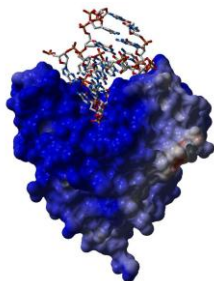
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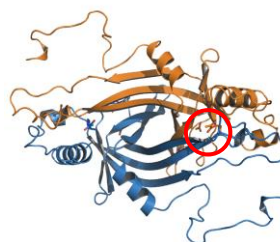
Protein engineering (rational design)



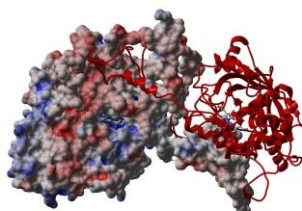
DNA-regulation



Genetic diseases



Interacting proteins



Core activity:

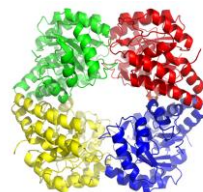
Macromolecular structure determination

Core method: X-ray crystallography

→ Structure – function relation studies

Supporting techniques and activities:

- Protein production
- Protein – ligand interaction studies
- Protein stability studies
- Enzyme activities
- Molecular modelling
- Etc...



Optimizing the pipeline – from gene to structure to design

Protein production:

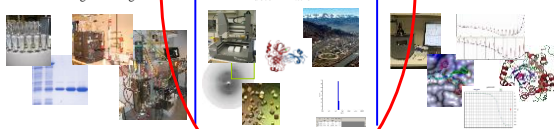
- Cloning, small scale expression and purification
- Medium scale expression and purification
- Large scale expression and purification
- Protein expression optimization
- Protein refolding screening

Structure determination:

- Quality control
- Initial crystallization screening
- Robotic nanolitre crystallization screening
- Buffer optimization
- X-ray data collection and structure determination

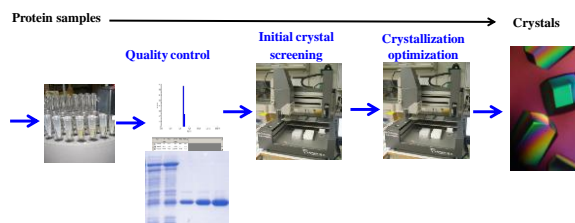
Drug discovery & design:

- Structures of ligand target complexes
- Crystal structure of target-low-affinity fragment complexes ("fragment screening")
- Off target binding
- Chemical crystallography
- Computer modelling
- Thermodynamics



Structure determination

Crystallization



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Structure determination

Sample preparation

Guidelines on:

<http://norstruct.uit.no>



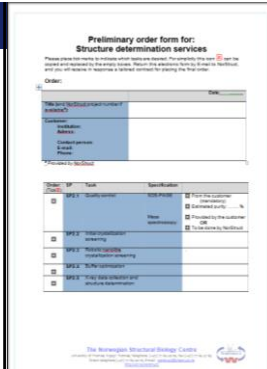
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Structure determination

Order form

Key information about your protein

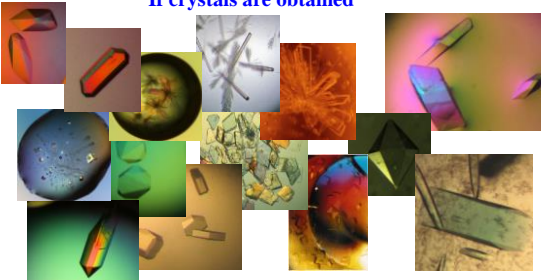
- Size
- Solubility
- Stability
- Cofactors
- Buffer
- Production methods
- etc



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Structure determination

If crystals are obtained



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Structure determination

Data collection

Home laboratory



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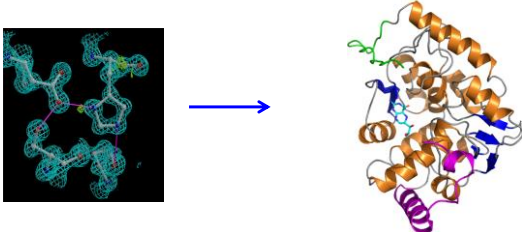
Data collection

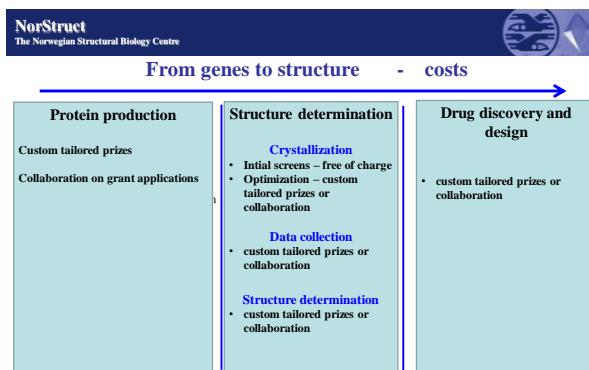
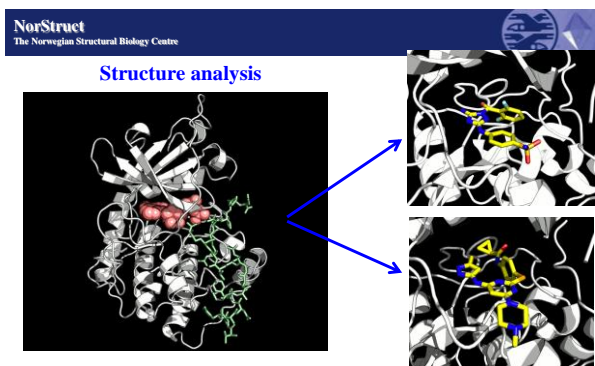
International Synchrotron radiation facilities



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Structure determination





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Project involvement

Since start-up in 2003:

- **Involved in more than 170 projects**
 - From 6 Norwegian universities
 - From 2 Norwegian research institutes
 - From 10 Norwegian companies
 - From 3 international companies
 - From 3 University hospitals
- **Experimental work on > 250 different proteins**
- **Partner in ca. 180 project grant applications (~24% granted)**

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NorStruct is hosting:

BioStruct – National graduate school in structural biology

- **Currently about 100 PhD-students**

