Proton therapy centres in Norway

Eirik Malinen
**X-ray therapy**
Radiation dose from X-ray beam gradually declines through matter

**Proton therapy**
Radiation dose from proton beam increases before it rapidly drops to zero
Protons vs X-rays

Proton Beam Therapy - Mayo Clinic
New Radium hospital - 2024
Proton center at Haukeland
Varian ProBeam360
Treatment room and gantry
Coming infrastructure, Oslo

Ground floor (U1)

Research gantry

Office space for researchers on 2nd floor
Coming infrastructure, Bergen

1st floor
Green: research areas
## Plan, Oslo

(Confidential, do not share)
Organization of coming infrastructure

• The pre-clinical infrastructure in Oslo will be organized as a core facility

• Access to all Norwegian and international research groups

• Most likely similar arrangement in Bergen

• In case of high demand, a national board must prioritize
Microdosimetry with a 3D silicon on insulator
Small animal platform

Precise dose application with in situ multi-modal anatomical image guidance and in vivo verification of the actual treatment delivery
MR-guided proton therapy

- MRI: superior soft tissue contrast
- Use MRI to guide proton delivery to the tumor
- Technological challenges
- Next 5-10 years?
Proton computed tomography

NOVO: Hybrid approach to treatment verification

Scientific Reports | (2023) 13:6709
Sharp dose profiles for high precision proton therapy

Scientific reports 2022
Research opportunities in proton therapy*

• Clinical trials
• Translational research
• New delivery principles
• Technological innovations
• AI in proton therapy

*Report in Norwegian

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Costs...