

**PSI** Center for  
Life Sciences

**ETH** zürich

# Research at PSI on Molecular Design (2026)

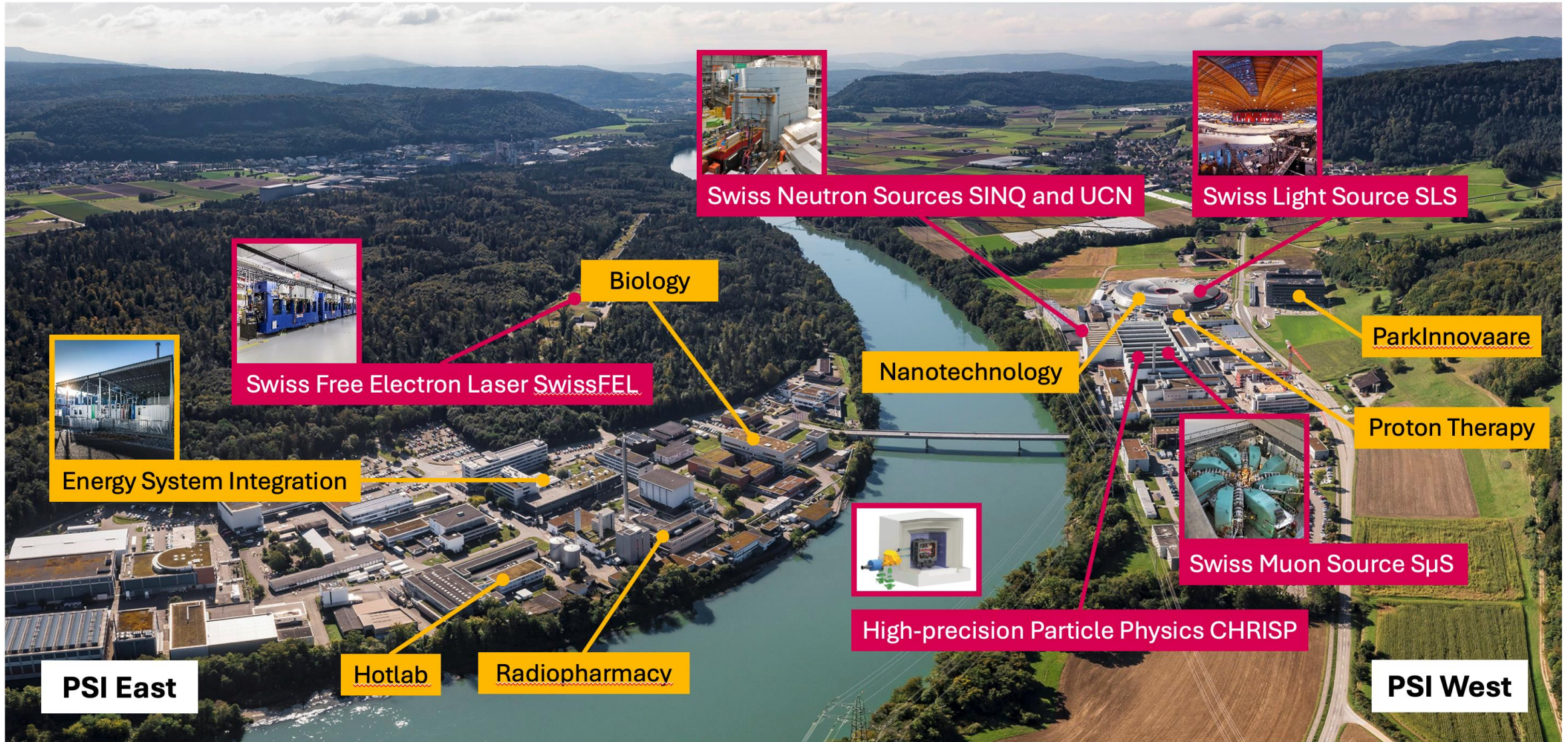
G.V. Shivashankar

ETH Zurich & Paul Scherrer Institute, Switzerland

Website: <https://www.psi.ch/en/mgg>

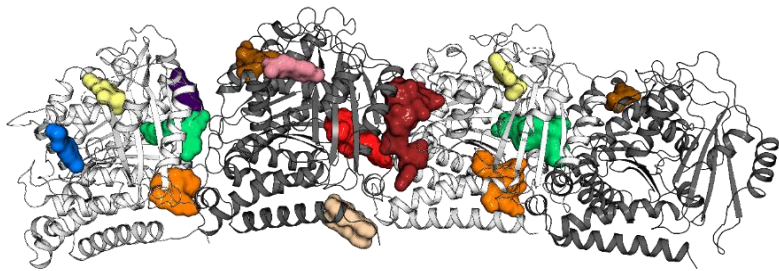
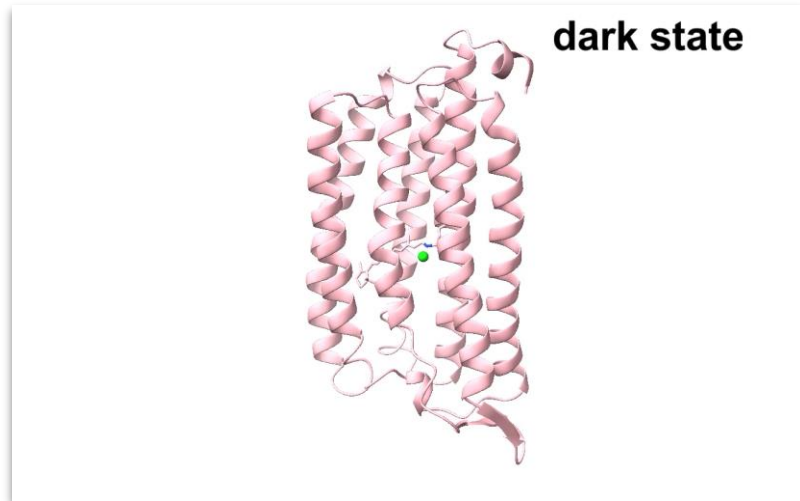


# Paul Scherrer Institute offers unique research infrastructures to study “Molecular Design”

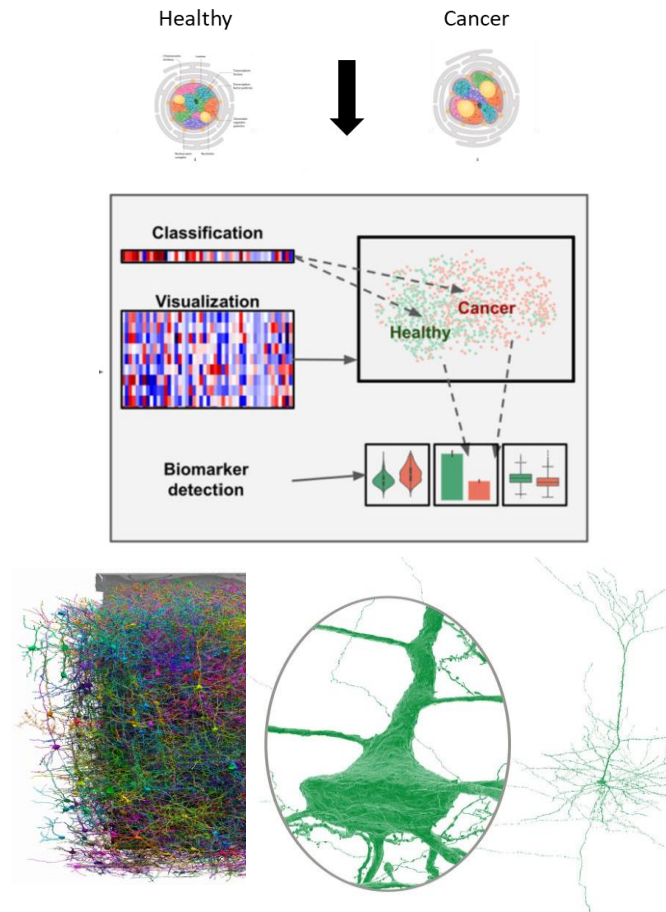




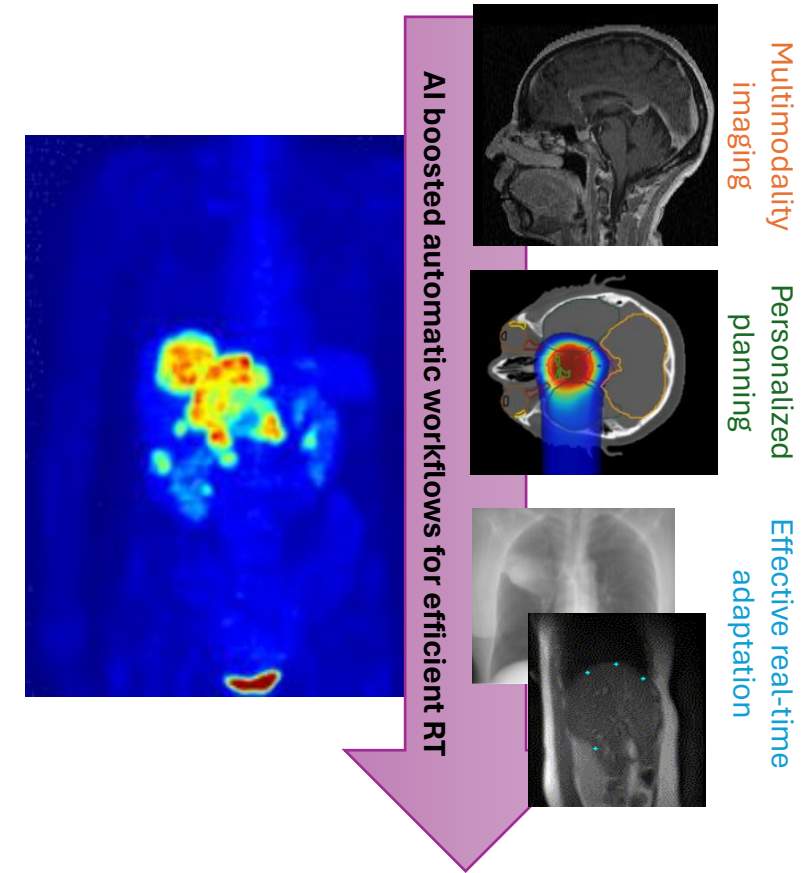
# Life Science and Medical Research Program at PSI



**(I) Addressing fundamental biological questions:** Structure, dynamics, and function - from proteins to macromolecular complexes to subcellular structures to cells.



**(II) Integrating scales and modalities:** Using AI for combining multi-scale imaging with other data modalities – from cells to tissues to organs to organisms.



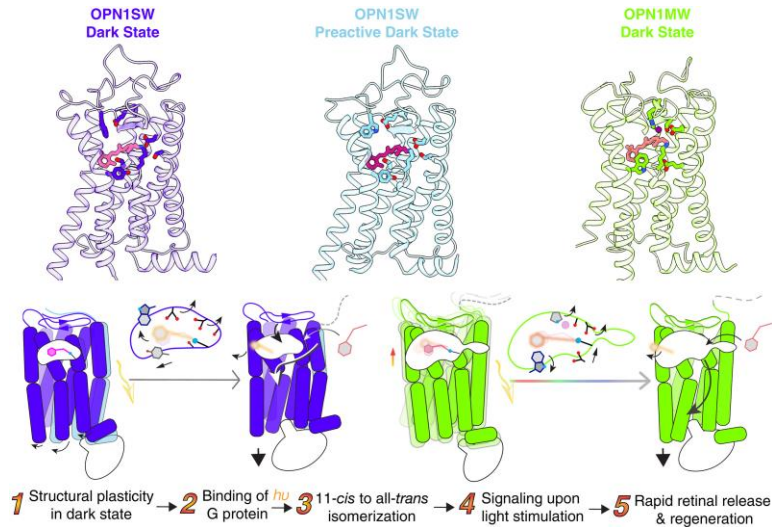
**(III) Addressing complex diseases:** Using multi-disciplinary expertise from basic science to efficient treatment in the clinic with a focus on age-related diseases.

# Linking Molecular Design to Function



## How our eyes perceive colours:

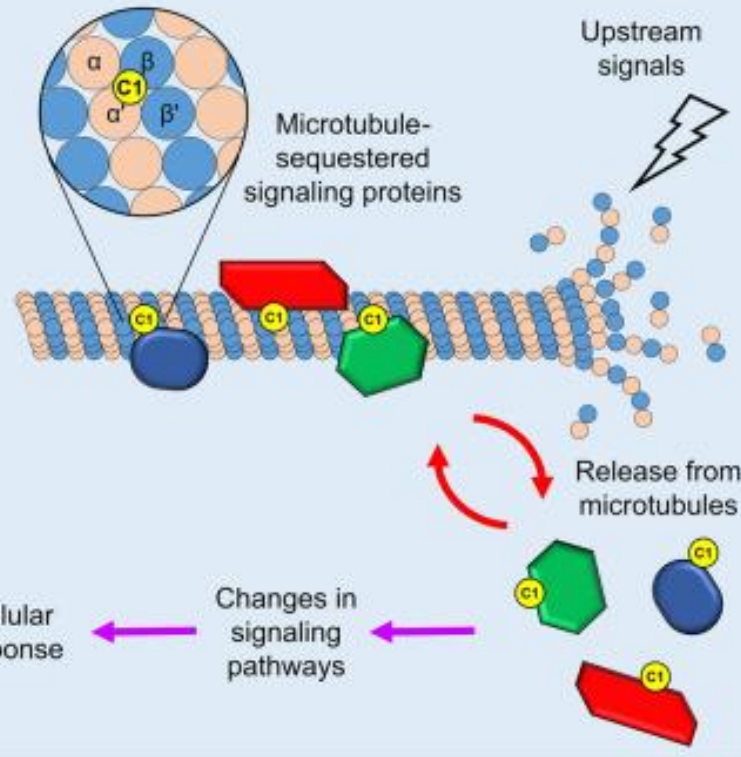
PSI researchers have deciphered key details of the molecular mechanisms by which proteins in the retina discern colours and movements with high resolution in daylight.



Science 2026; Isaikina Group

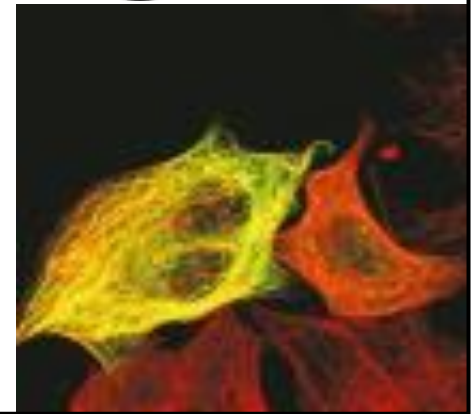
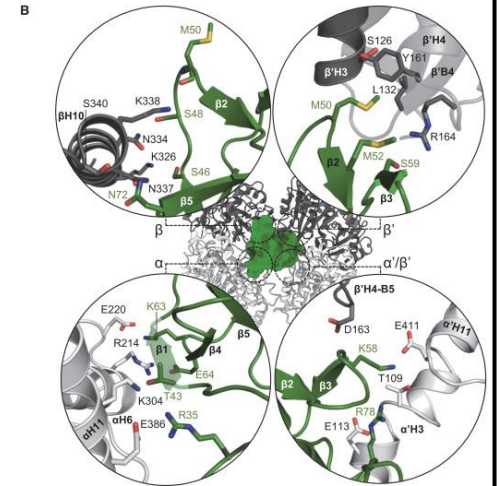
**Protein Structure and Dynamics**

## Microtubules as signal sensors



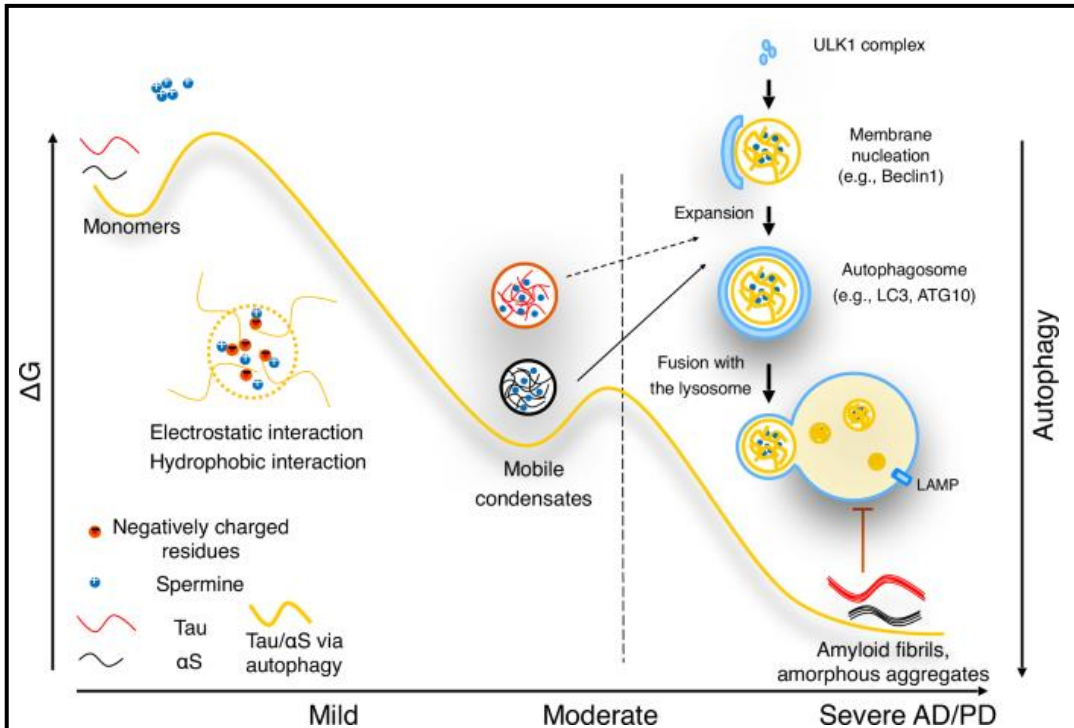
Cell 2026; Steinmetz Group

**Protein Assemblies and Function**





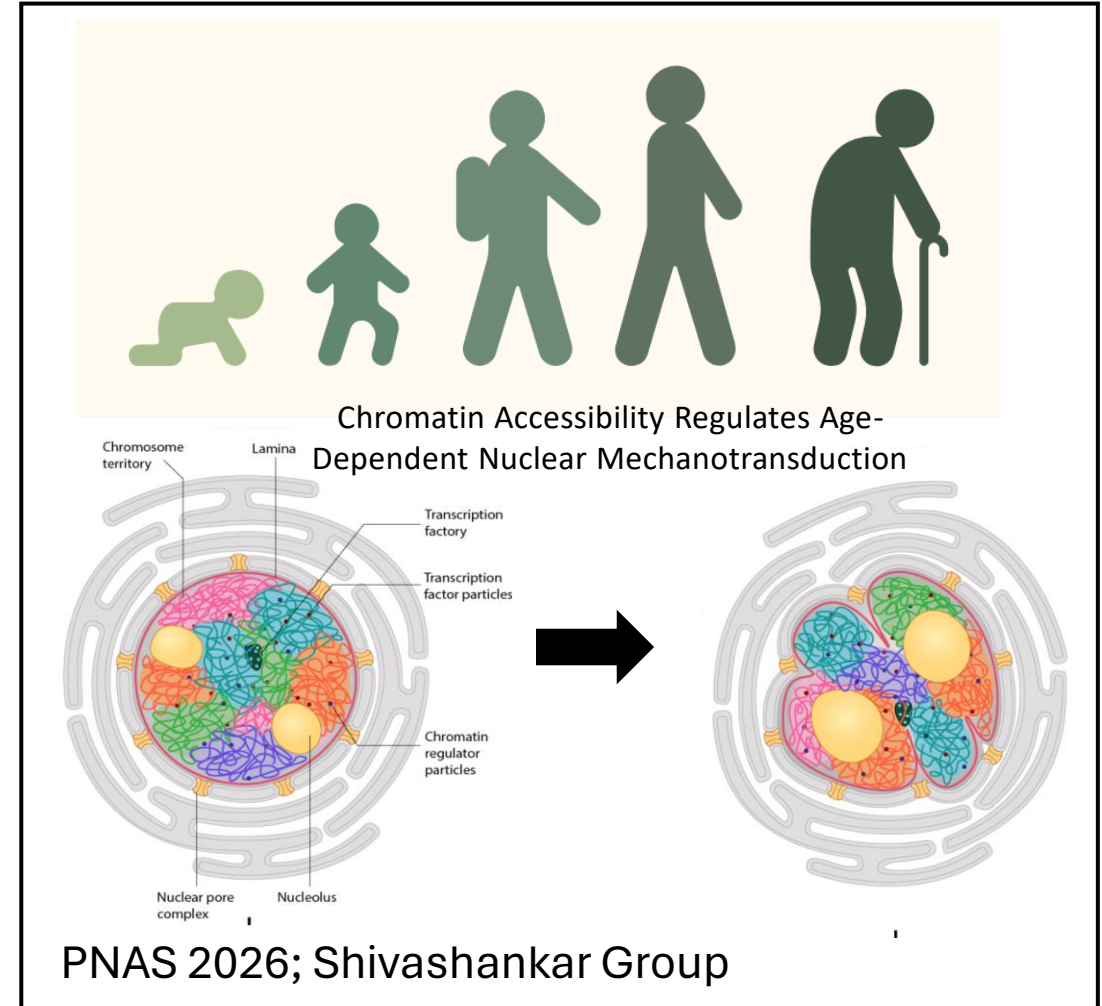
# When Nature's Molecular Designs Go Awry?



Researchers at the Paul Scherrer Institute PSI have clarified how spermine – a small molecule that regulates many processes in the body's cells – can guard against diseases such as Alzheimer's and Parkinson's: it renders certain proteins harmless by acting a bit like cheese on spaghetti, making them clump together.

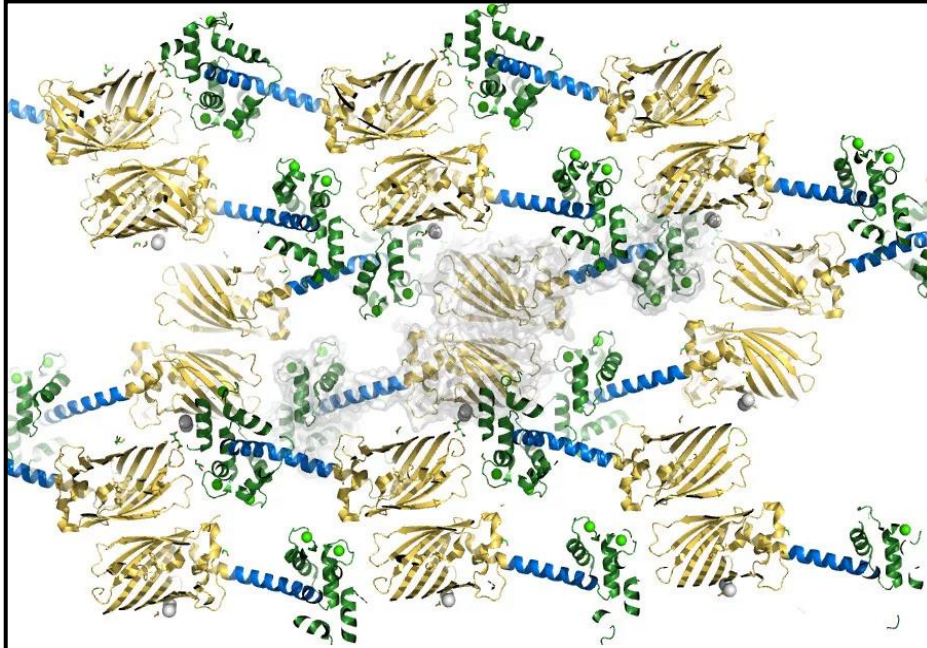
Nature Communications 2025; Luo Group

**Protein Aggregation  
and Disease**



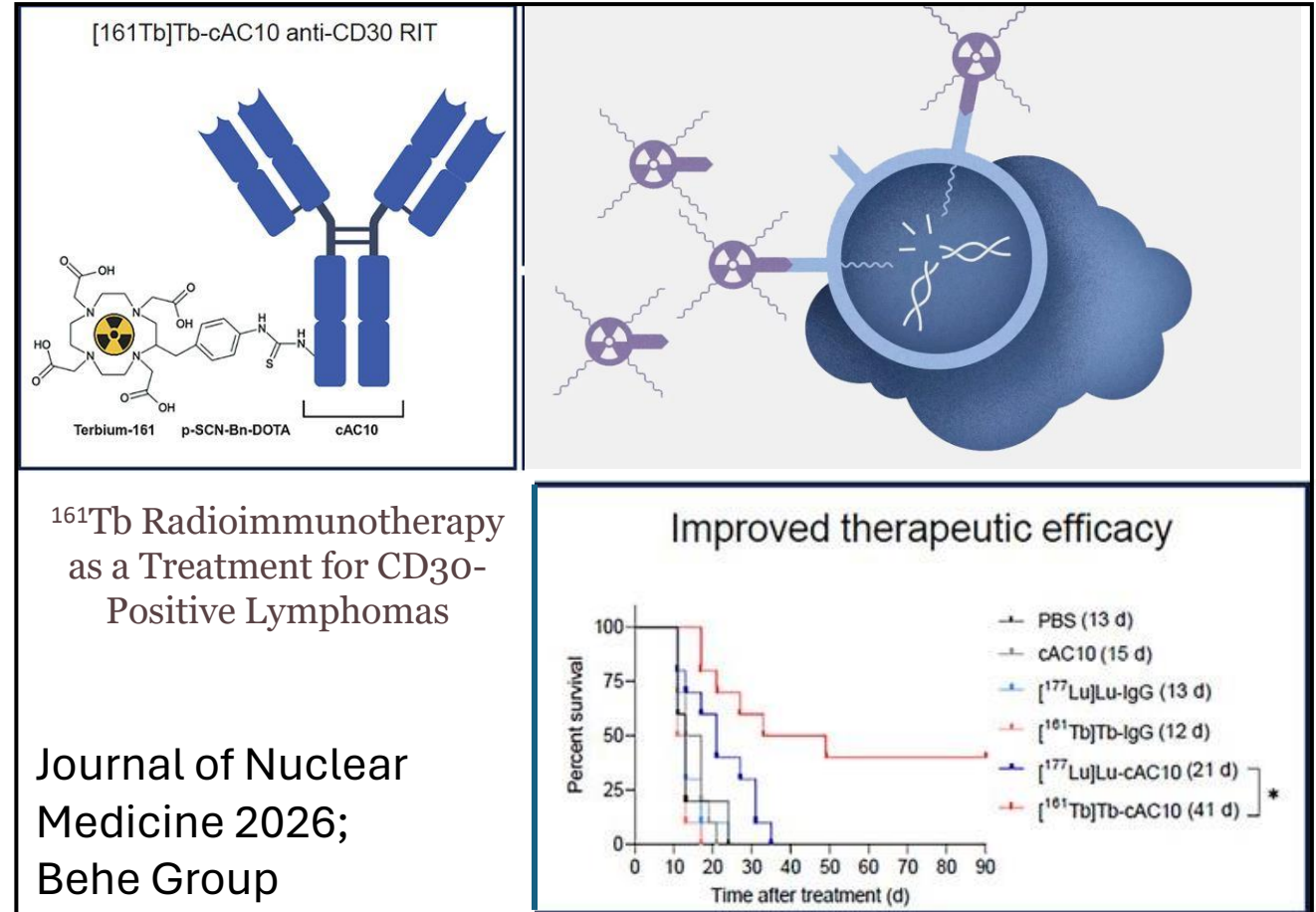
**Chromatin Organization  
and Aging**

# Engineering Molecular Design for Therapies?



Structure-based protein engineering to create biomolecules with novel functionalities

Journal of Structural Biology 2026;  
Benoit Group



**From Protein Engineering to Cancer Therapies**

# Future of Molecular Design Research @ PSI

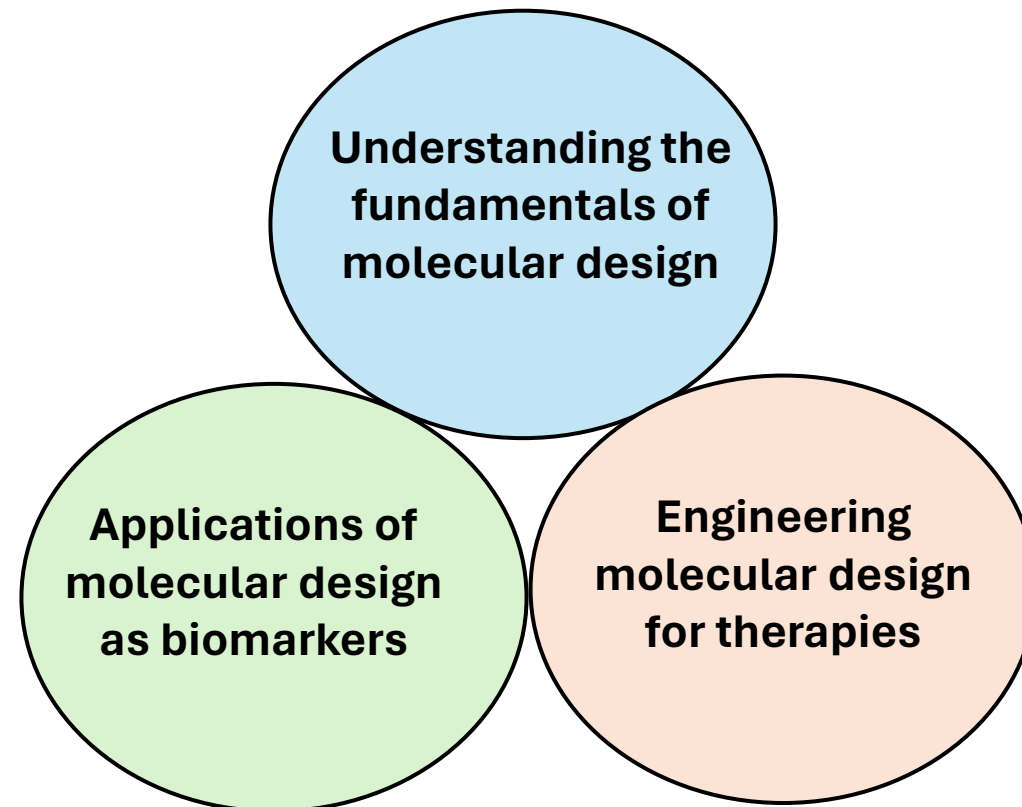


## **Center for Life Sciences**

Core laboratories:

- Biomolecular Research
- Multi-scale Bioimaging
- Radiopharmaceutical Sciences

**Enabled through AI**



## **Mission: Towards Multiscale Life Sciences**