

# Proteins under the (high-end) microscope

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Two new transmission electron microscopes (TEM) will give Monash University researchers unprecedented insights into the structure and function of proteins and contribute to breakthroughs in treating conditions from cancer to cardiovascular disease.

The Titan Krios cryo TEM and Tecnai T12 TEM, manufactured by FEI, will be installed in early 2014 at the new Clive and Vera Ramaciotti Centre for Structural Cryo Electron Microscopy at Monash. The new Centre will be the first in Victoria dedicated to structural Cryo-EM, where samples are studied at temperatures lower than -150 degrees Celsius, allowing them to be observed in their natural environment.

Professor James Whisstock of Monash University's Department of Biochemistry and Molecular Biology will lead the new Centre with Monash Pro Vice-Chancellor (Research and Research Infrastructure) Professor Ian Smith and Associate Professor Mike Lawrence from the Walter and Eliza Hall Institute.

"Cryo-EM provides the missing piece of the puzzle for researchers trying to understand the workings of [complex biological systems](#) at the smallest scale, where we know that tiny multi-component molecular machines perform many of the most important functions," Professor Whisstock said.

"These TEMs will give Australian scientists a new capability to study proteins that to date have resisted detailed characterization."

The Titan Krios is the most powerful and flexible high-resolution cryo-EM for characterisation of protein structures and protein complexes. With automated sample loading and unattended 24 hour operation, it enables the collection of the massive data sets, which are required by advanced structural analysis techniques but are difficult or impossible to obtain with manual methods. Its cryo capability ensures that the analytical results accurately represent the structures as they exist in their natural cellular environment.

The Tecnai T12 instrument will provide a dedicated support capability, permitting preliminary testing of samples prior to automated data collection using the Titan Krios TEM.

Director of structural biology for FEI's Life Sciences Business Unit, Thomas Wohlfarth said the TEMs would enable new research breakthroughs.

"Monash is one of the top XRD research sites in the world, comprising over 150 world-class researchers pioneering the new field of integrated structural biology," Mr Wohlfarth said.

"The Titan Krios promises to play a pivotal role in this exciting new discipline by providing the molecular-scale framework into which data from complementary atomic-scale techniques and computational methods are integrated."

The integration of cryo-EM with the many different complementary imaging technologies located on and around the Monash Science Technology Research and Innovation Precinct will allow researchers to make key health-related discoveries.

Provided by Monash University

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