



Tianwei Lin

*Department of Molecular Biology and
Center for Integrative Molecular
Biosciences, The Scripps Research
Institute, USA*

Structural Exploitation of an Icosahedral Virus as Nano-materials

Biological macromolecules with their programmability through genetic engineering and propensity to form arrays can serve as the templates for the assembly of molecular components into devices in nanotechnology. We exploit an icosahedral plant virus, Cowpea mosaic virus (CPMV), as the scaffold for the attachment of nano-components in designed patterns. CPMV is a *Picornavirus-like* virus with a size of 30 nm. It can be produced in gram quantities and is exceptionally stable. To explore the virus system as general purpose biomaterials and reagents, chemistry was introduced by engineering Cys and Lys residues on the virus exterior surface. The capsid-associated chemistry was investigated by the addition reactions with fluorescent compounds. Engineered virus particles with multiple reactive groups in designed patterns were produced to anchor organic compounds and gold particles. Formation of virus particle arrays demonstrated the feasibility of assembling devices in millimeter scale. The virus capsid is also used for the attachment of exogenous proteins on the interior and exterior surfaces, which transforms the system into a scaffold for structural studies by electron microscopy and X-ray crystallography.

In a separate effort, elevated hydrostatic pressure was exploited as the thermodynamic perturbation to study the capsid assembly and protein folding. The high pressure induced additional order in the virus crystals and improved the diffraction dramatically for the structural studies in much higher resolution.

All are welcome

Date: 17 Oct 2003, Friday

Time: 4 pm

Venue: LT 20

Host: A/P Kini RM



Department of Biological Sciences

Seminar Announcement

