

## Transcriptional regulation of genes and synthesis of nanomaterials using biomolecules

### Experimental Biochemistry

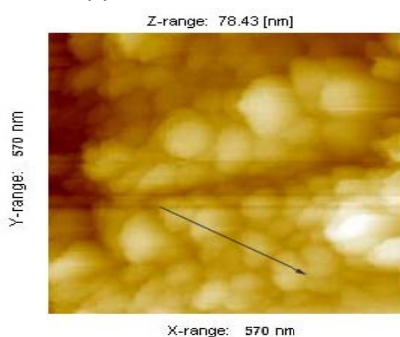
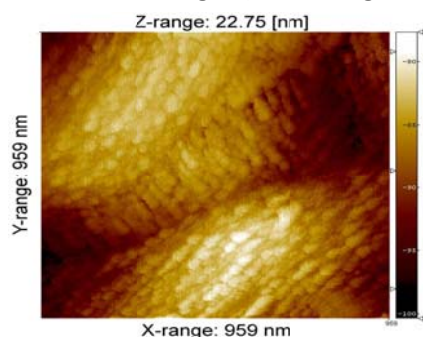
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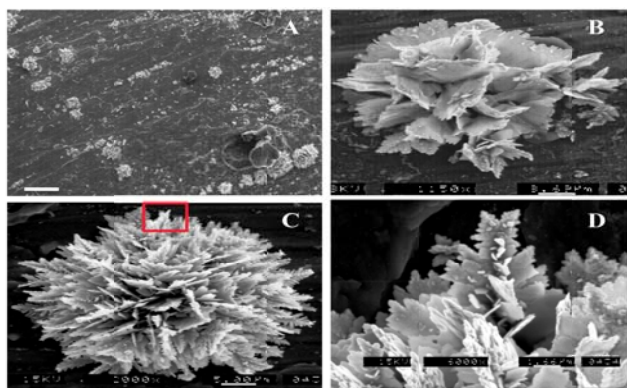
**Description:** Our interest is primarily in transcriptional regulation of genes, specifically of PKD1 (Polycystic Kidney Disease-1) gene, defect in which is responsible for 90% end stage renal failure. Regulation of gene expression, i.e., its protein/enzyme product formation, is critical in all cells for their normal differentiation, development and function. Transcription is the initial step for gene expression and is a complex process. It is influenced by both cellular and environmental factors, which can be specific for a gene, or can regulate many genes. In many instances, they are also regulated by other cellular or environmental factors. Using PKD1 gene as a model, we try to understand this important basic process of life.

In another area we recently got involved is to synthesize nanomaterials using biomolecules (like amino acid, sugars) for biological or other applications.



Scanning Tunneling Microscope (STM) images of silver nanoparticles produced by Household microwave using a carbohydrate, glucose.

*Z Dong, D Richardson, C Pelham, MR Islam: Rapid Synthesis of Silver Nanoparticles using a Household Microwave and their characterization - a Simple Experiment for Nanoscience Laboratory; Chem. Edu. 13: 240-243, 2008*



Scanning Electron Microscope (SEM) images of silver nanoparticles (AgNPs) synthesized using an amino acid, L-cysteine: these AgNPs spontaneously formed flower-like dendritic supra structure.

*A Swatek, Z Dong, J Shaw, MR Islam: Self-assembly of Silver nanoparticles into Dendritic flowers from aqueous solution; J. Exp. Nanosci. 5:10-16, 2010*

### ➤ Student Researchers (Most of them presented in a number of conferences)

- Zheng Dong (currently in Medical School, NU)
- Andrew Swatek (currently in Dental School, MU)
- Chris Pelham (currently in PhD program, IU)
- Scott Pease (currently in Graduate program, ISU)
- Collin Petegrew (currently in Undergraduate program, Northwest)
- Seung Hee Lee (currently in Undergraduate program, Boston U)