Akm A. Sattar, Ph.D.

Assistant Professor, Department of Internal
Medicine/ Endocrinology, Elliman-1146
Wayne State University School of Medicine
421 East Canfield Avenue
Detroit, MI 48201

CAPABILITIES:

- cDNA cloning and Site-directed mutagenesis
- Protein purification, crystallization, and Enzyme kinetics
- Receptor-ligand binding, Insulin receptor and GLUT4 trafficking assays
- Membrane fusion assay

RECENT ACCOMPLISHMENTS:

- Evidence of Gαi3 protein in vesicle fusion
- Phospholipase A2 in G-protein mediated pancreatic zymogen granule fusion
- Role of human insulin receptor juxtamembrane domain in insulin signaling
- RT-PCR and sequencing of rat alveolar macrophage fusion receptor (MFR)
- Differential expression of CD4, CD44, CD47, and MFR mRNAs from rat alveolar macrophage under fusing and non-fusing conditions
- Characterization of exonuclease active site residues of bacteriophage T4 and RB69 DNA polymerases
- Crystallization of RB69 DNA polymerase

EDUCATION:

1990 Ph.D., Pharmaceutical Science; Nagasaki University, Japan

1985 M.S., Biochemistry; Dhaka University, Dhaka, Bangladesh

1982 B.S. (Honors), Biochemistry; Dhaka University, Bangladesh

TECHNICAL SKILLS:

Biochemical: Purification of proteins from plants, mushrooms, and E. coli (rDNA expressed proteins) both by conventional and FPLC/HPLC ion-exchanger and gel filtration chromatographies. Antibody preparation and purification. Determination of pH-optima, pH-stabilities, thermal stabilities, isoelectric points, substrate specificities, subsites and kinetic parameters of enzymes. DNA, RNA and oligonucleotide purification and radiolabeling. Protein-DNA binding, cross-linking, and crystallization. Western blot, CD spectra, and SDS-PAGE and 2D-gel. **Molecular:** Mutagenesis, RT-PCR, northern blot, DNA-sequencing, cDNA expression arrays, cDNA library construction and screening by oocyte expression system. **Cell Biological:** Tissue culture, transfection, cell surface receptor-ligand interaction and cytosolic calcium assay. Isolation of zymogen granules, plasma membrane and membrane proteins. Membrane fusion assay using spectrophotometry and fluorometry.

TRAINING:

1990-1994 Postdoctoral Associate, Yale University School of Medicine, New Haven, CT

FACULTY APPOINTMENTS:

Jan.1986-Sept.1986 Lecturer, Institute of Nutrition and Food Sciences, Dhaka University, Dhaka, Bangladesh

Sept.1994-Sept.2000 Associate Research Scientist, Yale University School of Medicine, New Haven, CT

Oct.2000- June 2003 Assistant Professor., Dept. of Physiology, Wayne State University School of Medicine, Detroit, MI

July 2003-Present Assistant Professor, Division of Endocrinology, Wayne State University School of Medicine, Detroit, MI

Honors & Special Recognition:

1983-1984 Post-graduate Diploma Award in Nutrition, INFS, Dhaka University, Dhaka, Bangladesh

1986-1990 Monbusho Shogakkin, Japanese Government Scholarship for Higher Studies

PUBLICATIONS:
Original Articles

1) **Sattar, A.A.**, Berhanu, C., Gebrelassie, S., and Berhanu, P. Human insulin receptor juxtamembrane domain independent insulin signaling. *Cell Biology International* ***31****, 815-824 (2007)*

2) **Sattar, A.A.** and Haque, R. Cytosolic PLA_2 in Zymogen Granule Fusion and Amylase Release: Inhibition of GTP-induced Fusion by Arachidonyl Trifluoromethyl Ketone Points to $cPLA_2$ in G-Protein Mediated Secretory Vesicle Fusion. *J. Biochem.* ***141****, 77-84 (2007)*

3) **Sattar, A.A.**, Boinpally, R., Stromer, M., and Jena, B.P. Gαi3 in pancreatic zymogen granules participates in vesicular fusion. *J. Biochem.* **131**, 815-820 (2002)

4) Cho, S.J**, Sattar, A.A**., Jeong, E-H., Satchi, M., Cho, J.A., Das, S., Mayes, M.S., Stromer, M.H., and Jena, B.P. Aquaporin 1 regulates GTP-Induced rapid gating of water in secretory vesicles. *Proc. Natl. Acad. Sci. U.S.A.* **99**, 4720-4724 (2002)

5) Jeong, E-H., Webster, P., Khuong, C.Q., **Sattar, A.A.**, Satchi, M., and Jena, B.P. The native membrane fusion machinery in cells. *Cell Biology International* **22**, 657-670 (1998)

6) Wang, J., **Sattar, A.A.**, Wang, C.C., Karam, J.D., Konigsberg, W.H., and Steitz, T.A. Crystal structure of a pol alpha family replication DNA polymerase from bacteriophage RB69. *Cell* **89**, 1087-1099 (1997)

7) **Sattar, A.A**., Lin, T.C., Jones, C., and Konigsberg, W.H. Functional consequences and exonuclease kinetic parameters of point mutations of bacteriophage T4 DNA polymerase. Biochemistry **35**, 16621-16629 (1996)

8) O'Mally, S.M., **Sattar, A**., William, K.R., and Spicer, E.K. Mutagenesis of the COOH-terminal region of bacteriophage T4 regA protein. *J. Biol. Chem.* **270**, 5107-5114 (1995)

9) **Sattar, A.A**., Yamamoto, N., Yoshimoto, T., and Tsuru, D. Purification and characterization of an extracellular prolyl endopeptidase from *Agaricus bisporus*. *J. Biochem.* **107**, 256-261 (1990)

10) **Sattar, A.A**., Yoshimoto, T., and Tsuru, D. Purification and characterization of proline iminopeptidase from *Lyophyllum cinerascens* *J. Ferment. Bioeng.* **68**, 178-182 (1989)

11) **Sattar, A.A**., Yoshimoto, T., and Tsuru, D. *Lyophyllum cinerascens* aminopeptidase: purification and enzymatic properties. *Arch. Biochem. Biophys*. **274**, 241-250 (1989)

12) Yoshimoto, T., Matsuo, F., Oyama, H., Honda, T., **Sattar, A.A**., and Tsuru, D. Purification and characterization of prolyl endopeptidase from *Flavobacterium breve*. *Biochem. (Life Sci. Adv.)* **7**, 313-316 (1988)

13) Yoshimoto, T., **Sattar, A.A**., Hirose, W., and Tsuru, D. Studies on prolyl endopeptidase from shakashimeji (*Lyophyllum cinerascen*): purification and enzymatic properties. *J. Biochem*. **104**, 622-627 (1988)

14) Yoshimoto, T., **Sattar, A.A**., Hirose, W., and Tsuru, D. Studies on prolyl endopeptidase from carrot (*Daucus carota*): purification and enzymatic properties. *Biochem. Biophys. Acta* **916**, 29-37 (1987)

15) Majumder, M.S.I. and **Sattar, A.A**. Payer's patches immune function of vitamin A deficient guineapigs. *Nutrition Reports International* **36**, 143-150 (1987)

16) Majumder, M.S.I, **Sattar, A.A**, and Zaman, N. Effect of vitamin A deficiency on guineapig Payer's patches. *Nutrition Research* **7**, 539-545 (1987)

SELECTED ABSTRACTS:

1) **Sattar, A.A.** and Berhanu, P. "Human Insulin Receptor (hIR) and Glucose Transporter (GLUT4) Trafficking in Transfected CHO Cells: Effects of the Inhibitors of PI-3 and MAP Kinases and that of the Actin-Microtubules" Mol. Biol. Cell 17 (Supplement) CD-Rom (2006)

2) **Sattar, A.A.** and Berhanu, P. Intracellular trafficking of the human insulin receptor requires the intact juxtamembrane domain segment but not its specific amino acid sequence: Dependence of trafficking on PI-3 and MAP kinases. Diabetes (Suppliment 1) 54, P. A623-A624 (2005)

3) **Sattar, A.A.** and Haque, R. Midregion parathyroid hormone-related peptide specific receptors in cells. Molecular Biology of the Cell (Supplement) 13, P. 287a (2002)

MEMBER OF PROFESSIONAL ASSOCIATIONS:

1. American Society For Cell Biology
2. Nagasaki University Pharmacists Alumni Association, Nagasaki 852, Japan
3. Dhaka University Biochemists Alumni Association, Dhaka, Bangladesh
4. Bangladesh Nutrition Society, Dhaka, Bangladesh
5. Bangladesh Association for the Advancement of Sciences, Dhaka, Bangladesh

DR. SATTAR'S RESEARCH INTEREST: My research deals with the basic investigations of cellular and molecular biology of insulin action. I have been focusing on human insulin receptor (hIR) and GLUT4, as key molecules to study the molecular basis of insulin action. The binding of insulin to insulin receptor triggers intracellular insulin signaling and GLUT4 redistribution from intracellular compartment to the plasma membrane where it facilitates the entry of glucose into the cell. This insulin signaling pathway has significant medical implications, since its impairment may contribute to the development of obesity, cardiovascular problems and type 2 diabetes. The long-term objective of my research is to understand in molecular terms how insulin works.

Research Projects:

a) Dynamics of Human Insulin Receptor (hIR) and Glucose Transporter (GLUT4) Trafficking.

The binding of insulin to insulin receptor triggers intracellular insulin signaling and GLUT4 redistribution from intracellular compartment to the plasma membrane where it facilitates the entry of glucose into the cell.The aim of the project is to investigate the trafficking dynamics of hIR and GLUT4 in transfected CHO cells in insulin action.

b) Cross-talk between Insulin Signaling and Adiponectin Signaling.

The binding of insulin to insulin receptor triggers intracellular insulin signaling. Similarly, adiponectin signaling is primarily initiated through its binding to its receptor and participates in insulin signaling. Fat and muscle cells express both insulin receptor and Adipo R1. However, the relationship between these two receptors is not clearly understood. The aim of the project is to investigate the relationship between activation of key insulin signaling molecules and adipo R1 protein expression in fat and muscle cells. Also to determine the effect of over-expression of hIR and/ or adipo R1 on key molecules involve in insulin signaling and adiponectin signaling.

These studies will provide important information on the cross-talk between IR and Adipo R1 in mediating insulin signaling. In turn, such information may contribute towards the knowledge base necessary for eventual elucidation of the mechanism of insulin resistance.