

Prof. dr SATISH RAINA

Proposed subjects for PhD research in the Unit of Bacterial Genetics:

1. Catalysis of protein folding in the periplasmic space of *Escherichia coli*: study of disulfide bond formation and chaperones/folding catalysts required for maturation of outer membrane proteins.
2. *In vivo* function and mechanism of substrate recognition by universally conserved members belonging to peptidyl prolyl *cis/trans* isomerase family in *E. coli*.
3. Regulation and function of the essential sigma factor RpoE, control of outer membrane biogenesis and response to envelope stress.
4. Functional characterization of newly identified small non-coding sRNA's in regulating RpoE and the essential outer membrane components.
5. Regulated assembly and translocation of lipopolysaccharide: coupling of LPS synthesis and translocation by TPR containing essential heat shock protein LapB.
6. Regulation of heat shock response and functional characterization of novel heat shock proteins in the pathway of protein folding and acting as scaffold proteins.

Publications:

1. Klein, G., Kobylak, N., Lindner, B., Stupak, A., and **Raina, S.** (2014) Assembly of lipopolysaccharide in *Escherichia coli* requires the essential LapB heat shock protein. *J Biol Chem* **289**:14829-14853.
2. Klein, G., Müller-Loennies, S., Lindner, B., Kobylak, N., Brade, H., and **Raina, S.** (2013) Molecular and structural basis of inner core lipopolysaccharide alterations in *Escherichia coli*: incorporation of glucuronic acid and phosphoethanolamine in the heptose region. *J Biol Chem* **288**:8111-8127.
3. Brade, L., Heine, H., **Raina, S.**, Klein, G., di Padova, F., Brade H. and S. Müller-Loennies (2012) Immunization of rabbits with an anti-idiotypic antibody against the broadly cross-reactive monoclonal antibody WN1 222-5 induces a core-type restricted endotoxin-neutralizing immune response. *Innate Immunity* **18**:279-293.
4. Klein, G., Lindner, B., Brade, H., and **Raina, S.** (2011) Molecular basis of lipopolysaccharide heterogeneity in *Escherichia coli*: envelope stress responsive regulators control the incorporation of glycoforms with a third 3-deoxy- α -D-manno-oct-2-ulosonic acid and rhamnose. *J Biol Chem* **286**:42787-42807.
5. Murata, M., Fujimoto, H., Nishimura, K., Charoensuk, K., Nagamitsu, H., **Raina, S.**, Kosaka, T., Oshima, T., Ogasawara, N., and Yamada, M. (2011) Molecular strategy for survival at a critical high temperature in *Escherichia coli*. *PLoS One* **6**(6):e20063.