Lectins are ubiquitous and are being intensively studied from plants, animals, bacteria and fungi, as they specifically recognize and bind to carbohydrates present on cell surfaces. Although much is known about their structure, the physiological roles of plant lectins still remain obscure. Similar to plant lectins the functional roles assigned for fungal lectins are also highly speculative. However the functions of animal lectins are comparatively better understood.

Main objective of our work was to understand the physiological role of lectin from *Sclerotium rolfsii*, a soil borne phytopathogenic fungus, which infects several agricultural crops. For establishing the physiological role of this lectin, the distribution and cellular localization of SRL was studied by immunolocalization. Results of immunolocalization together with lectin expression studies revealed that SRL is expressed initially on the young hyphae and very high levels accumulated rapidly at the time of sclerotial body formation. Also the study revealed that SRL is developmental-stage specific lectin secreted by the fungus. Considering the fact that *S. rolfsii* forms sclerotial bodies under stress, our results suggests that SRL is secreted in response to stress. On the other hand capping of the lectin sites by anti-SRL strongly inhibits germination of the sclerotial bodies. Similar inhibition was also found by capping lectin sites with mucin or fetuin, with
which SRL binds strongly. A novel putative endogenous receptor for SRL was identified in the lipid extract of sclerotial bodies by using specific lectin labeling method, that substantiates the significance of the lectin-receptor interaction in the development of the fungus. It appears that the lectin-receptor complex formed at the time of sclerotial body formation will remain intact during the resting stage and the complex must undergo changes to facilitate germination. Considering the sugar specificity of SRL which binds specifically to Galβ1→3GalNAc-α-O-ser/thr residues of glycoproteins, it becomes evident that lectin binding receptor contains this moiety. Preliminary characterization studies of the lectin binding receptors after HPTLC using specific spraying reagents, indicate that the receptor RI and RII resemble phytoceramides as reported in fungi. The functions of the fungal phytoceramides is still obscure. The lectin receptor identified in S. rolfsii appears to be galactosyl ceramide, which strongly support our view that lectin-receptor interaction plays a key role in development and morphogenesis of the fungus. With these findings, we propose that the lectin expressed on the mycelia abundantly at the time of sclerotial body formation facilitates the aggregation of the mycelium by interacting with its endogenous receptor having specific carbohydrate moieties distributed on the hyphae. These ceramides, probably play diversified roles as second messengers, which activate intracellular signal transduction pathways leading to regulation of cell cycle and growth and thus play a key role in
germination. Based on our results, we conclude by assigning physiological role for both SRL and glycosylinositolphosphorylceramide (GIPC) receptors in the development and morphogenesis of *Sclerotium rolfsii*.

Considering the interesting sugar specificity of SRL, which recognizes Thomsen-Friedenreich (TF) antigen (DGalβ1→3 GalNAc-α-O-ser/thr) our another objective was to exploit the TF antigen specificity of SRL in histochemical studies to develop SRL as a novel probe to detect tumour associated antigens on malignant cell surfaces.

Preliminary comparative histochemical binding studies using labeled SRL and PNA with human normal and malignant tissues of colon, breast, ovary and oral tissues revealed interesting differences. Thus it warrants for careful investigations using large number of tissue samples to develop SRL as a potential histochemical probe in cancer biology. Also SRL is shown to be a potent mitogen to cultured human peripheral lymphocytes.

As there is no much information available on the structural details on fungal lectins, we undertook crystallization studies of SRL with the hope to determine the X-ray crystallographic structure. SRL was successfully crystallized and its preliminary X-ray diffraction data was collected at 1.1 Å resolution.