Modification of cell-signalling in eukaryotic cells using the adenylate cyclase toxin of *Bordetella pertussis*.

The aim of my diploma thesis was to study the transport of calcium ions into the host cells after their interaction with adenylate cyclase toxin (ACT) of *Bordetella pertussis*. During the interaction of ACT with mouse macrophages bearing integrin on their surface, intracellular concentration of calcium ions $[Ca^{2+}]_i$ was significantly increased. Variations of intracellular concentration of Ca^{2+} were measured by spectrofluorometer using Fura-2 fluorescence probe, which interacts with calcium ions inside the cells. The mechanism of calcium influx was studied as well as the effect of the presence of integrin receptor on the target cells.

Using the calcium channels inhibitors, I found that calcium ions enter the cells from extracellular environment via of ACT toxin itself and such toxin-mediated calcium influx can be inhibited by lanthanum ions (La^{3+}). Furthermore, calcium ions obviously enter the cells due to the AC domain translocation. On the other hand, the ACT toxins mutants lacking the AC domain are also able to induce an increase of $[Ca^{2+}]_i$ level in case when they exert an increased hemolytic activity due to an increased frequency of toxin pore formation. During the experiments with CHO cells (with integrin receptor on thir surface) I concluded, that the different calcium influx kinetics induced by the toxin (in comparison with J774A.1 cells) resulted from an increased integrin density on their surface.