Abstract

Protein engineering attracts more attention as a powerful tool of biotechnology and medicine. Small, engineered proteins derived from protein molecules of stable fold, the so called scaffolds, are potential replacements of supplements of more widely used antibodies. In this thesis, I introduce utilization of two scaffold molecules designed in our laboratory for development of stable and specific protein binders of high affinity. This thesis discusses the development of binders interacting with medically important human cytokines and their cellular receptors, interleukin-10, interleukin-28 receptor, and interleukin-9 receptor alpha. Recombinant cytokine and receptor proteins were expressed in eukaryotic cells in high yields and quality and served as molecular targets for selections using various display methods of directed evolution. We demonstrated that application of ribosome and yeast display methods or their unconventional combination in a newly developed integrated pipeline leads to successful generation of high affinity and specificity binders based on newly designed protein scaffolds called 57aBi and 57bBi.