

6 Summary

This work focus on the generation and application of high-density protein arrays to study autoimmune diseases.

For the generation of a cDNA-expression library from murine T-helper cells type 1 (Th1) the cDNA was directly cloned in the *E. coli* expression vector pQE30NASTattB. As T cells are implicated in immunological reactions, this TH1 expression library will be a source of recombinant proteins enabling the monitoring of the antibody repertoire in various autoimmune diseases. 65.000 clones were picked, and 200 of them were sequenced. The DNA sequence analysis shows T cell specific genes such as genes coding for IFN- γ and T cell receptor. The diversity of the T cell library is about 70-80%. The expression analysis identifies 12.100 expression clones, which were rearranged into an expression subset. High-density protein filters have been generated and successfully screened with specific antibodies.

The following part describes the screening of sera on high-density protein arrays from a human fetal brain cDNA-expression library to identify autoantigenes, which may be involved in rheumatoid arthritis. Identified clones from this library were induced for protein expression, their proteins were purified and immobilised onto microarrays which were incubated afterwards with the same patient and same control sera. Nine potential marker proteins could be identified. For some proteins, such as *TRAF family member-associated NF κ B activator* (NF κ B) and *interleukin-1 receptor associated kinase 1b* (IRAK) the relation to RA is new, whereas the complement component 3 have been previously described as autoantigen and the implication of heterogeneous nuclear ribonucleoprotein A1 in RA could be confirmed.

In the third part of the work, protein high- density filters of the mouse TH1 expression library are used for serum screening. For analysing the antibody repertoire protein arrays of the expression subset were incubated with sera of mice from a mouse model for SLE. Autoantigenes such as ribosomal proteins as well as the subunit C7/C8 of the 20S proteasome could be identified. Human related autoantigenes such as the subunit C9 of the 20S proteasome have been already confirmed as well as proteins such as the CD27 binding protein have been identified with no known function in this autoimmune disease.