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T cells in rheumathoid arthritis: from bench studies to new biomarkers and potential therapeutic targets

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Pathogenesis of rheumatoid arthritis involves a prominent role for self-reactive T cells, specific for collagen II. Yet, no biomarkers are currently in use that helps the clinical management of patients that can directly monitor T cell activity during the disease. By using the immuno scope technique, we identify and monitor individual T cells specific for human collagen II, shared among DR4+ RA patients, circulating in the peripheral blood and able to home to the synovia. This repertoire of T cells appears to be a by stander of acute presentation of the disease, being detectable in peripheral blood only during disease flares. The presence of this repertoire at the onset of the disease allows the identification of a sub group of RA patients, characterized by a peculiar HLA-DR haplotype that are resistant to standard first line therapy and would benefit from direct access to DMARD-BM therapy. This approach would reduce incidence of unwanted side effects of first line therapy and the accumulation of damage during an ineffective therapy. Finally, by using *in silico* approach, we were able to design specific inhibitors for the recognition of collagen II/HLA-DR4 complexes by T cells which may represent the basis for future drugs.

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