purification, solution NMR mapping, mutagenesis and Surface Plasmon Resonance) and computational simulations (docking) were used to characterize the binding of IL3 and anti-CD123 to CD123.
4. RESULTS
Nine anti-TIM-3 antibodies were obtained and they showed different Kd (from 10^{-10} to 10^{-8}), measured by SPR, now we plan to sequence them.
Docking simulations, using ROSETTA software, were performed using as template the receptor of IL3, composed by chain Î±Î², and IL3/anti-CD123. Computational models of IL3/IL3R and anti-CD123/CD123 complexes were obtained, both in accordance with previous published works, in particular with residues that are fundamental for binding.
To confirm IL3/CD123 docking NMR mapping between IL3 (^{15}N labeled) and CD123 was done showing a different HSQC spectrum before and after the addition of CD123 to IL3 labeled, meaning that a complex was formed. To know which are the residues at the interface other NMR experiment to assign the protein were performed that are still in progress.
To confirm anti-CD123/CD123 docking different mutants that should affect binding were prepared, according to docking results, and ELISA comparing wt and mutants was performed obtaining consistent results.
5. SUMMARY
Our work is still in progress but all the results obtained are promising and our approaches, if confirmed by further experiments, could be applied to other types of cancer.

Session: **Inaugural Symposium of the European Academy for Food Engineering (EAFE)**
Time: **14:00 - 14:25**
Abstract Nr: **181**

MICRO- AND NANOTECHNOLOGY IN FOOD ENGINEERING

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(This contribution is for the Inaugural Symposium of the European Academy of Food Engineering)
Application of micro- and nanotechnology in the production of foods gives us fundamentally new ways to process raw materials to valuable products. These new technologies may contribute to a number of the societal problems that will be important in the coming century: better nutrition for better health, for an ageing population, and to reduce the incidences of (mal)nutrition related diseases. In addition, it can help in making production processes more sustainable.
Micro- and nanotechnology may enable us to work with much greater precision and under milder conditions than previous. Separations can be carried out with high selectivity under mild, ambient conditions; conversions can become very selective, while the internal structure of products can be formed with great precision. One may even form product structures that simply were not possible with conventional techniques, and that could be important for the development of healthy products with good sensory properties.
Micro-engineered membranes can have fluxes that are three orders of magnitude larger than those of conventional membranes. At the same time the pore size and pore geometry can be exactly designed and created. For these types of membranes it is possible to use a skimming effect to achieve full rejection with membrane pores that are much larger than the particles that are retained.
Full-resolution simulation of the dynamics of polydisperse suspensions above such as well-defined membrane indicated that the shear-induced diffusion process responsible for back-transport is more complex than generally thought. It was found possible to use this understanding to completely avoid membrane fouling while achieving full fractionation at very high volume fractions of the dispersed phase.
Using micro-engineered microchannels or edge based emulsification (EDGE) microdevices, it is possible to create completely monodisperse emulsions at very low energy input. Especially the EDGE systems were found to be very suitable for scale-up, as there is no interference between droplet forming units, and the droplet detachment, based on Laplace instability, is very stable against pressure differences.
Finally, the same type of non-idealities in the dynamics of concentrated suspensions under flow can be used to structure (soft) food solids down to scales below 200 nm. Protein domains of 100 - 200 nm in concentrated suspensions tend to line up under shear flow. Simultaneous, slow enzymatic crosslinking then results in fibrillar protein products that show hierarchical fibrous structure from 150 nm up to macroscopic scales.
These examples show that use of micro-and nanotechnology is possible, and suitable for scale up. It will give food engineers the possibility to contribute to the societal challenges on sustainability and health that face us in the 21st century.

Session: **Inaugural Symposium of the European Academy for Food Engineering (EAFE)**
Time: **14:25 - 14:50**
Abstract Nr: **249**

EMULSION ENGINEERING: PRECISION PRODUCTION, PRECISION APPLICATIONS

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