



© CDC / Unsplash

ENZYMES AT THE HEART OF CELL THERAPY

#enzyme engineering #molecular biology #bioinformatics #genomics
#health #cell therapy

Hyaluronic acid is a polymer that is well-known in health and cosmetic fields because of its ability to heal and reconstruct tissue. In recent years, it has been increasingly used in cell therapy because it reinforces stem cell properties. A company that manufactures pharmaceutical grade hyaluronic acid contacted Capacités' enzyme engineering experts: the company aims at developing a new deacetylation process which keeps overall polymer structure while increasing its interactions with stem cells.

FROM MODELING TO GENETICALLY ENGINEERED ENZYME

The acetyl functions of hyaluronic acid are usually removed through a chemical treatment. However, such poorly controlled reaction usually damages the polymer, leading to a loss of its physicochemical properties. Capacités' experts were in charge of developing an enzymatic process to deacetylate hyaluronic acid under mild condition, in order to retain its properties.

The customer had identified an enzyme capable of replacing the known chemical process that produces a deacetylated form of hyaluronic acid. The company needed to compare this enzyme to another that possessed the desired characteristics but already patented.

Capacités' experts first made 3D models of these two enzymes to compare their structures. The models showed strong similarities. However, they also revealed that the active site of the enzyme selected by the customer requires

modifications so as to interact more efficiently with hyaluronic acid. Next, the enzyme engineering experts proposed directed evolution strategies for modifying the enzyme's active site. They used the same digital models as the ones used initially to predict DNA sequence modifications for the enzyme.

Capacités' expert succeeded in producing an enzyme having new characteristics which complies with customer specifications and improves the performance of the customer's products in the field of cellular therapy.

To successfully complete this project, the Capacités' experts benefited from support and technical equipment from the UFIP laboratory (Protein Functionality and Engineering Unit), joint research unit of Université de Nantes and CNRS (The French National Centre for Scientific Research). ■

Expertises:

- Enzymology
- Glycochemistry

CAPACITÉS

Created in 2005, Capacités is the private engineering and research valorisation subsidiary of the University of Nantes. It employs 90 employees, mainly engineers and PhDs, who work directly with scientists in the research laboratories.



UNIVERSITÉ DE NANTES



Commercial contact
deveco@capacites.fr
(+33)2.72.64.88.94



Communication contact
communication@capacites.fr
(+33)6.36.13.36.56