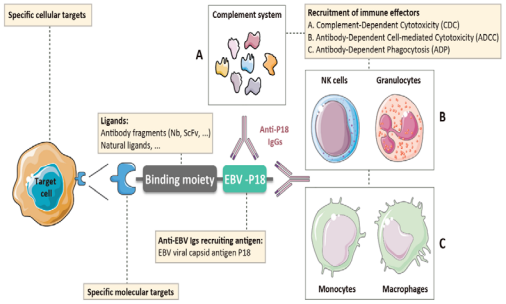
NANOCURE

Use of an Epstein Barr Virus (EBV) antigen to redirect a pre-existing immune response against EBV towards pathogenic targets in several diseases.

ERGANEO
L'AVENIR EST FAIT D'AUDACE

PRESENTATION

98 % of the human population is chronically infected by EBV. We propose an innovative platform for engineering immunogenic bi-modular fusion proteins comprising a binding moiety and an EBV antigen to redirect an EBV pre-existing immune response towards a select cellular target. The aim is to develop efficient therapies triggering immune mechanisms such as Complement-Dependent Cytotoxicity (CDC), Antibody-Dependent Cell-mediated Cytotoxicity (ADCC) and Antibody- Dependent Phagocytosis (ADP) to combat pathogens or treat pathologies such as cancer.



Conceptual modes of action of Bi-Modular Fusion Proteins. EBV-P18 antigen (Ag) is highly recognized by circulating immunoglobulins (Igs) present in the plasma of chronically infected individuals.

Once fused to a binding moiety specifically directed towards a molecular marker on a target element, P18 may serve as a recruiting antigen for anti-P18 IgGs and lead to the formation of immune complexes at the surface of the unwanted element.

The subsequent initiation of antibody-dependent clearing mechanisms via Fc binding to C1q (A) or to FcRs present at the surface of immune effectors cells (B, C) will ultimately lead to the elimination of the target cell. Nb: Nanobody (single domain antibody). ScFv: Single-chain Fragment variable. The art pieces used in this figure were modified from Servier Medical Art by Servier, licensed under a Creative Commons Attribution 3.0 Unported License (https://smart.servier.com/). Credits: Arnaud Chêne®

APPLICATIONS

- Treatment of cancers (such as B-cell lymphomas)
- Treatment of infectious diseases (such as malaria)

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Epstein-Barr Virus - Therapeutic molecular engineering - Antibody fragments - Nanobodies - Immune effectors - Cellular cytotoxicity / complement activation

COMPETITIVE ADVANTAGES

- Applicable for 98 % of the population.
- Easy to produce as compared to current therapies such as monoclonal antibodies.
- Triggering of multiple immune effectors due to the recruitment of polyclonal antibodies.
- Allow efficacy improvement of current therapeutic antibodies.
- Versatile platform allowing large scale screening of binding moieties.
- Multiple applications (treatment of a large panel of diseases).

INTELLECTUAL PROPERTY

Patent application filed on June 2017

DEVELOPMENT PHASE

☑ TRL 3 / Infectious disease (malaria) and cancer (B lymphoma) models have revealed that bi-modular constructs respectively targeting P. falciparum-infected erythrocytes and malignant B cells were able to trigger CDC, ADCC and ADP leading to pathogenic cell clearance.

☑ Furthermore, in vivo experiments performed in a mouse tumor model, showed that treatment with a bi-modular construct specifically targeting B cells was able to significantly decrease tumor progression and promote cancer remission in mice.