
Microalgae, a sustainable and innovative way to produce therapeutic antibodies

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Résumé

Considering the rise of chronic diseases such as cancers, the demand for innovative and specific antibodies used as diagnostic tools or biologics has increased significantly. Currently, these antibodies are produced using mammalian cells. However, this type of production present drawbacks such as high production costs, heterogeneous production, cell line instability and potential risk of viral contamination. Therefore, it is essential to develop alternative biomanufacturing methods that reduce production's cost while maintaining the antibodies quality and efficacy, thus facilitating patient access to these innovative treatments and diagnostic tools.

Bioinspired by the ocean, Alga Biologics is a DeepTech, Greentech, Blue Tech company developing an innovative platform for antibody's production using microalgae. Such cell biofactory presents the advantages to be sustainable and ecoresponsible as compared to mammalian cells. To begin its activities, Alga Biologics has targeted Neuroblastoma, a tumor of the sympathetic nervous system that represents around 7% of pediatric cancers. The immunotherapy treatment against this tumor is based on the use of an antibody targeting the ganglioside GD2. *Phaeodactylum tricorutum*, a diatom very promising for pharmaceutical applications is used as an innovative cell factory to produce this antibody.

Using multiple approaches such as genetic engineering and abiotic factor improvements, the antibody's yield has been multiplied by 100 within the last year. The antibody's production has been proven stable from laboratory to pilot scale. Our team has also recently demonstrated its ability to produce on a 200L scale, microalgae-based antibodies with a functional profile identical to those produced in mammalian cells.

Mots-Clés: Antibodies, *Phaeodactylum tricorutum*, Neuroblastoma, cancer, recombinant proteins, microalgae

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