

BioWin: driving cancer immunotherapy in Wallonia

BioWin, the health competitiveness cluster of Wallonia, Belgium, is the region's point of reference across biopharma and medtech. Cancer immunotherapy has rapidly emerged as a focal point of BioWin's uniquely collaborative ecosystem, owing to the local high density of cancer and immunology players.

Since its inception in 2006, BioWin, the health competitiveness cluster of Wallonia, Belgium, has become the point of reference for any stakeholders in the fields of biopharma and medtech—companies, investors, research institutions, universities and government—that are interested in partnering within the region. With 187 industrial members, and a system in place to address all elements of the drug development cycle, from research to marketing, through biomanufacturing, clinical trials and drug registration, BioWin is a key contributor to the dynamic innovation ecosystem and economic output of Wallonia.

Focus on cancer immunotherapy

Enlisting the help of the body's own immune system is a leading strategy in the fight against cancer. Wallonia has a high concentration of top-level researchers in immunology, oncology, and the combined translational field of cancer immunotherapy at centers such as the Ludwig Institute of Cancer Research (LICR), the de Duve Institute (DDI) at Université Catholique de Louvain, and the Institute of Medical Immunology (IMI). Against this backdrop, and given the collaborative environment fostered by BioWin, several startup companies in cancer immunotherapy have entered the scene. Here, we highlight four of these companies.

Celyad: developing a universal CAR-T therapy

Celyad is developing next-generation, genetically engineered autologous and allogeneic T cells expressing chimeric antigen receptors (CARs) that bind to cancer-specific antigens. In contrast to first-generation CAR-T cells, which typically recognize just one tumor antigen and thus limits their use to one type of cancer, Celyad's CYAD-01 CAR-T cells express an artificial receptor derived from a natural receptor present in natural killer cells that interacts with eight different ligands produced by tumor cells under stress. Because these ligands are expressed in many types of tumor, CYAD-01 could be potentially useful in up to 80% of cancer types.

In preclinical studies, CYAD-01 targets tumor cells, ligand-expressing blood vessels that feed the tumor and inhibitory cells that help tumors evade the immune system within the tumor microenvironment. CYAD-01 also triggers the generation of long-term cell memory against targeted tumors—an effect akin to traditional vaccination—owing to induction of the host's adaptive immune response.

In addition to CYAD-01, Celyad's pipeline includes programs in solid tumors and allogeneic CAR-T cell development.

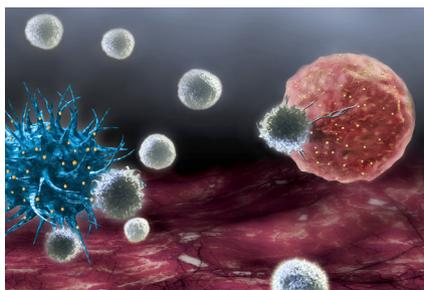


Fig. 1 | Cancer immunotherapy—a key driver of innovation in Wallonia. Shown here, cytotoxic T cells (grey) induced by a plasmacytoid dendritic cell (PDC)-based cancer vaccine (blue) attacking a tumor cell (red). Image courtesy of PDC*line Pharma.

iTeos: targeting the immune tumor microenvironment to optimize patient outcomes

iTeos Therapeutics is a privately held, clinical-stage biopharmaceutical company dedicated to extending and improving the lives of cancer patients by designing and developing next-generation immunotherapies.

The company is advancing EOS100850, an insurmountable and non-brain-penetrant adenosine A2A receptor antagonist, into a phase 1 trial in the second half of 2018. A second program for its human antibody-dependent cell-mediated cytotoxicity-enabling anti-TIGIT antibody (EOS884448) is expected to enter the clinic in 2019.

Based in Gosselies, Belgium, and Cambridge, Massachusetts, iTeos Therapeutics was founded out of LICR and DDI in 2011. In June 2018, the company completed a \$75 million series B financing round led by MPM Capital, alongside new investors HBM Partners, 6 Dimensions Capital and Curative Ventures, and all previous investors, including Fund +, VIVES II, the Regional Investment Company of Wallonia (SRIW) and the Federal Holding and Investment Company (SFPI).

*PDC*line Pharma: developing versatile, off-the-shelf therapeutic cancer vaccines*

PDC*line Pharma is developing a line of plasmacytoid dendritic cell (PDC)-based cancer vaccines derived from a proprietary allogeneic human PDC line, the PDC*line (Fig. 1). PDC*line displays strongly enhanced antigen-presentation and neoantigen-presentation capabilities compared with autologous dendritic cells, and an improved response to checkpoint inhibitors.

PDC*line is easy to expand in large quantities and without growth, differentiation or maturation factors in bioreactors, and following in vitro exposure to tumor antigens and irradiation, can be frozen and

stored for years. The off-the-shelf product is thawed and directly injected to treat any patient with a cancer type that expresses the selected antigens and expresses HLA-A2—other HLAs may also be used to extend the target population, making the platform applicable to any cancer type.

A first-in-human phase 1 study has been completed in melanoma, and PDC*line Pharma is now developing two other lead candidates: a candidate for lung cancer (PDC*Lung), which is entering a phase 1/2 study, and a neoantigen-based candidate (PDC*Neo).

ImmunXperts: customizing immunotherapy development support

ImmunXperts is a contract research organization that offers comprehensive and customized immunogenicity assessment solutions for companies developing immunotherapies, in particular cancer immunotherapies.

Through its global network of immunology experts and partners, ImmunXperts has access to the best advice and infrastructure needed to offer the most appropriate support throughout the drug development process. Using in vitro assays to measure and assess the effect of a drug candidate on immune cells, the more promising and less risk-bearing drug candidates are selected, which drastically increases their chance of passing subsequent in vivo tests and clinical trials.

ImmunXperts designs test combinations that are specifically tailored to a client's drug in development, and the company is continuously updating its offerings to include the latest advances in immunogenicity assessment. The ultimate goal of ImmunXperts is to serve as a flexible and rapidly adjusting development arm to its partnering clients.

Driving global partnerships

At the heart of BioWin's mission to promote innovation in cancer immunotherapy and the life sciences lies a philosophy of open collaboration that illustrates the dynamism of a region that is not only open to technological partnerships, but also offers a vibrant ecosystem to support those partners—a region that equally invests in, and supports the growth of, scientific excellence and entrepreneurial leadership.

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