PDC*line Pharma
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PDC*line pharma
ADVANCED CANCER VACCINES

PDC*vac: highly potent, versatile, off-the-shelf therapeutic cancer vaccines

PDC*line Pharma is developing cancer vaccines derived from a proprietary allogeneic human plasmacytoid dendritic cell line. Following a feasibility clinical trial in melanoma, the company is actively expanding and diversifying its portfolio of cancer vaccines with a phase 1/2 trial in non-small-cell lung cancer.

Based in Liège (Belgium) and Grenoble (France), clinical-stage biotech PDC*line Pharma is developing a novel class of off-the-shelf cancer immunotherapies derived from PDC*line, a proprietary plasmacytoid dendritic cell line that can be engineered to display high levels of any cancer-antigen-derived, human leukocyte antigen (HLA)-A2-restricted peptide of choice. The resulting PDC*vac potently primes and boosts fully functional antitumor CD8$^+$ T cells to generate strong cytotoxic activity against tumor cells.

Compared with conventional, mostly autologous dendritic cell (DC)-derived vaccines, PDC*vac is off the shelf, easily scalable, up to ten times more economical, easily genetically modifiable and exhibits up to 200-fold higher potency. The antitumor activity of PDC*vac can be further increased by using it in combination with anti-programmed cell death 1 (PD-1) immune checkpoint inhibitors to achieve a synergistic effect.

"PDC*vac is derived from the only therapeutic plasmacytoid dendritic cell line available off the shelf and is ready to be used globally," said Eric Halioua, CEO and president of PDC*line Pharma. "The first preclinical and clinical results are very encouraging, and the recent licensing deal we signed with leading Korean pharmaceutical company LG Chem further underscores the potential of our technology."

In March 2019, PDC*line Pharma granted an exclusive license in South Korea and exclusive options in other Asian countries to LG Chem Life Sciences Company for the development and commercialization of the PDC*lung cancer vaccine. The total value of the deal is $123 million (€108 million) plus tiered royalties on net sales in Asia.

Giving cancer vaccines a PDC boost

DC-derived cancer vaccines have been in development for close to three decades now, but despite some clinical success, there is a need for further improvement and optimization of the approach. Existing DC-based cancer vaccines are mostly autologous, which severely limits the scalability of the approach, and their efficacy is compromised by the challenge of obtaining a sufficient quantity of fully functional DCs and by external factors such as tumor-induced immune suppression.

PDC*line addresses these issues through its increased ability to prime and expand antigen-specific CD8$^+$ T cells compared with conventional (myeloid) DCs. PDC*line achieves this effect through an original mechanism of action involving (1) the activation of allogeneic CD4$^+$ T cells and (2) the expression of specific cytokines, which together help to fully activate and expand antitumor CD8$^+$ T cells.

In addition, the lack of expression of key costimulatory molecules prevents the effective proliferation of allogeneic CD4$^+$ T cells, explaining the absence of allogeneic rejection of PDC*line both in vitro and in vivo.

Together, all these features lead to a boosted expansion of antigen-specific CD8$^+$ T cells, resulting in the potent antitumor activity of PDC*vac.

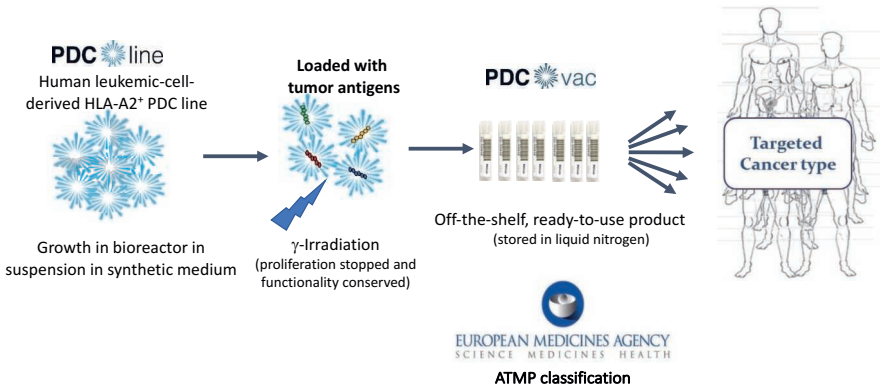

Fig. 1 | Development of next-generation plasmacytoid dendritic cell-based cancer vaccines. These allogeneic vaccines are derived from a potent plasmacytoid dendritic cell (PDC) line and can be engineered to present any cancer antigen-derived, human leukocyte antigen (HLA)-A2-restricted peptide of choice or neoantigen. ATMP, advanced therapy medicinal product.

A PDC*vac for every need

PDC*line is a professional and universal antigen-presenting cell that is very easy to expand in large quantities. Following in vitro loading with the desired tumor antigen target, the resulting PDC*vac can be irradiated and stored frozen for years. The off-the-shelf product is thawed and directly injected to treat any patient with a cancer type expressing the selected antigens and HLA-A2. Because of the ease of transformation of the PDC*line cells, PDC*vac can be engineered to present different HLAs and/or any type of conventional antigen, neoantigen, shared antigen, peptide, mRNA or even viral vector (**Fig. 1**).

PDC*vac is currently available in the form of several cancer vaccine drugs.

- PDC*mel: PDC*Pharma's first candidate for melanoma. PDC*mel completed a first-in-human phase 1b feasibility clinical trial in 2017 assessing the safety of the product, the absence of rejection and its biological activity.
- PDC*lung: the company's leading candidate for non-small-cell lung cancer. PDC*lung targets widely expressed shared antigens. A phase 1b/2 trial evaluating its safety and biological activity, alone and in combination with anti-PD-1 immune checkpoint inhibitors, is being initiated.
- PDC*neo: PDC*Pharma's next candidate. PDC*neo is in preclinical development as a platform for expressing any kind of neoantigen.

According to Halioua, "with a workforce of 20 people, an experienced management team and a robust financial situation—looking to close a new round of financing of €11 million in 2019 following a previous raise of €17 million—PDC*line Pharma is in a strong position to advance its existing clinical programs and further develop its preclinical pipeline."

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