MATWIN
MATURATION & ACCELERATING TRANSLATION **WITH INDUSTRY**

TECHNOLOGY OFFER

SUPPORTING INNOVATION AND TECHNOLOGY TRANSFER IN ONCOLOGY

THERAPY

XXX*Lung

A therapeutic vaccine candidate for lung cancer based on a proprietary allogeneic cell line of Plasmacytoid Dendritic Cells

CONTEXT & BACKGROUND

Since 2014, the revolution of immuno-oncology gives unprecedented hope for cure to lung cancer patients thanks to anti-PD-1 immune checkpoint inhibitors. However, in most indications, **around 80% patients don't respond to anti-PD-1, in relation to poor anti-tumor immunity.**

Therapeutic vaccines, which aim at boosting anti-tumor immunity represent a potential solution. The most attractive approach is based on dendritic cells (DC) due to their unique antigen-presenting properties. However, DC-based vaccines are autologous cell therapies which face complex and costly logistic and production processes, and lack convincing clinical efficacy.

The company is a clinical stage biotech that develops a new class of therapeutic vaccines using a proprietary cell line of Plasmacytoid Dendritic Cells (XXX*Line) with unique features, potentially synergizing the clinical activity anti-PD-1 devoid of additional toxicity, without process challenges of other cell therapies. A robust preclinical proof-of-concept of the technology is established, and a first-in-human phase Ib in melanoma shows promising preliminary results.

XXX*vac superior mechanism of action **represents a unique solution to overcome all the limitations of conventional therapeutic cancer vaccines, and beyond.** Indeed, XXX*vac shares the advantages of both antigen-based vaccines (homogeneity, cost-effectiveness, scalability…) and of classical dendritic cell-based vaccines (optimal DC targeting and loading, efficacy…), while in fact being **much more potent than either of them.**

The objective of the company is now to demonstrate how its innovative approach based on a proprietary allogeneic cell line of Plasmacytoid Dendritic Cells can boost CD8+ T cells anti-tumor immunity in lung cancer patients 4,5 and thus significantly enhance clinical response to anti-PD(L)1.

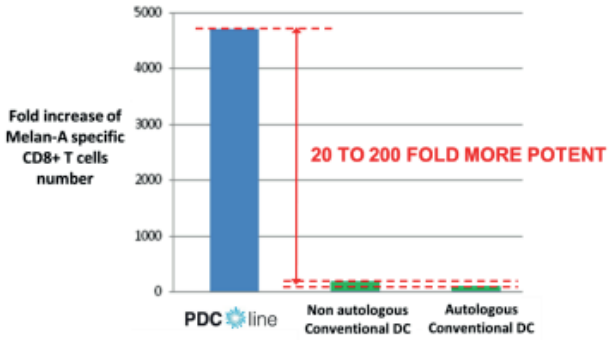

*Figure 1: PDC*line superior immunogenicity to induce CD8+ T cells compared to conventional allogeneic or autologous DCs*

INNOVATIVE COMPONENT & TECHNOLOGY

- XXX*vac: a new class of therapeutic cancer vaccines based on proprietary allogeneic cell line of Plasmacytoid Dendritic Cells (XXX*line), a potent antigen presenting cell with unique mechanism of action, loaded with any desired HLA-A*02:01 restricted peptides derived from antigens of target cancer type.
- Pipeline : XXX*mel for melanoma in phase I, XXX*lung for lung cancer (preclinical validation)

OBJECTIVES

Establish the clinical proof-of-concept that XXX*lung synergizes with anti-PD-1 immune checkpoint inhibitors in advanced stage non-small cell lung cancer patients compared to anti-PD-1 in monotherapy;

SCOPE

Cancer immunotherapy

KEYWORDS

Immuno-oncology, Therapeutic cancer vaccine, Immune checkpoint inhibitors combination strategy (anti-PD-1 / anti-PD-L1), Non-small cell lung cancer, Plasmacytoid dendritic cell, Allogeneic cell based therapy.

DEVELOPMENT & MATURATION STAGE

- Robust preclinical proof-of-concept of XXX (Aspord, Plos One 2010; Aspord, JID,2012)
- First-in-man phase IB in melanoma

INTELLECTUAL PROPERTY & PATIENT CO-OWNER(S)

- 2 patents: Dendritic cell line GEN 2.2 (WO 2004-061-089), and Plasmacytoid dendritic cell line used in active or adoptive cell therapy (WO 2009-138-489)
- Exclusive rights granted by EFS (Etablissement Français du Sang) to the company for therapeutic cancer vaccines

TARGET POPULATION

- Advanced stage Non-small cell lung cancer, eligible to anti-PD-(L)1
- HLA-A2 compatible (50% of patients in Europe, 36% in the USA)

TARGET PROFILE

- XXX*lung: Company*line (proprietary plasmacytoid dendritic cell line) loaded with HLA-A*02:01 restricted peptides derived from tumor antigens expressed by over 90% of target population (cancer/testis antigens, MUC1…)
- Dose: 70 Million cells (10 million cells / peptide)
- Route: intravenous
- Combination: with anti-PD-(L)1 monoclonal antibody
- Schedule: every 2 weeks x 6 (induction), then every 2 months x 4 (consolidation)

STRENGHTS & COMPETITIVE ADVANTAGES

- **Potency**. Ex-vivo studies show (Aspord et al, 2010) that Company*line is more potent than conventional (myeloid) DCs (that are suboptimal, heterogenous and may be affected by disease and previous treatments). The use of multiple cancer / testis antigens is also a plus.
- **Scalability.** Company*line can be mass-produced as an off-the-shelf standardized product, much cheaper and more convenient than conventional autologous DC-based immunotherapies. The same product is used for all treatments of the target population, which also facilitates its development.

INDUSTRIAL APPLICATIONS & OPPORTUNITIES

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- XXX*vac is applicable to virtually any cancer type, and even to personalized approaches based on neo-antigens. It is easy to adapt the set of tumor antigens used, with no need of significant preclinical validation.
    - o in combination with immune checkpoint inhibitors such as anti-PD-(L)1 in advanced stage cancer
    - o as an adjuvant monotherapy treatment in early stage cancer
- XXX*vac can also be engineered to express other molecules, such as other HLA haplotypes in order to extend the targeted patient population to non-HLA-A*02:01 patients. Futures generations of products will be able to be developed.

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