vaccibody

Vaccibody

NORWEGIAN BIOTECH ONCOLOGY SEMINAR

ABG Sundal Collier

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Martin Bonde, PhD
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Vaccibody AS in summary

- Founded in 2007 in Oslo, Norway
- Privately held clinical stage immuno-oncology company, spun-out from Oslo University, 25 employees
- Proprietary, patented vaccine technology
- Experienced, international management team with oncology expertise and biotech pedigree driving development
- Raised € 52 mill in equity since inception, € 32 mill in cash, market cap approx. € 240 mill (traded stock)

Martin Bonde,
CEO

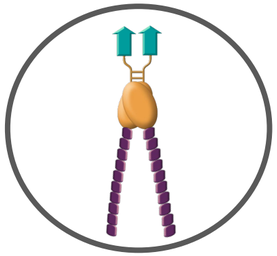
Agnete B. Frederiksen,
Founder, President and CSO

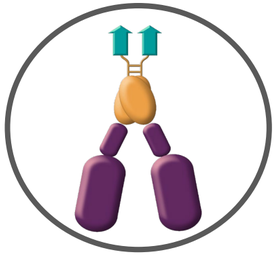
Mads B. Axelsen,
CMO

Mette Husbyn,
CTO

Vaccibody Product Pipeline

PROGRAM	DISCOVERY	PRE-CLINICAL	PHASE I	PHASE II	PHASE III
MELANOMA LUNG (NSCLC) BLADDER RENAL HEAD AND NECK	VB10.NEO				
HEAD AND NECK	VB10.NEO + NKTR-214		NEKTAR®		
PRECANCEROUS CERVICAL LESIONS	VB10.16				
CERVICAL	VB10.16 + Atezolizumab (CPI)		Roche		

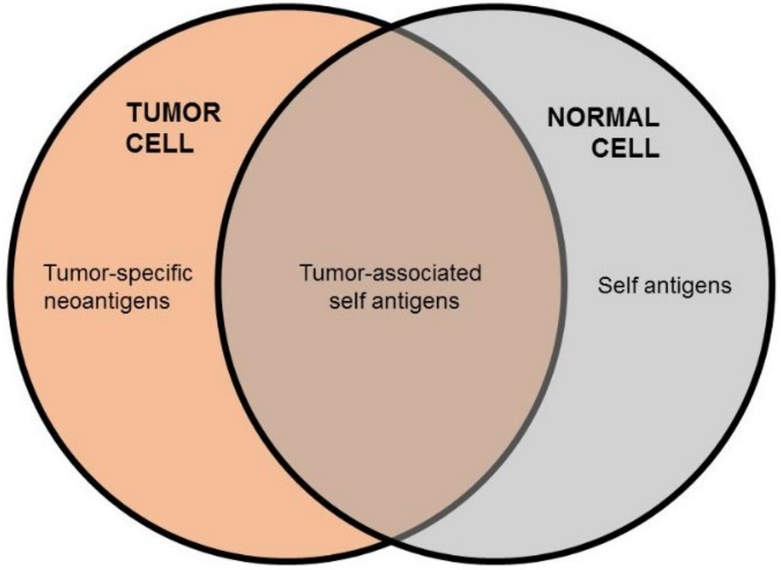




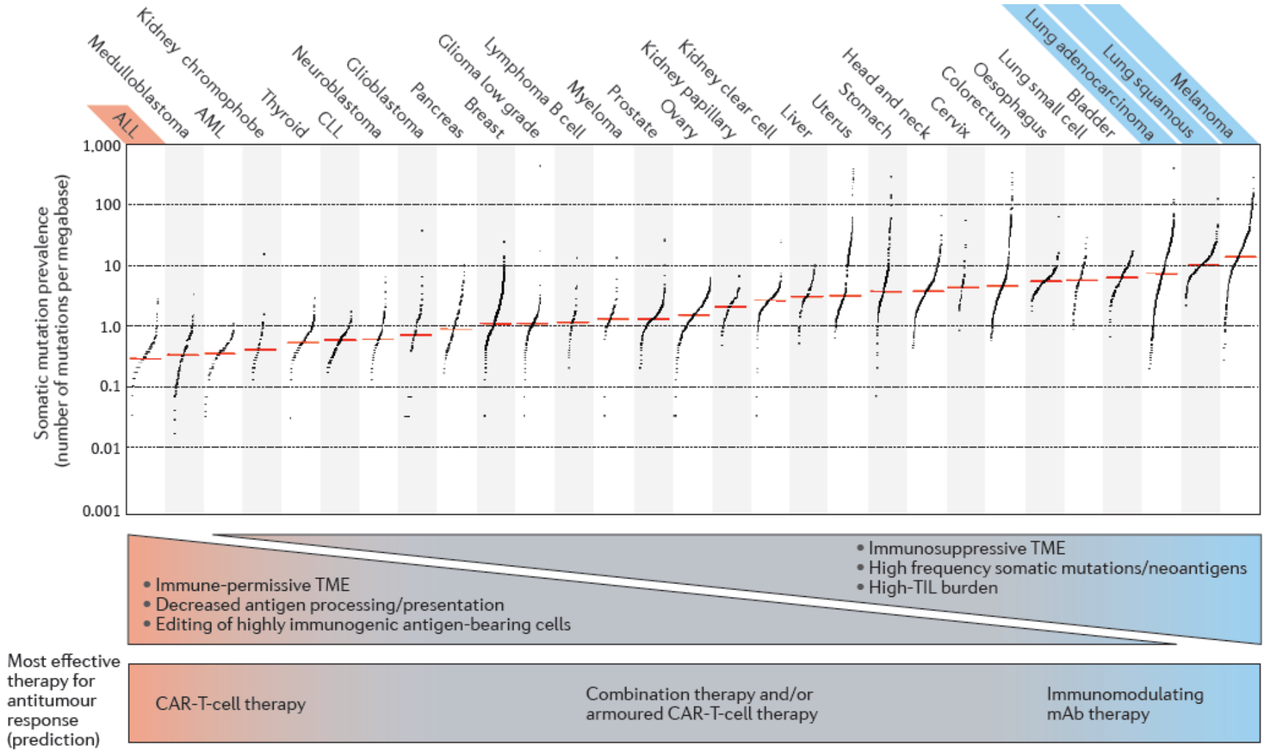
Neoantigens: New tumour-specific antigens

«Recognition of random somatic mutations is the «final common pathway» explaining cancer regression from immune oncology therapies for solid tumors»*

Neoantigens: New tumour-specific antigens



The key target of T cells in patients that experience clinical benefit from cancer immunotherapies like immune checkpoint inhibitors



Source: Khalil DN et al., Nat Rev Clin Oncol. 2016 Mar 15
*From Steven Rosenberg's presentation at SITC2019

The Workflow of Personalised Cancer Treatment

1. Tumour biopsy and sequencing

2. Neoepitope selection (TSNA)

3. Vaccine manufacturing (n=1)

4. Vaccine administration and immunogenicity

Time, cost, efficacy?

Vaccibody – Proprietary Vaccine Technology Platform

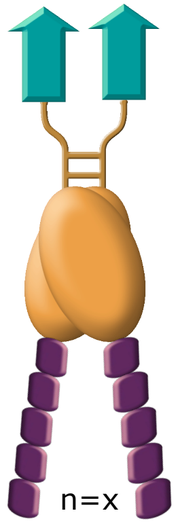
The Vaccibody Technology Platform was developed based on the concept of **targeting antigen to APC** in order to create more efficacious vaccines.

Exchangeable DNA Cassette

Vaccibody DNA Vaccine Plasmid

VB10.NEO

In vivo expression



Vaccibody in Protein Format

Target to Antigen Presenting Cell

Dimerization for crosslinking target receptor

Antigen moiety

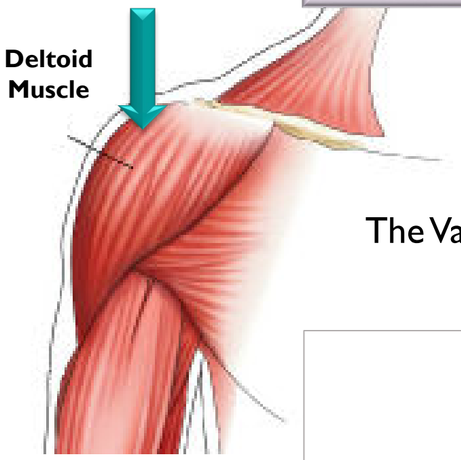
Mechanism of action: Intrinsic adjuvant for direct targeting

Administration (i.m.) of DNA plasmid

***In vivo* protein expression and secretion**

Target – Attract – Mature – Deliver – Cross-present

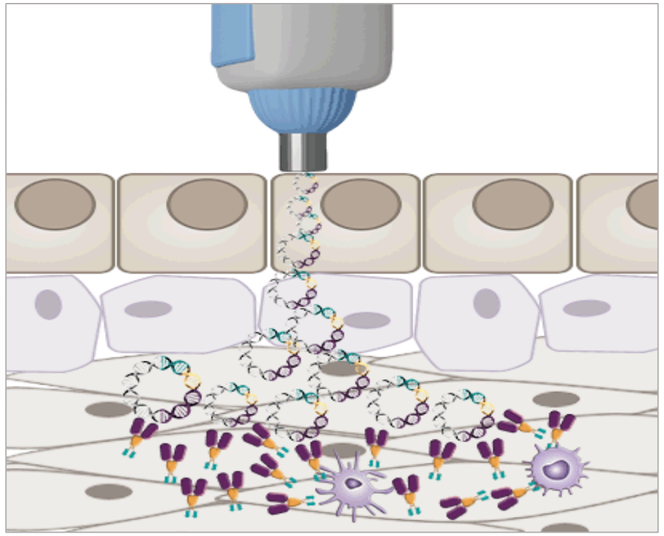
Skewing the immune system to a CD8+ killer T-Cell response

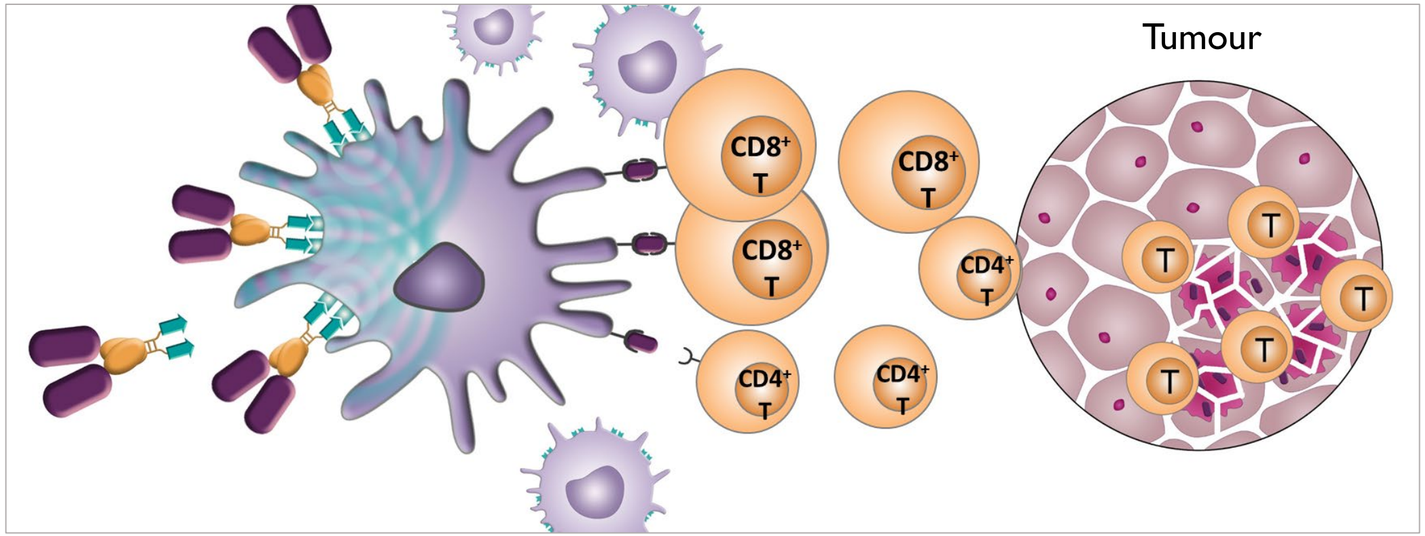


The Vaccibody uses the muscle cell as a factory

- Direct targeting & attraction of antigen presenting cells, high local vaccine concentration
- Enhanced T cell immunity obtained with fewer and lower doses
- Faster and longer lasting immune responses
- **Stronger potential to kill cancer cells**

PharmaJet®

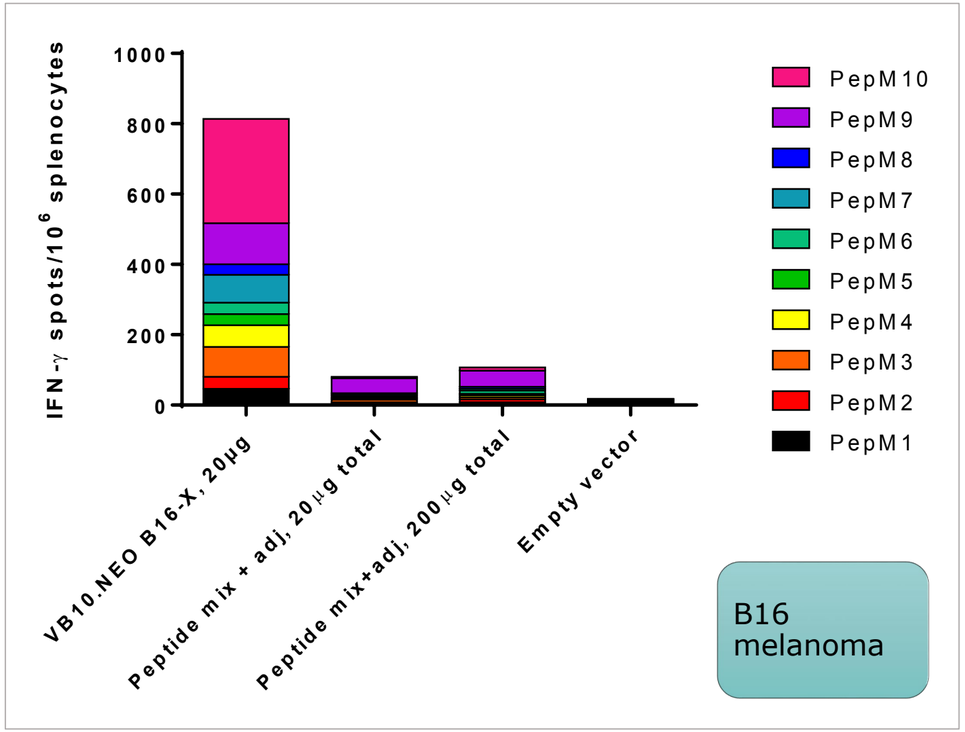




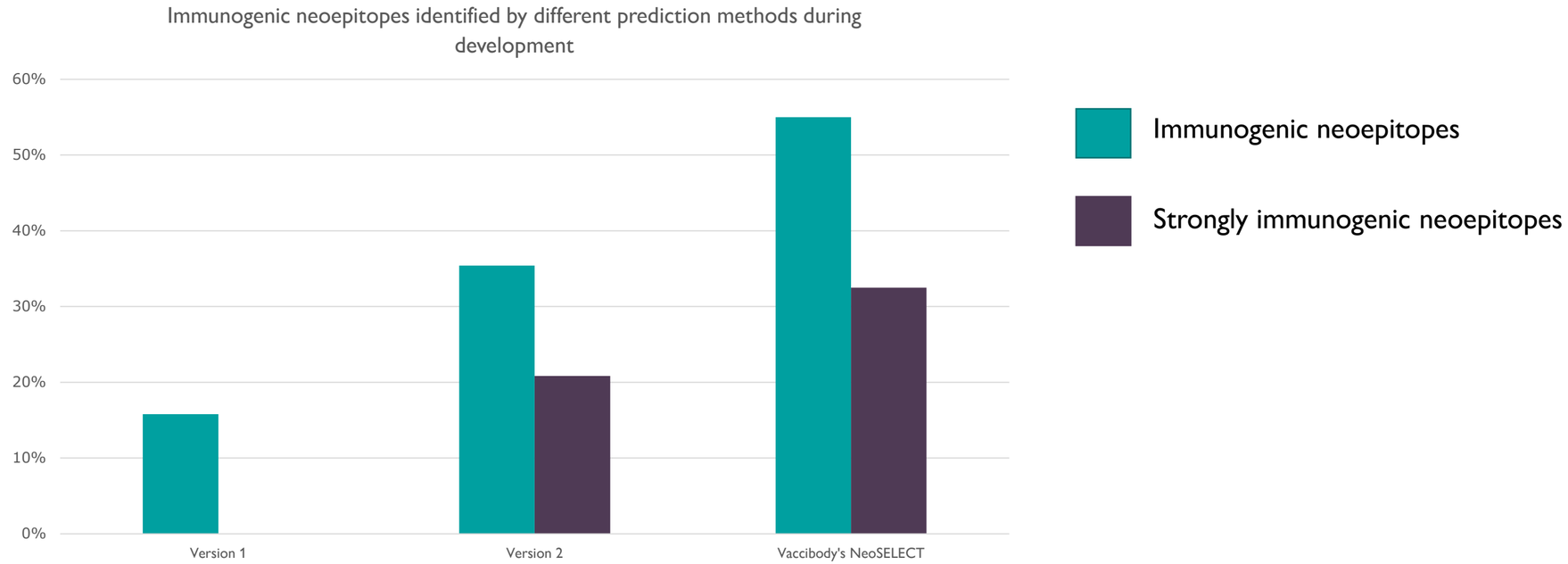
Targeting is elicited by the MIP-1α chemokine

VB10.NEO induces Rapid, Broad and Strong responses to multiple Neoepitopes by single Vaccination

- VB10.NEO induces a broader and stronger response than Peptide + Poly (I:C) Adjuvant vaccines after a single immunization.
- VB10.NEO vaccinated animals respond to all 10 neoepitopes after a single immunization.
- Immunodominant neoepitopes differ between delivery vehicles



Successful development of a strong proprietary neoepitope selection method NeoSELECT™

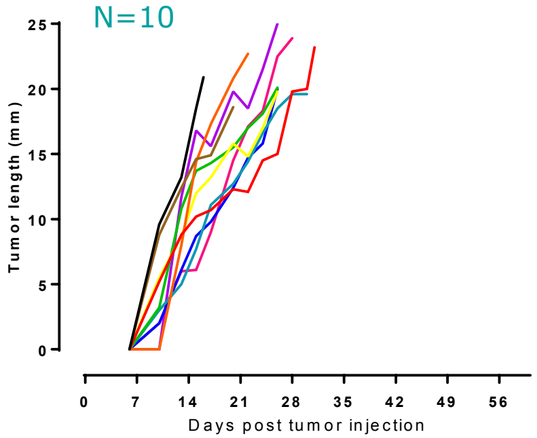


- Vaccibody has since 2017 successfully developed a proprietary neoepitope selection method able to identify a high number of immunogenic neoepitopes when used in VB10.NEO vaccines
- Competitors present in general 0.1-20% immunogenic neoepitopes for their prediction analysis
- This method, NeoSELECT, is used in the VB N-01 clinical trial

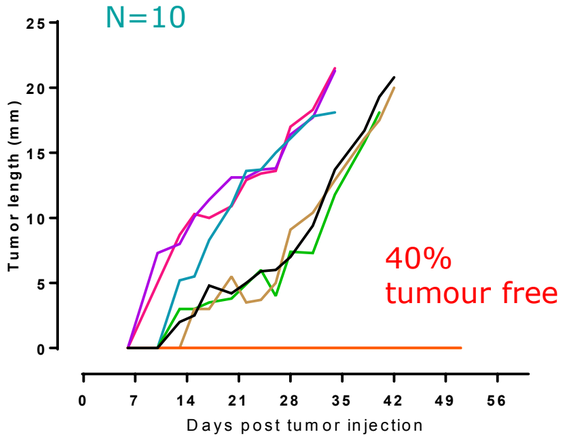
Vaccibody Induces Tumor Protection as Monotherapy

CT26 colon carcinoma model

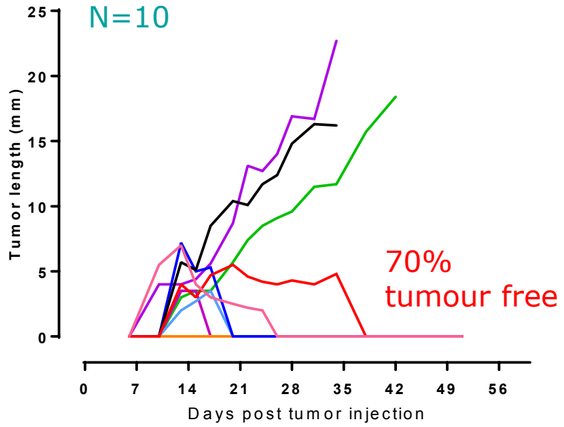
Control



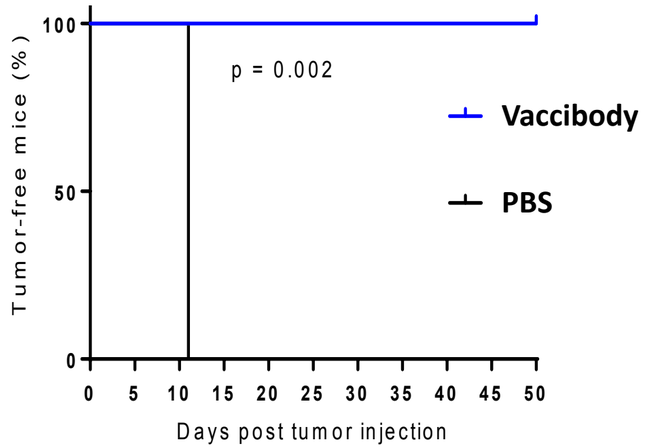
Vaccibody Monotherapy



Vaccibody Combination Therapy



Re-challenged mice are protected



- Vaccibody vaccination induces strong CD8+ T cell responses and **tumour protection as Monotherapy**
- Combination with anti-PD-1 immunotherapy induced enhanced anti-tumour responses in mice involving **complete tumour regression** of large, established tumours
- **Long-term memory responses** ensure effective anti-tumour responses after a 2nd tumour challenge in surviving mice with no sign of tumour growth

Vaccibody Product Pipeline

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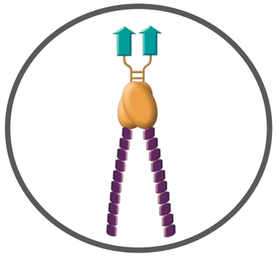
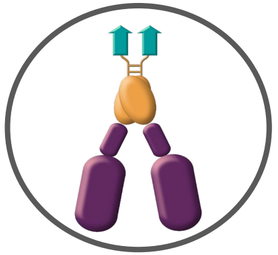
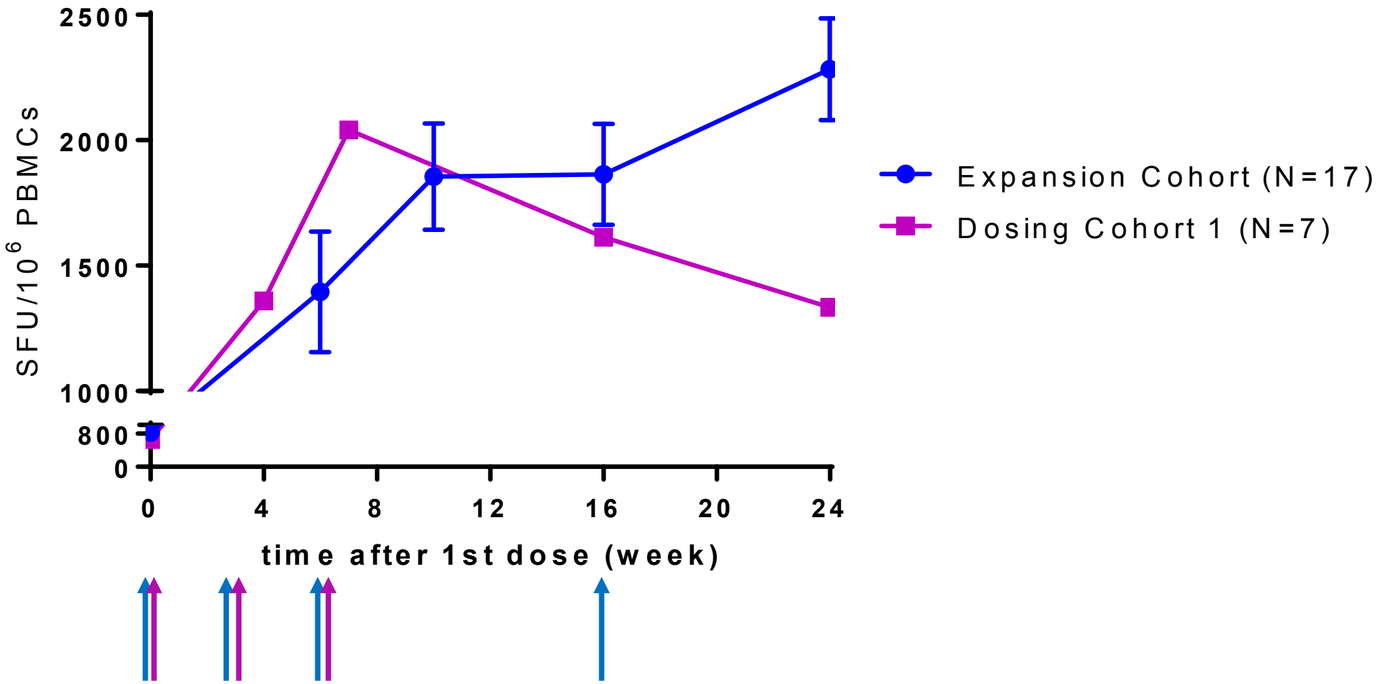




Tecentriq® (Atezolizumab) is Roche's proprietary anti-PD-L1 checkpoint inhibitor (CPI)

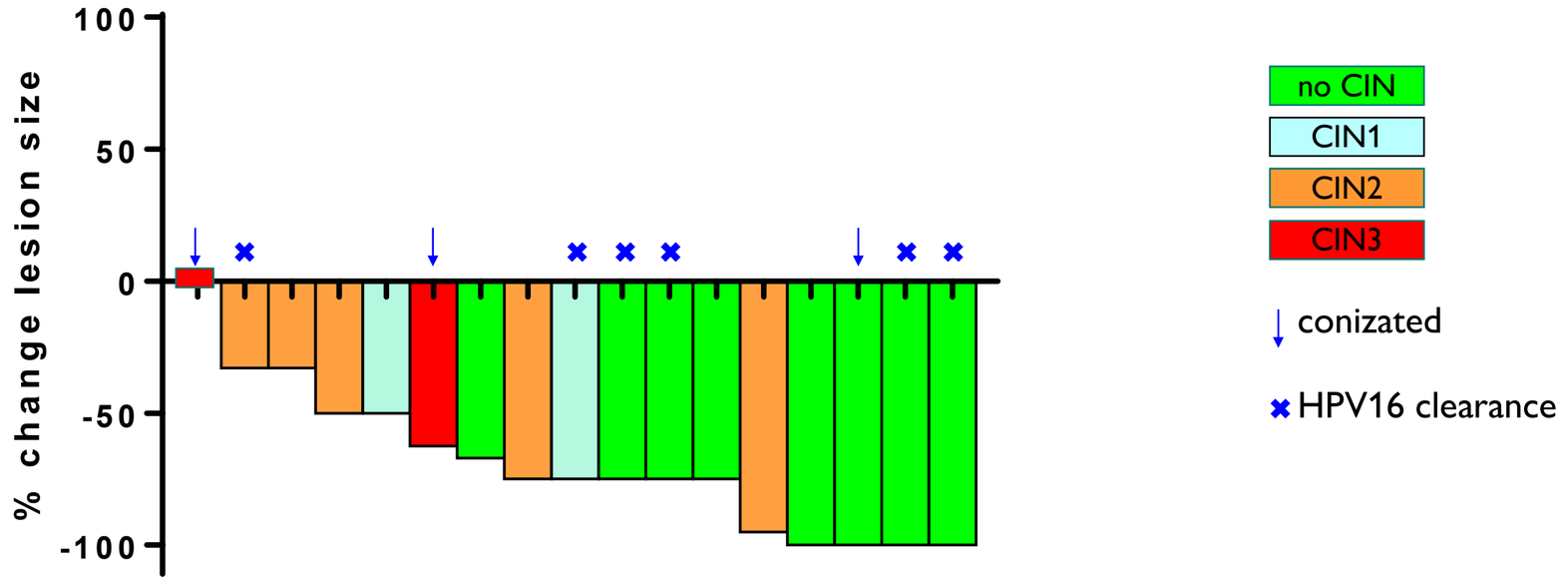
Strong, long-lasting immune responses elicited to HPV16, VB C-01



- The vaccination regiment from cohort 1 (week 0, 3 and 6) plus a booster vaccination at W16 was introduced in phase IIa
- 16 of 17 patients (94%) from phase IIa elicited increased HPV16-specific T cell responses after vaccination with VB10.16.
  - Rapid, strong and long-lasting

Promising clinical efficacy with excellent safety, VB C-01

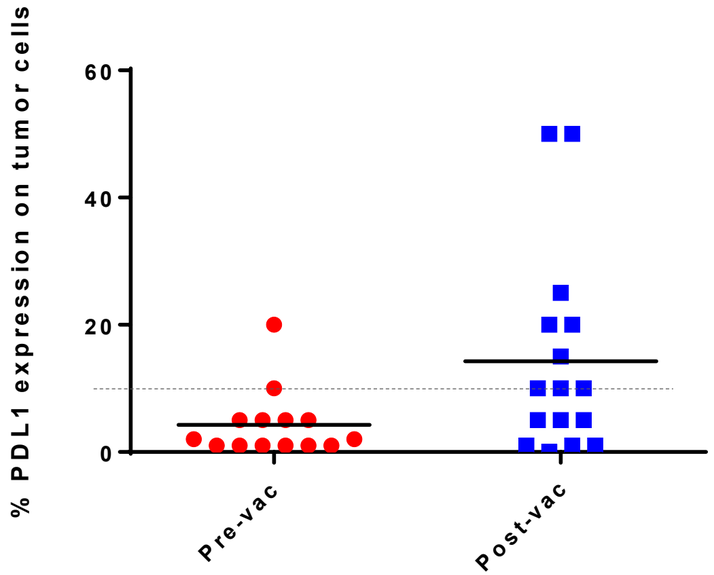
Best response data
(At enrollment: 10 CIN3 and 7 CIN2 patients)

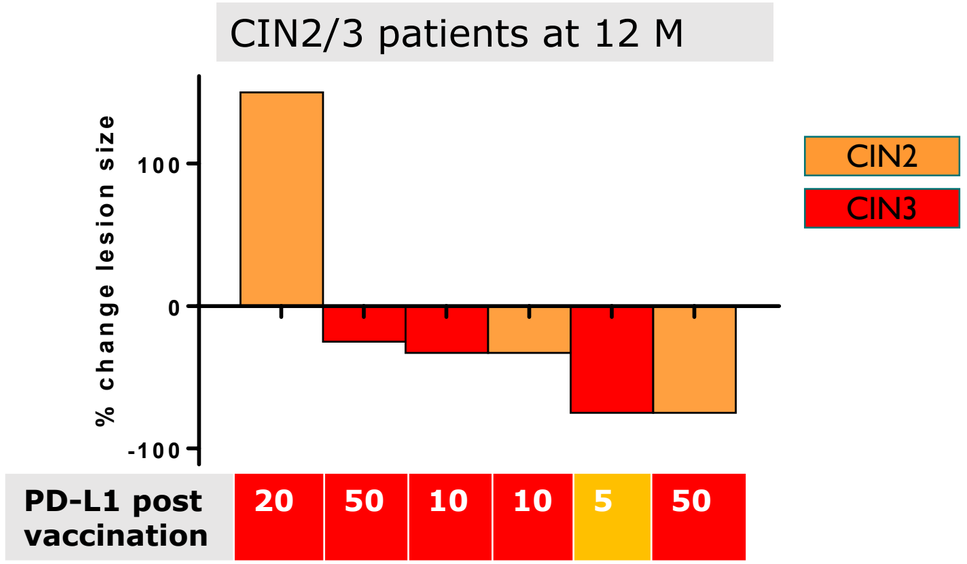


VB10.16 as a monotherapy in HPV16-positive, precancerous cervical lesions induces:

- Lesion size reduction in all patients followed >4 months
- CIN regression to CIN1 or no CIN in 10 patients
- HPV16 clearance in 6 patients

VB10.16 upregulates PD-L1, suggesting effect of combination therapy





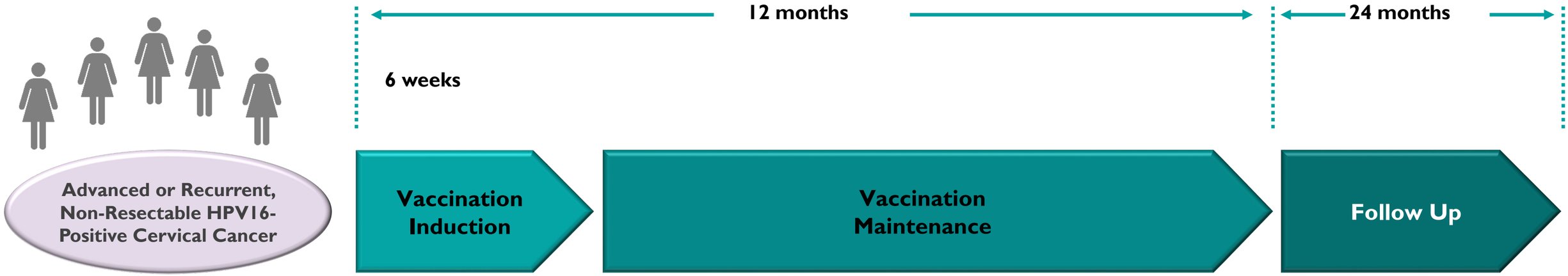
- 5 of 6 patients that were CIN2/3 after completing the study (12M) showed **upregulation of PD-L1** ≥10% (1 patient 5%)
- PD-L1 is upregulated by a strong local T cell response and may inhibit an efficacious long-term immune response
- Anti-PD-1/PD-L1 inhibitors blocks the brake and activates the immune system to attack PD-L1+ tumour cells
- VB10.16 induces a strong T cell response and creates a target for PD-1/PD-L1 inhibitors. Thus, there is a strong rationale for combination of VB10.16 with an anti-PD-1/PD-L1 checkpoint inhibitor to improve its effect, especially in PD-L1 negative patients

CPI: checkpoint inhibitor

Proposed study design for VB10.16 + Tecentriq®

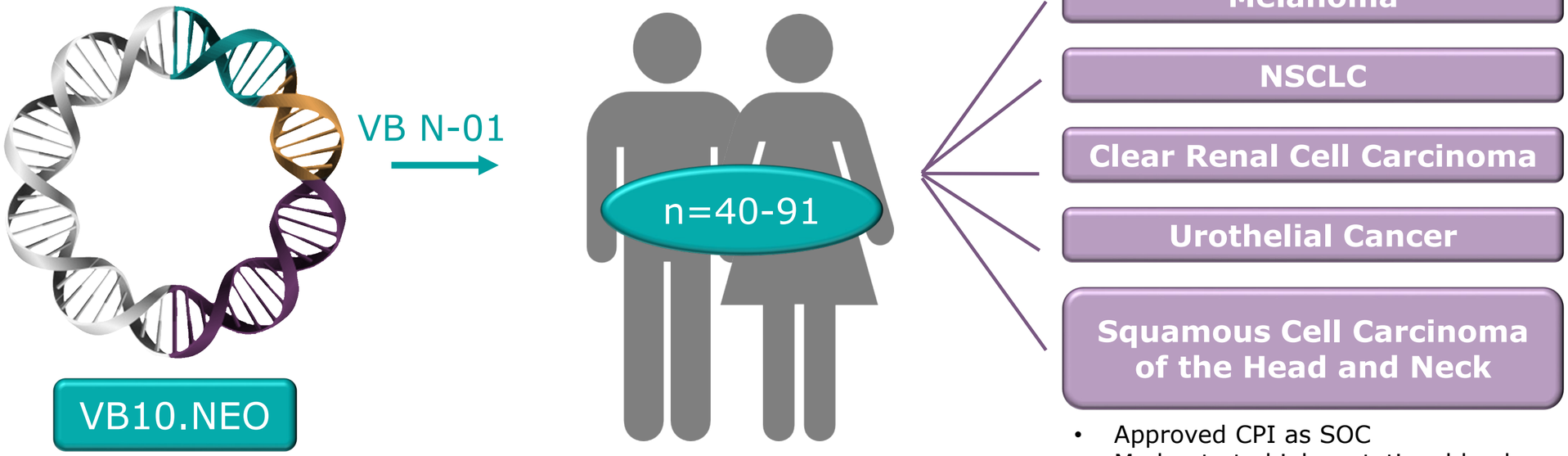
In patients with advanced or recurrent, non-resectable HPV16+ cervical cancer

- Dosing of VB10.16 in combination with Atezolizumab (Tecentriq®)
- Purpose is to assess the safety/tolerability, immunogenicity and the efficacy of multiple doses of 3 mg VB10.16 immunotherapy in combination with Atezolizumab
- First patient, first visit is est. in Q1 2020
- Up to 50 patients are planned to be enrolled
- The study will be conducted in Europe at est. 20 clinical sites
- 6 months interim data from first few patients in Q4, 2020



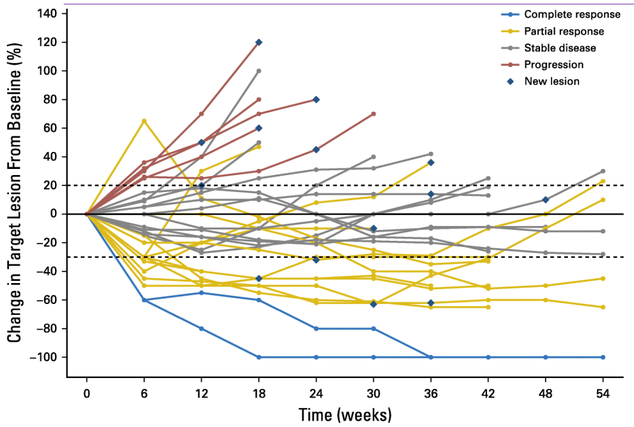
VB10.NEO: Cancer neoantigen vaccine in clinical trial (VB N-01)

VB N-01: An open labelled first human dose phase 1/2a study to evaluate safety, feasibility and efficacy of multiple dosing with individualised VB10.NEO immunotherapy in patients with locally advanced or metastatic melanoma, NSCLC, clear renal cell carcinoma, urothelial cancer or squamous cell carcinoma of head and neck, who did not reach complete responses with current standard of care immune checkpoint blockade



- Approved CPI as SOC
- Moderate to high mutational load

Unique Study Design and Treatment Schedule VB N-01



12 months

24 months

6 weeks

Sequencing, Synthesis & Manufacturing

Vaccination Prime

Vaccination Maintenance

Follow Up

CPI treatment >12 weeks

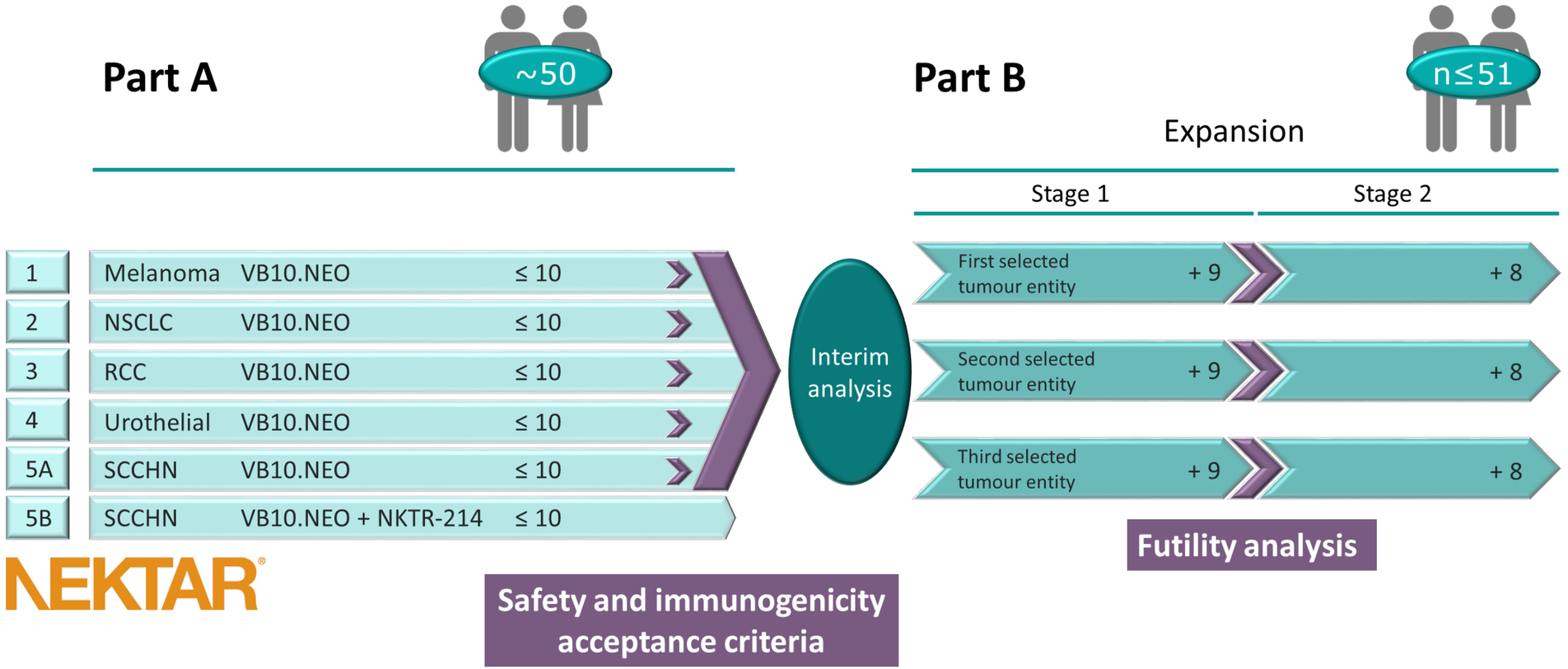
Consent + Biopsy

Week	0	3	6	10	14	18	22	26	30	34	38	42	46	50
Dose #	1	2	3	4	5	6	7	8	9	10	11	12	13	14

- Inclusion criteria: previous treatment with CPI for >12 weeks and stable disease (or partial response or mixed response) at enrollment. Limited tumour reduction expected from continous CPI treatment only

Tsimberidou et al., 2018

Plan to open expansion cohort in 2H 2019



- 100% vaccine manufacturing success for all patients with a successful biopsy so far
- 20 neoepitopes selected for all patients in the trial
- First expansion cohort could be initiated in H2, 2019

Vaccibody's Solution to Personalised Cancer Treatment

1. Tumour biopsy and sequencing

NeoSELECT™

2. Neoepitope selection (TSNA)

-DNA: Robust, rapid, cost-effective, stable, safe, up to 40 neoepitopes

3. Vaccine manufacturing (n=1)

-Needle-free

-Target, Attract, Mature, Deliver, Cross-present

-Rapid, strong, long-lasting

-unique CD8 dominated responses

4. Vaccine administration and immunogenicity

Vaccibody provide a Rapid, Cost-effective and Efficacious solution

DNA plasmid as therapeutic modality enables competitive COGS for personalized neoantigen vaccine

	1st Clinical Trial(s)	On Market
Manufacturer	• CMOs	• Dedicated manufacturing unit(s)
Services	• Variety of suppliers	• All under one roof
Capacity	• 120 - 150 vaccines per year	• Matching market demand
Time from biopsy to immunization	• 12-14 weeks	• Target: 4-6 weeks
Cost per batch	• > 100.000 EUR	• ~15 000 EUR

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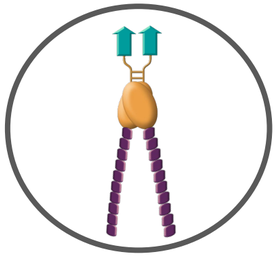

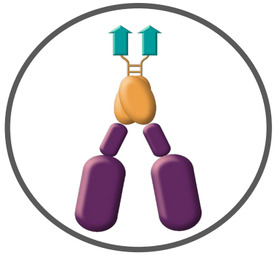

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