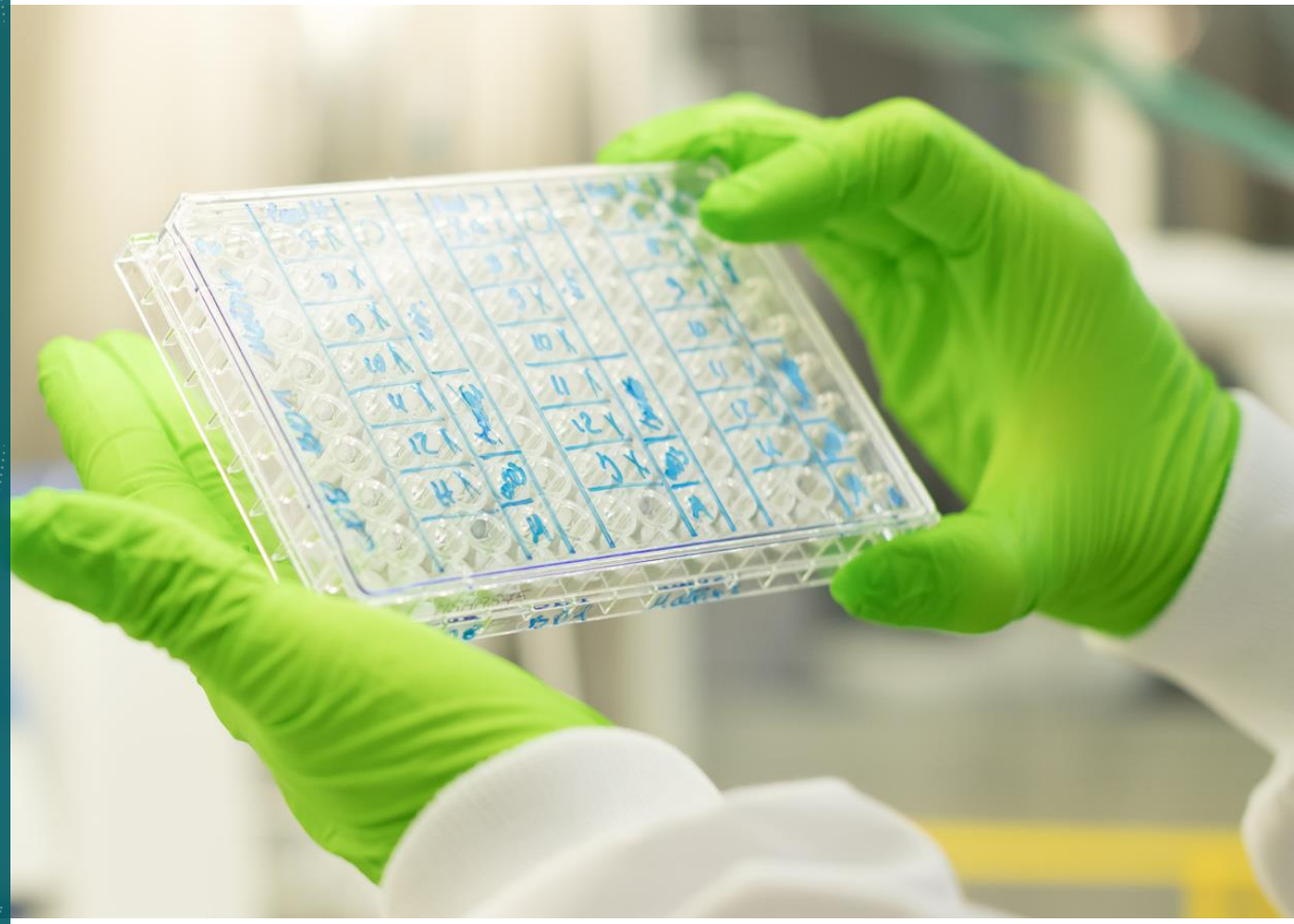
Next Generation Immunotherapy

August 2020



This slide presentation includes forward-looking statements

Forward-Looking Statements

Various statements in this slide presentation concerning the future expectations of BioNTech, its plans and prospects, includingthe Company's views with respect to the potential for mRNA therapeutics; the planned next steps in BioNTech's pipeline programs and specifically including, but not limited to, statements regarding plans to initiate clinical trials of BioNTech's product candidates and expectations for data announcements with respect to BioNTech's product candidates; the development of commercial capabilities and the transition of BioNTech to a fully integrated biopharmaceutical company; its expectations with respect to interactions with regulatory authorities such as FDA and EMA, including the potential approval of BioNTech's or its collaborators' current or future drug candidates; expected royalty and milestone payments in connection with BioNTech's collaborations; BioNTech's anticipated cash usage for fiscal year 2020 and beyond; the creation of long-term value for BioNTech shareholders; the ability of BioNTech to successfully develop and commercialize a vaccine for COVID-19 in partnership with Pfizer and Fosun Pharma; the timing for any potential emergency use authorizations or approvals for BNT162; and the ability of BioNTech to supply the quantities of BNT162 to support clinical development and, if approved, market demand, including its production estimates for 2020 and 2021 and the impact of COVID-19 on our clinical trials and business operations, are forward-looking statements reflecting the current beliefs and expectations of management made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, as amended. Words such as "expects," "plans," "potential," "target," "continue" and variations of these words or similar expressions are intended to identify forward-looking statements. Such statements are based on the current beliefs and assumptions of the management team of BioNTech and on the information currently available to the management team of BioNTech, and are subject to change. The Company will not necessarily inform you of such changes. These forward looking statements are subject to known and unknown risks, uncertainties, assumptions and other factors that could cause the Company's actual results, performance or achievements to be materially different than any future results, performance or achievements expressed or implied by the forward-looking statements. Actual results may differ materially from those indicated by these forward-looking statements as a result of various important factors, including the Company's ability to discover and develop its novel product candidates and successfully demonstrate the efficacy and safety of its product candidates; the pre-clinical and clinical results for its product candidates, which may not support further development of product candidates; actions of the Company's collaborators regarding continued product development and product commercialization; actions of regulatory authorities, which may affect the initiation, timing and progress of clinical trials or the ability of the Company to obtain marketing authorization for its product candidates; the Company's ability to obtain, maintain and protect its intellectual property; the Company's ability to enforce its patents against infringers and defend its patent portfolio against challenges from third parties; competition from others using technology similar to the Company's and others developing products for similar uses; the Company's ability to manage operating expenses; the Company's ability to obtain additional funding to support its business activities and establish and maintain its existing and future collaborations and new business initiatives; the Company's dependence on collaborators and other third parties for development, manufacture, marketing, sales and distribution of products; the outcome of litigation; and unexpected expenditures. Any forward-looking statements represent the Company's views only as of today and should not be relied upon as representing its views as of any subsequent date. The Company explicitly disclaims any obligation to update any forward-looking statements. The mRNA vaccines and other product candidates discussed in this slide presentation are investigational products being developed by BioNTech and its collaborators and are not currently approved by the FDA, EMA or any other regulatory authority.

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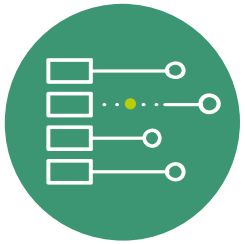
Next generation immunotherapy

Harnessing the full potential of the immune system



Broad suite of novel technology platforms

Immunotherapies for cancer and infectious diseases

Fully integrated with in-house GMP manufacturing

Industry-leading global collaborations

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We collaborate with global leaders in our industry

Collaborations for clinical stage programs

Covid-19 vaccine	FixVac Melanoma	iNeST	Bispecific mABs	Intra-tumoral mRNA
50:50 Gross Profit share[1]	*Each company to keep 100% of rights to own product*	*50:50 Cost & Profit share*	*50:50 Cost & Profit share*	*Cost & Profit share*
Pfizer, FOSUNPHARMA	REGENERON	Genentech	Genmab	SANOFI

Pre-clinical Collaborations

Seasonal Influenza	Up to 10 Infectious Disease Indications	HIV, Tuberculosis	5 Rare Disease Indications
Royalties & Milestones	*Worldwide opt-in right*	*Developed world rights*	50:50 Cost & Profit share
Pfizer	University of Pennsylvania	BILL & MELINDA GATES foundation	GENEVANT

[1] 50:50 Cost & Profit share refers to terms of Pfizer collaboration only (world-wide ex-China)

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Broad progress in executing our multi-platform IO strategy

Targeting Cancer + Immunomodulation

mRNA Cancer Vaccines

- Randomized Phase 2 trial starts for FixVac and iNeST in multiple solid tumors expected in 2H 2020

Next Generation Immunomodulators

- First Phase 1/2 data expected for PD-L1 x 4-1BB antibody in 2H 2020

Cell Therapies

- Phase 1/2 trial start for CARVac planned in 2H 2020
- Filed IND for Phase 1 trial of ex-vivo neoantigen T cell therapy

Antibodies

- Ongoing Phase 1/2 trial for CA19-9 antibody in pancreatic cancer

Small Molecule Immunomodulators

- First-in-human Phase 1/2 trial for TLR7 agonist initiated in early July 2020

Engineered Cytokines

- First Phase 1/2 data from intratumoral mRNA in 2H 2020
- Ribocytokines to enter the clinic. in 2021

Potential for multiple blockbuster opportunities with powerful combinations

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Compelling data generated from innovative immunotherapy approaches

Approved PD1-/PD-L1 Inhibitors

+

mRNA Cancer Vaccines

- **FixVac Melanoma (BNT111):** Induces objective responses in CPI-experienced patients
- **iNeST (BNT122):** Currently in Phase 2 in combination with CPI in 1L Melanoma. 2 adjuvant trials planned in 2020

mRNA Cancer Vaccines

+

Engineered Cytokines

- **Ribocytokine IL-2 (BNT151):** Amplification of vaccine induced T cell response in pre-clinical studies

Cell Therapies

+

mRNA Cancer Vaccines

- **BNT211:** Novel CLDN-6 CAR-T approach utilizing CAR-T Amplifying RNA Vaccine (**CARVac**)
- Significant amplification of CAR-T cells in preclinical studies (published in Science, 2020)

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A technology agnostic approach targets a broader addressable market

Cancer segment	Patient Population	Challenge	Our Therapeutic Strategies
High mutational burden/ adjuvant stage cancers	Significant portion of cancer patients	Poor risk-benefit profile of checkpoint inhibitors	• ***mRNA Neoantigen Immunotherapy*** *(iNeST)*
Low mutational burden cancers	>60% of cancers	Poor response to checkpoint inhibitors	• ***Shared Antigens*** *(FixVac, CAR-T cells, Neoantigen-targeted T cells, Antibodies)*
"Immune desert" cancers	>40% of high-mutational cancers	Poor infiltration and activation of T-cells in TME[1]	• ***RNA Immunotherapy*** • ***Immunostimulatory Compounds*** *(intratumoral, RiboCytokines)*
Cancers with MHC / B2M loss	20-30% of CPI-experienced advanced cancers	Failure of immune system to recognize tumor cells	• ***Antibodies*** • ***CAR-Ts***
Refractory tumors	Patients with large tumors and multiple resistance mechanisms	Few treatment options	• ***Cell Therapies*** • ***Combination Therapies***

[1]Tumor microenvironment

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12 product candidates in 13 ongoing clinical trials

Drug class	Platform	Product Candidate	Indication (Targets)	Preclinical Phase 1 Phase 2 Phas3 3	Rights Collaborator	Milestones
mRNA	FixVac (fixed combination of shared cancer antigens)	BNT111	advanced melanoma (adjuvant & metastatic)		fully-owned	Start phase 2 trial with registrational potential in 2H 2020
		BNT112	prostate cancer		fully-owned	
		BNT113	HPV16+ head and neck cancer[1]		fully-owned	Start phase 2 with registrational potential in 2H 2020
		BNT114	triple negative breast cancer[4]		fully-owned	Data update in 2H 2020
		BNT115	ovarian cancer[1]		fully-owned	
	iNeST (patient specific cancer antigen therapy)	RO7198457 (BNT122[4])	1L melanoma with CPI[2]		Genentech (global 50:50 profit/loss)	Enrollment update in 2H 2020[3] ; Interim data update in 2H 2021
			multiple solid tumors			Two phase 2 trials planned in adjuvant indications in 2H 2020
	Intratumoral Immunotherapy	SAR441000 (BNT131)	solid tumors *(IL-12sc, IL-15sushi, GM-CSF, IFNα)*		Sanofi (global profit/ loss share)	Data update in 2H 2020[5]
	Infectious Disease Immunotherapy	BNT162	COVID-19		Pfizer/Fosun	Data update phase 1 (BNT162b2) in Q3 2020 Data update phase 2/3 in Q4 2020
Antibodies	Next-Gen CP[2] Immunomodulators	GEN1046 (BNT311)	multiple solid tumors *(PD-L1×4-1BB)*		Genmab (global 50:50 profit/loss)	Data update in 2H 2020
		GEN1042 (BNT312)	multiple solid tumors *(CD40×4-1BB)*			
	Targeted Cancer Antibodies	BNT321 (MVT-5873)	pancreatic cancer (sLea)		fully-owned	
SMIM[6]	Toll-Like Receptor Binding	BNT411	solid tumors *(TLR7)*		fully-owned	

We intend to initiate up to five Phase 2 trials in 2020

[1] BNT113 and BNT115 are currently being studied in investigator-initiated phase 1 trials; [2] Checkpoint Inhibitor; [3] Update on the ongoing study including patient enrollment number, efficacy and safety data for an interim update expected in the second half of 2021; [4] BNT122 (iNeST) is also being investigated in arm 2 (N=15) of the 3 arm TNBC-MERIT trial, with BNT114 as an optional treatment; BNT114 is investigated in arm 1 (N=12) and arm 3 (N=15) of the TNBC-MERIT trial (total patients in study: N=42); [5] As the trial is sponsored and conducted by Sanofi, the timing of data updates is not under our control, and is subject to change by Sanofi; [6] Small Molecule Immunomodulators

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We plan to initiate FIH[1] trials for our preclinical product candidates across all platforms

Drug class	Platform	Product Candidate	Indication (Targets)	Rights Collaborator	Milestones
Oncology					
mRNA	**FixVac**	BNT116	NSCLC	fully-owned	
	RiboMabs (mRNA-encoded antibodies)	BNT141	multiple solid tumors	fully-owned	Phase 1 start in 1H 2021
		BNT142	multiple solid tumors *(CD3+CLDN6)*	fully-owned	Phase 1 start in 1H 2021
	RiboCytokines (mRNA-encoded Cytokines)	BNT151	multiple solid tumors *(optimized IL-2)*	fully-owned	Phase 1 start in 1H 2021
		BNT152, BNT153	multiple solid tumors *(IL-7, IL-2)*	fully-owned	Phase 1 start in 1H 2021
Cell Therapies	**CAR-T Cells**	BNT211	multiple solid tumors (*CLDN6)*	fully-owned	Phase 1/2 start in 2H 2020
		BNT212	pancreatic, other cancers *(CLDN18.2)*	fully-owned	
	Neoantigen-based T cell therapy	BNT221 (NEO-PTC-01)	multiple solid tumors	fully-owned	Phase 1 start in 2H 2020
	TCRs	to be selected	all tumors	fully-owned	
mRNA	**Infectious Disease Immunotherapies**	BNT161	influenza	Pfizer	Start first study in 2021
		undisclosed	up to 10 indications	Penn[3]	First phase 1 start 1H 2021
		undisclosed	HIV and tuberculosis	Bill & Melinda Gates Foundation	
	Rare Disease PRT[2]	BNT171	not disclosed	Genevant (global 50:50 profit/loss)	First phase 1 start in 2H 2021
		undisclosed	4 additional rare disease indications		

[1] FIH = First in Human; [2] PRT = Protein Replacement Therapy; [3] We are eligible to receive worldwide licenses

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Outlook for 2H 2020

Platform	Candidate	Indication *(Target)*	Next Expected Milestones[3]
FixVac	BNT111	advanced melanoma	Start Phase 2 with in 2H 2020
	BNT113	HPV16+ H&N cancer	Start Phase 2 with in 2H 2020
	BNT114	triple negative breast cancer	**Data update Phase 1 in 2H 2020[4]**
iNeST	RO7198457 (BNT122)	1L melanoma with CPI	Enrollment update in 2H 2020[1]
		NSCLC (adjuvant)	Start Phase 2 in 2H 2020
		CRC (adjuvant)	Start Phase 2 in 2H 2020
Intratumoral Immunotherapy	SAR441000 (BNT131)	Solid tumors *(IL-12sc, IL-15sushi, GM-CSF, IFNα)*	**Data update Phase 1/2 in 2H 2020[2]**
CAR-T Cells	BNT211	multiple solid tumors *(CLDN6)*	Start Phase 1/2 in 2H 2020
Neoantigen-based T cell therapy	BNT221 (NEO-PTC-01)	multiple solid tumors	Start Phase 1 in 2H 2020
Next-Gen CP Immunomodulators	BNT311	multiple solid tumors *(PD-L1x4-1BB)*	**Data update Phase 1/2 in 2H 2020**
Infectious Diseases	BNT162	COVID-19	**Data update Phase 1 (BNT162b2) in Q3 2020** **Data update Phase 2/3 in Q4 2020**

Expected newsflow / milestones:

- Phase 1 data for BNT162b2 COVID-19 vaccine and update from Phase 2b/3 trial as early as October 2020
- Data updates for 3 oncology trials (BNT114, 131, and 311)
- To initiate up to 4 randomized phase 2 trials for FixVac and iNeST
- To initiate up to 2 first-in-human phase 1 trials for our Engineered Cell Therapy product candidates

[1] We expect this update to include an update on the ongoing study, including patient enrollment numbers, with full efficacy and safety data for an interim update expected in the second half of 2021; [2] As the trial is sponsored and conducted by Sanofi, the timing of data updates is not under our control, and is subject to change by Sanofi. [3] Our expectations for timing of milestones beyond 2020 are premised on and subject to the achievement of earlier milestones on their expected timelines. Press releases will be issued once first patient has been dosed; [4] BNT122 (iNeST) is also being investigated in arm 2 (N=15) of the 3 arm TNBC-MERIT trial, with BNT114 as an optional treatment; BNT114 is investigated in arm 1 (N=12) and arm 3 (N=15) of the TNBC-MERIT trial (total patients in study: N=42);

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Building a next generation immunotherapy company

- Rapid progress in key pipeline programs in both oncology and infectious diseases
- Multiple data read-outs & late-stage trial starts anticipated in 2H 2020
- Expanded transatlantic operations with newly established R&D hub in Cambridge, U.S.
- Strong momentum toward our vision of building a global immunotherapy company

Agenda

Overview and business outlook

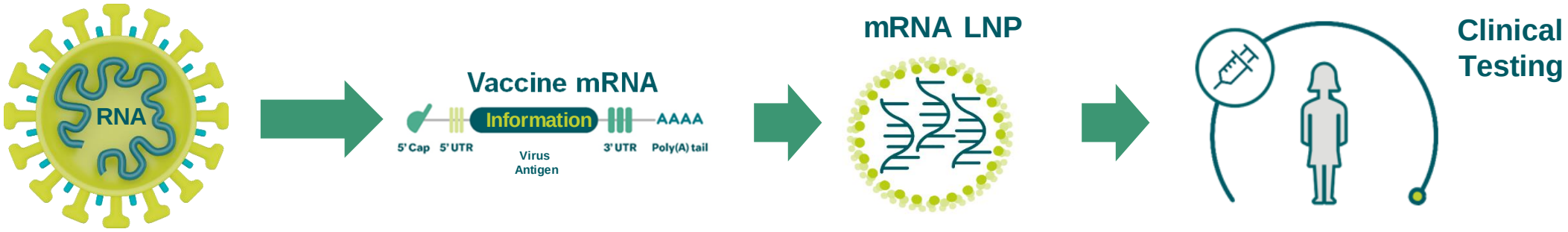
Deeper dive on our key programs

- COVID-19 vaccine program (project “Lightspeed”)
- mRNA vaccines – FixVac and iNeST
- Antibodies
- Small Molecule Immunomodulators
- CARVac platform – CLDN6 CAR-T
- RiboCytokines

mRNA pharmaceuticals as pandemic vaccines

- Synthetic variants of naturally occuring genetic molecules
- **Biochemically defined biopharmaceuticals**
- **High purity** and **free of animal product**
- Inherent immune-activating qualities with no need for additional adjuvant
- Stimulates both antibody and T-cell immune response at low doses
- More than **400 patients dosed in cancer setting** since 2013 (observing both safety and efficacy data)
- **Highly scalable production** with potential to manufacture hundreds of millions of doses

Solving for safety, speed and efficacy



Genetic Information SARS-CoV-2

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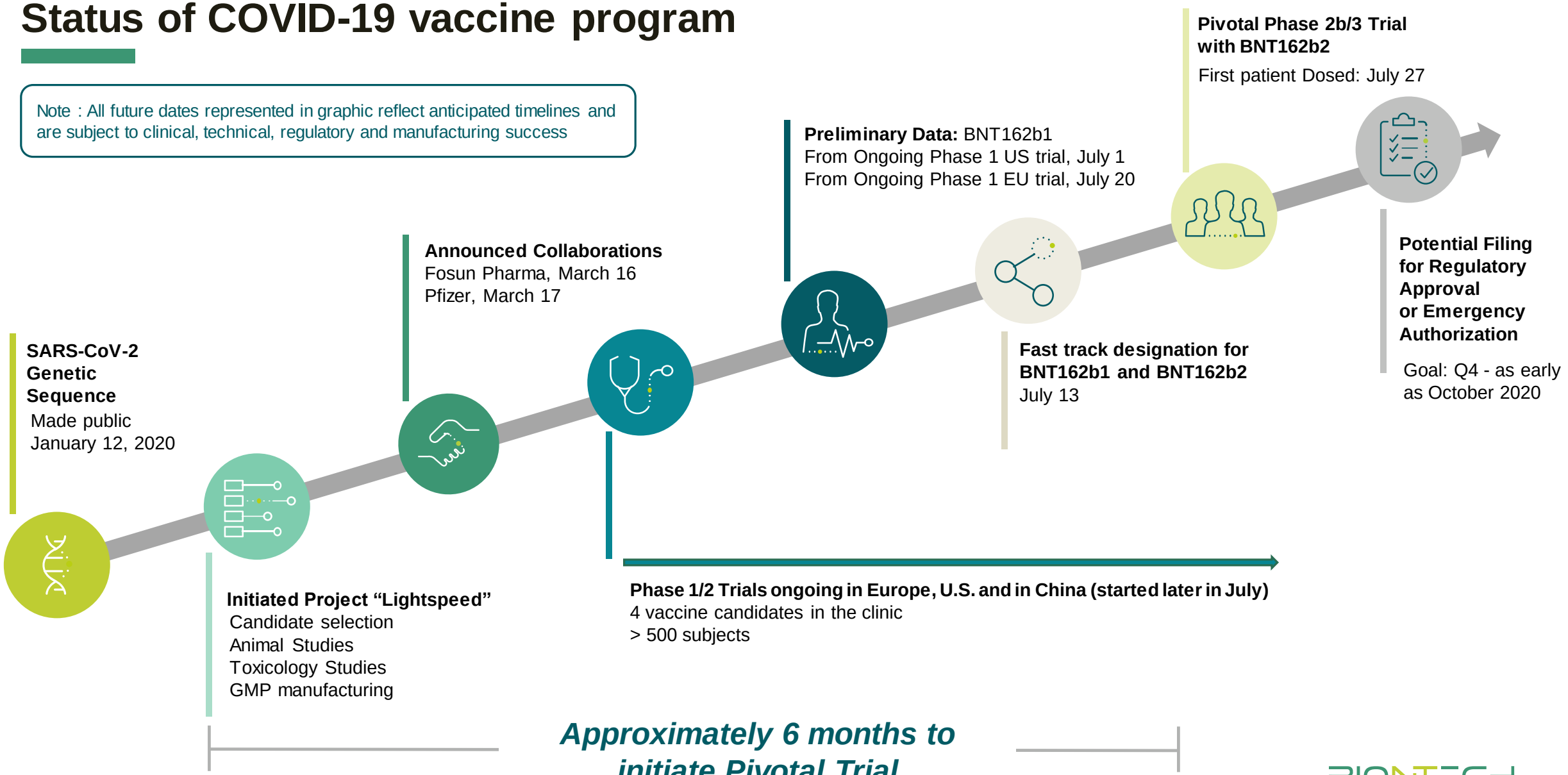
Status of COVID-19 vaccine program

Note : All future dates represented in graphic reflect anticipated timelines and are subject to clinical, technical, regulatory and manufacturing success



Approximately 6 months to initiate Pivotal Trial

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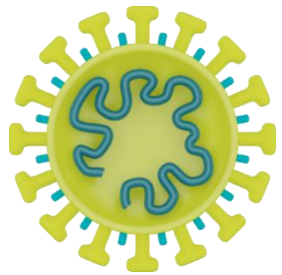
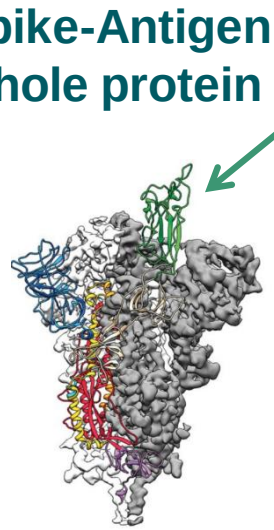
BNT162b2 selected as lead candidate for Phase 2b/3



SARS-COV-2



SARS-COV-2
Spike Protein 3D Structure[1]

Variant	Target	RNA construct	Immunization
162a1	RBD subunit	uRNA	prime/ boost
162b1	RBD subunit	modRNA	prime/ boost
162b2	2P-mutated full spike protein	modRNA	prime/ boost
162c2	2P-mutated full spike protein	saRNA	single injection

Received Fast Track designation

[1] Wrapp et al., Science, 2020

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Global BNT162 clinical development program Phase 1/2 ongoing

Phase 1/2 trials ongoing in Europe and US

- Evaluating safety, efficacy and optimal dose of 4 vaccine candidates

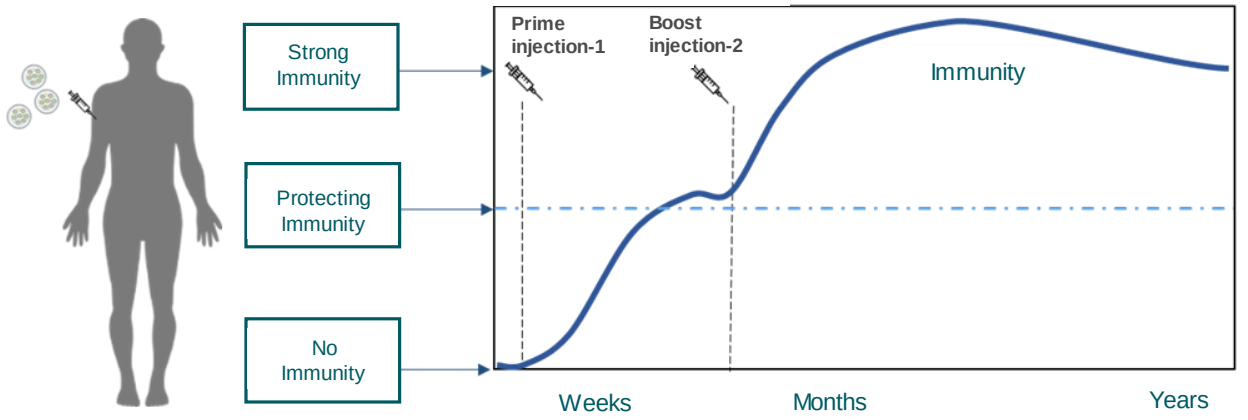
Designs

- Europe: Dose escalation part up to **200 healthy subjects** aged 18 to 55
- US: Seamless study design with several thousand subjects; Initial dose-finding part up to **360 healthy subjects** aged 18-85
- Dose range <1 µg to 100 µg
- Single-dose and 2-dose regimens to be tested in initial trial

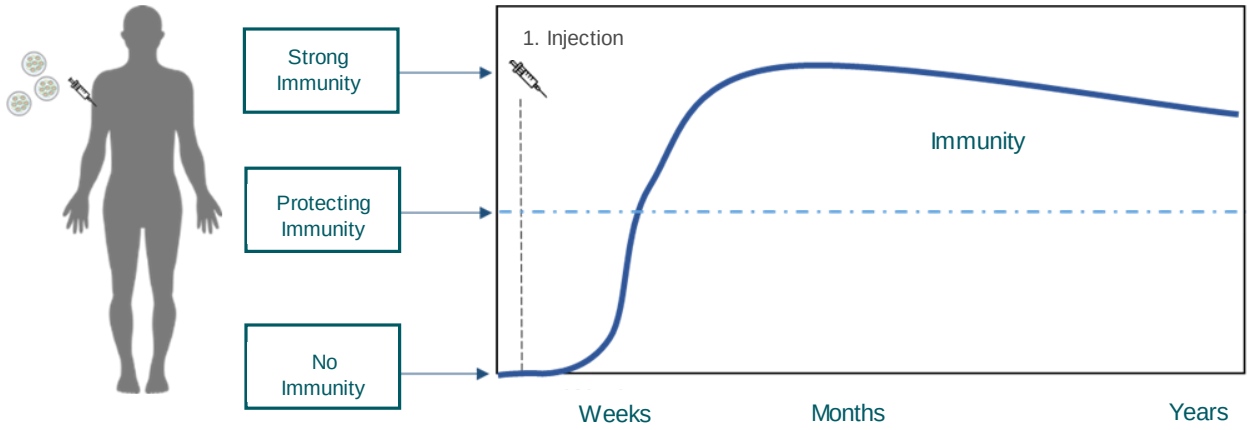
Between May 4, 2020 and June 19, 2020;
45 participants randomized and vaccinated in US study

Between April 23, 2020 and May 22, 2020;
60 participants randomized and vaccinated in German study

Prime / boost vaccine



Prime-only vaccine



BNT162 Global collaborations

- Co-development and Co-commercialization worldwide (ex China) if approved
- Combined upfront payment and equity investment of $185 million to BioNTech received in April
- Capital expenditures to be funded by each party independently
- Companies to share development expenses and gross profits on a 50:50 basis
- BioNTech eligible to receive further development & sales milestones up to $563 million

- Co-development with Fosun Pharma to hold exclusive marketing rights in China if approved
- Combined upfront payment and equity investment of $51 million to BioNTech received in April
- Fosun Pharma to fund development expenses in China
- BioNTech and Fosun to share gross profits on the sale of the vaccine in China
- BioNTech eligible to receive further China development & sales milestones up to $84 million

Agenda

Overview and business outlook

Deeper dive on our key programs

- COVID-19 vaccine program (project “Lightspeed”)
- mRNA vaccines – FixVac and iNeST
- Antibodies
- Small Molecule Immunomodulators
- CARVac platform – CLDN6 CAR-T
- RiboCytokines

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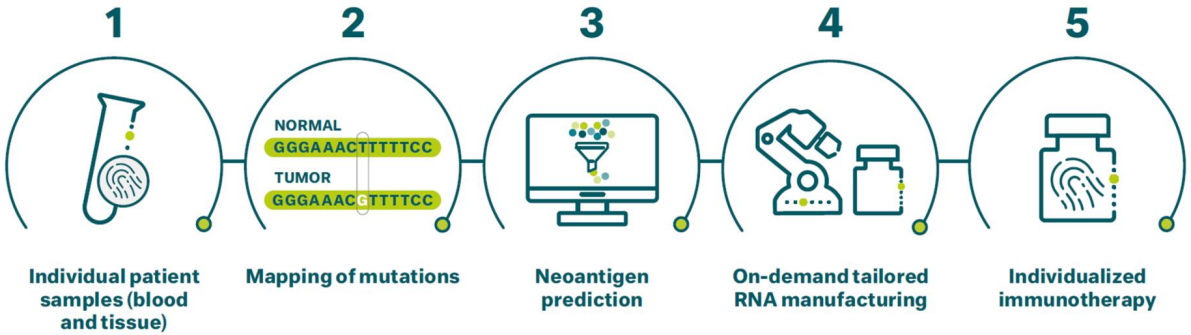
Our mRNA vaccine platforms: FixVac and iNeST

FixVac

- **Off-the-shelf mRNA immunotherapy**
- **Targeting a fixed combination of shared antigens**
  - Non-mutated antigens shared among patients with a specific cancer type
  - Applicable for almost all types of tumor antigens

iNeST



- **Fully individualized mRNA immunotherapy**
- **Targeting 20 neo-antigens unique to each patient**
  - Vast majority of neo-antigens are unique to individual patients
  - Applicable across solid tumor types

- **Proprietary RNA-LPX formulation for systemic dendritic cell targeting**
- **Strong immunogenicity observed *in vivo* via TLR7-driven adjuvant effect**
- **Potent induction of strong *ex vivo* CD4+ and CD8+ T cell responses**

Kranz et al., Nature 2016

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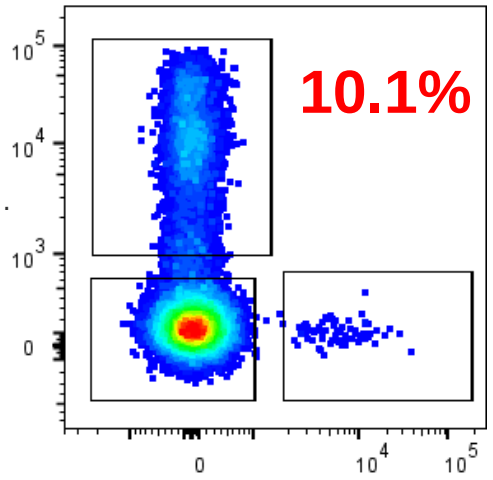
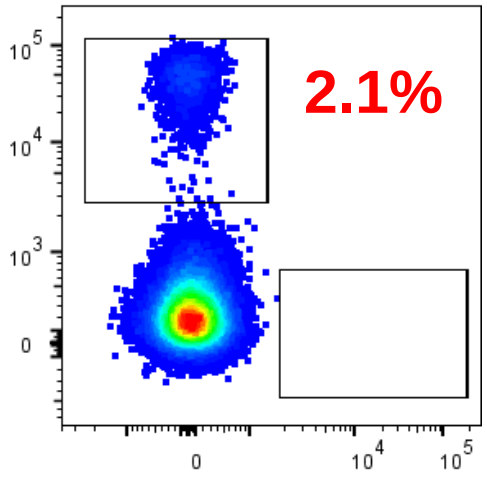
Our RNA-LPX vaccine approach

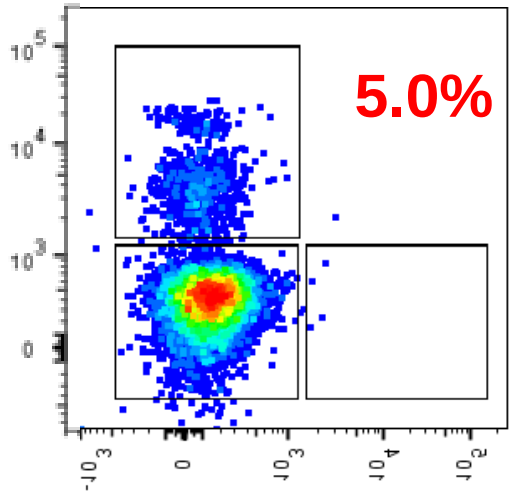
Strong vaccine-induced *ex vivo* CD8+ T cell responses[1] across different cancer types



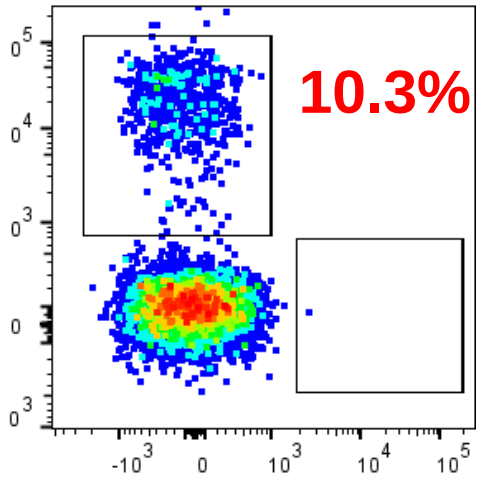
NY-ESO-1
Melanoma
BNT111, Lipo-MERIT trial



MAGE-A3
Melanoma
BNT111, Lipo-MERIT trial



HPV16-E7
Head Neck Cancer
BNT113, HARE40 trial



Mutant Neoantigen
TNBC
BNT114, TNBC MERIT trial

FixVac

iNeST

[1]T cell responses analyzed by *ex vivo* multimer staining analysis in blood

BNT111 FixVac Melanoma: Planning to initiate randomized phase 2 trial

Ongoing Phase 1 trial in Advanced Melanoma published in Nature

- Phase 1 trial data in CPI-experienced patients in monotherapy and in combination with anti-PD1 previously reported in July 2020 and published in Nature
- All patients showed tumor associated antigen (TAA) specific T cell responses with In vitro stimulation, and > 75% of patients showed immune responses against ≥ 1 TAA on an ex vivo basis
  - T cells responses ramped up over 4-8 weeks and increased or remained stable up to over one year with monthly maintenance therapy
- ***Reported durable clinical responses in monotherapy and in combination with anti-PD1 accompanied by high magnitude CD4+ and CD8+ response***

Regeneron strategic collaboration and planned Phase 2 trial

- Signed strategic collaboration to jointly conduct randomized Phase 2 trial with BNT111 and Libtayo® (cemiplimab anti-PD-1 therapy)
- Targeting patients with anti-PD1-refractory/relapsed, unresectable Stage III or IV cutaneous melanoma
- Companies to share development costs equally and keep full commercial rights to own programs
- ***Plan to initiate potentially registrational Phase 2 trial by the end of 2020*** – *more details on anticipated trial design to be released in Q3*

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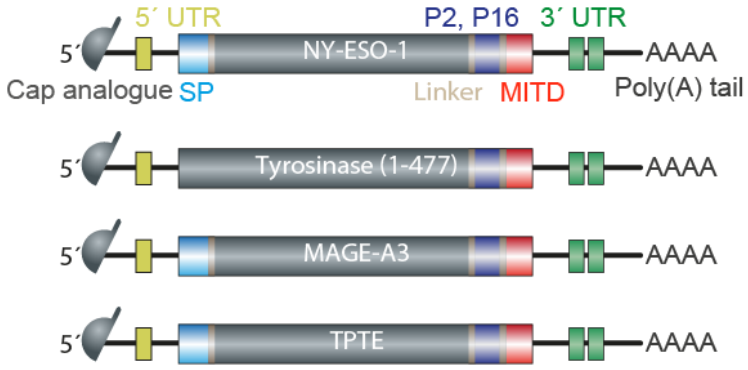
FixVac: BNT111 Interim clinical activity data in advanced melanoma

Summary

- Advanced melanoma patients (stage III, IV); dose range: 14µg -100µg
- Out of **74 patients** with available follow-up radiological imaging **42 patients** were assessed for preliminary analysis as of July 29, 2019
- **of 25 patients** with metastatic melanoma who received **BNT111 monotherapy** following progression on CPI* and in some cases other therapies
  - 3 patients with partial response (PR)
  - 1 patient with metabolic complete response[1]
  - 7 patients with stable disease (SD)
  - 14 progressive disease (PD)
- **of 17 patients** with metastatic melanoma who received **BNT111 in combination** with CPI after progression on CPI monotherapy
  - 6 patients with partial response (PR)
  - 2 patients with stable disease (SD)
  - 9 progressive disease (PD)
- Adjuvant cohort of 32 patients still in study



Cumulative patient coverage of FixVac melanoma targets is over 90%

Report phase 1 data 1H 2020

Start phase 2 with registrational potential in 2H 2020

*CPI: Checkpoint inhibitor; [1]based on ^{18}F-FDG-PET/CT analysis

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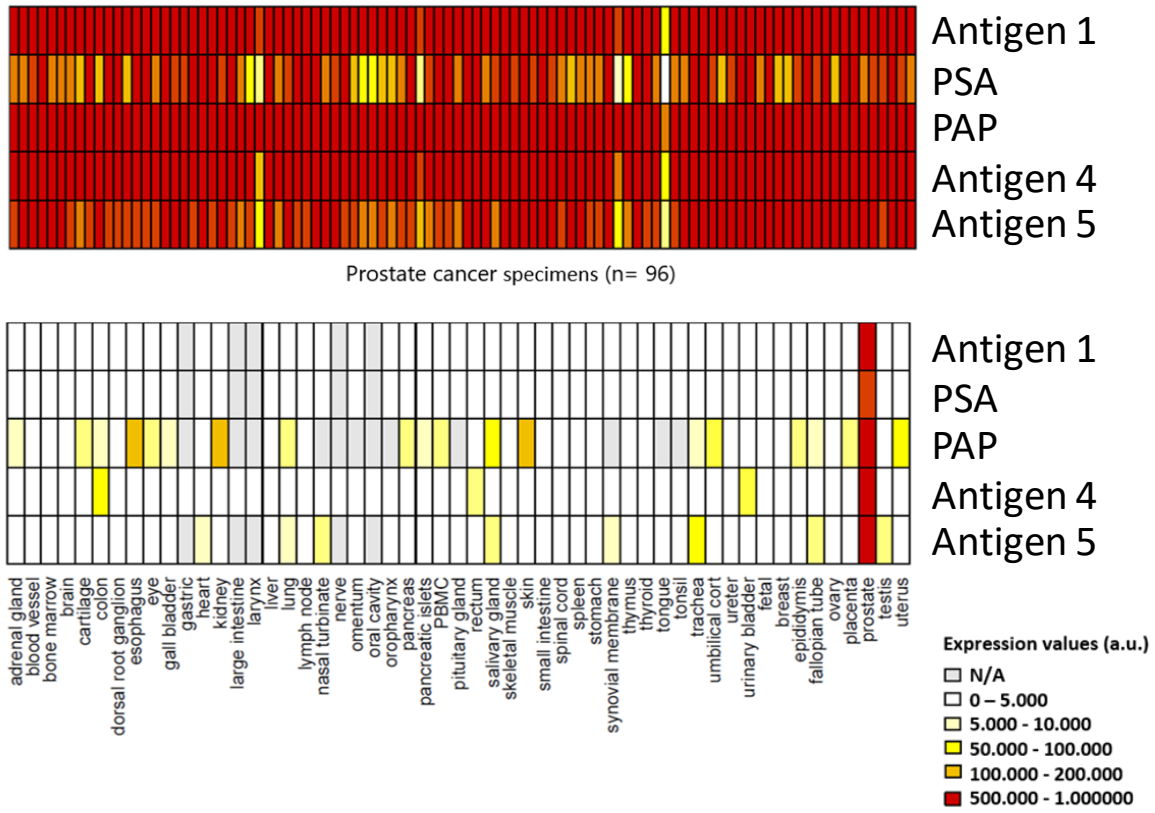
FixVac: BNT112 in Prostate Cancer



Ph1/2: first patient enrolled in December 2019

- Multipronged vaccine: Targeted antigens of BNT112 are 5 prostate cancer specific antigens (PAP, PSA and 3 undisclosed antigens)
- RNA-LPX vaccine format validated by our FixVac Melanoma program

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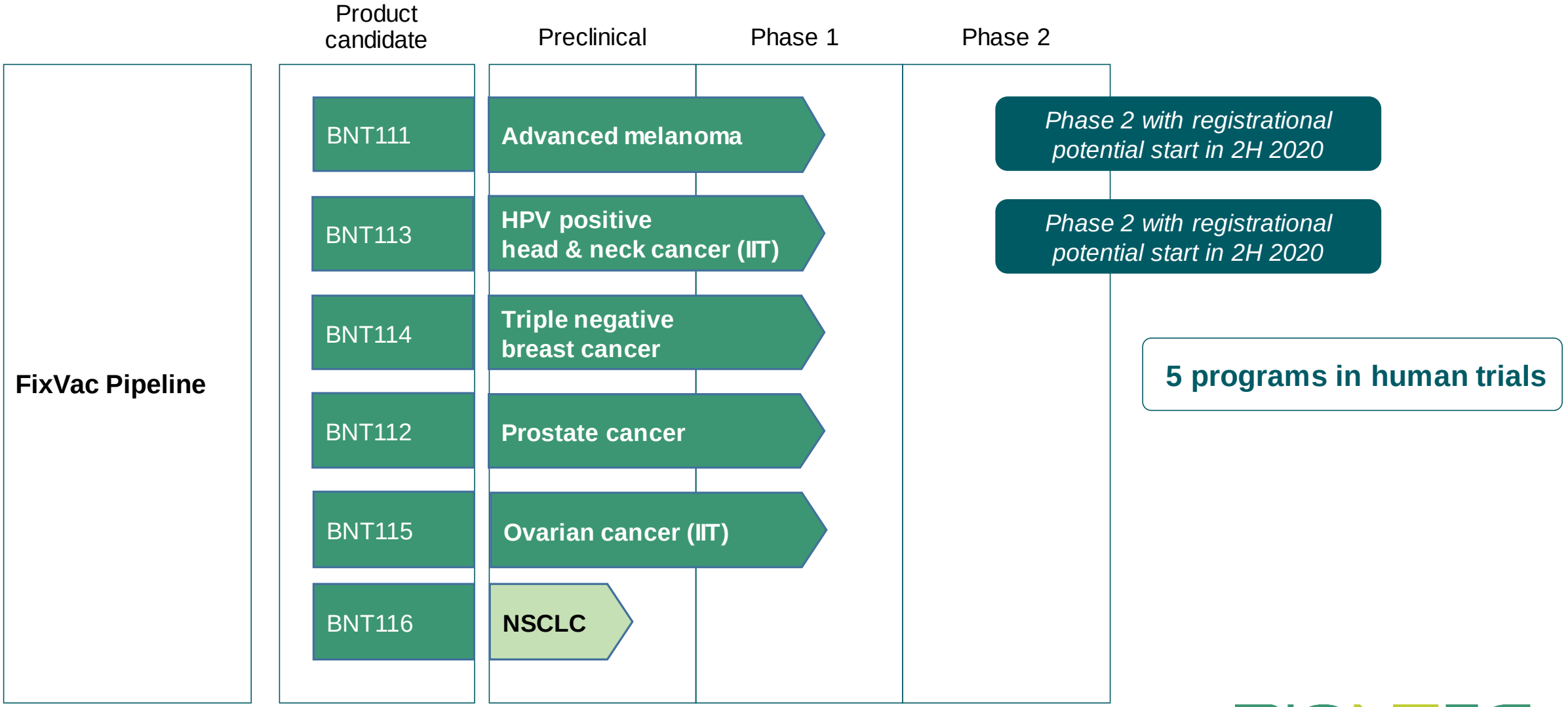
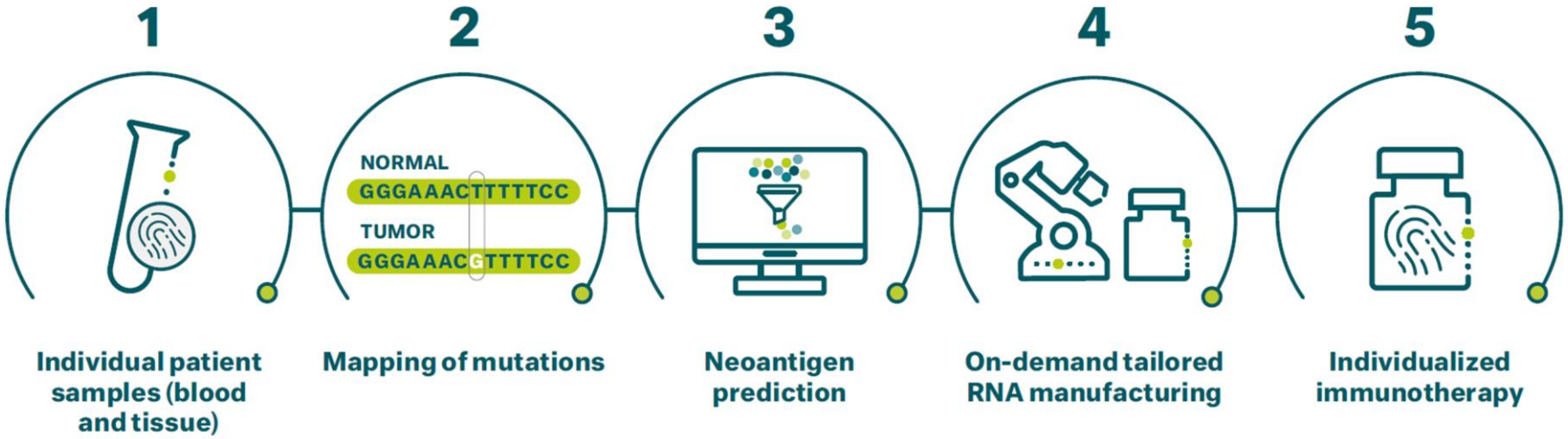
FixVac: a flexible format designed to be rapidly adapted for different tumors



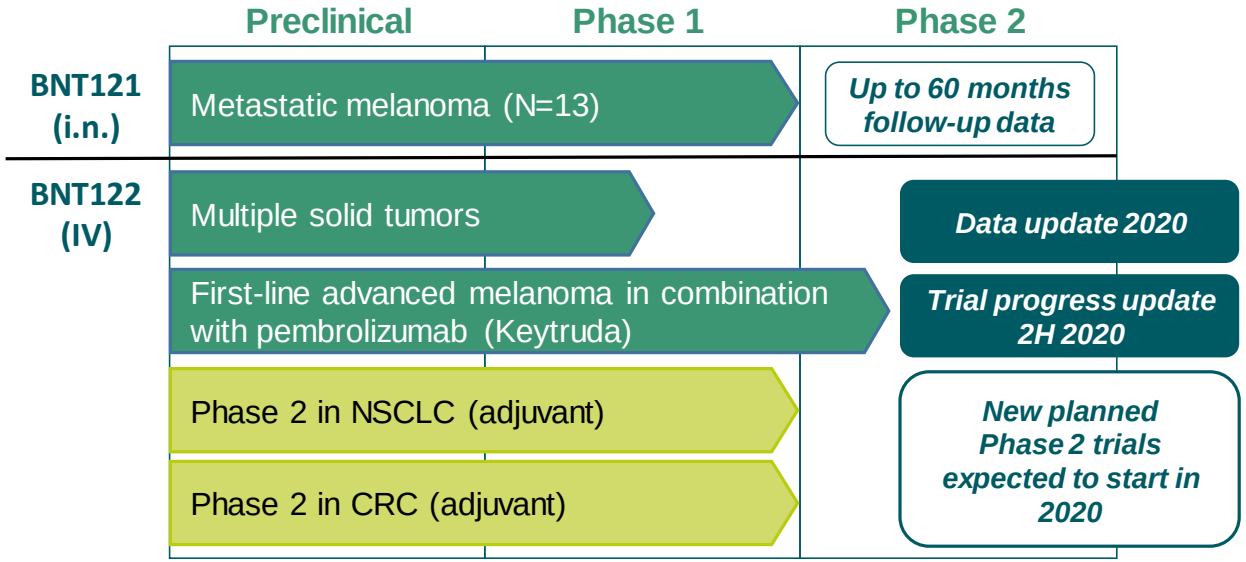
Individualized Neoantigen Specific Immunotherapy (iNeST)



Turnaround time reduced from three months to six weeks

Overview

- Targeting multiple neoantigens
- Intended to be a universal approach applicable for the majority of cancers
- 50:50 profit/loss share with Genentech



Currently being evaluated in ≥ 8 solid tumor indications

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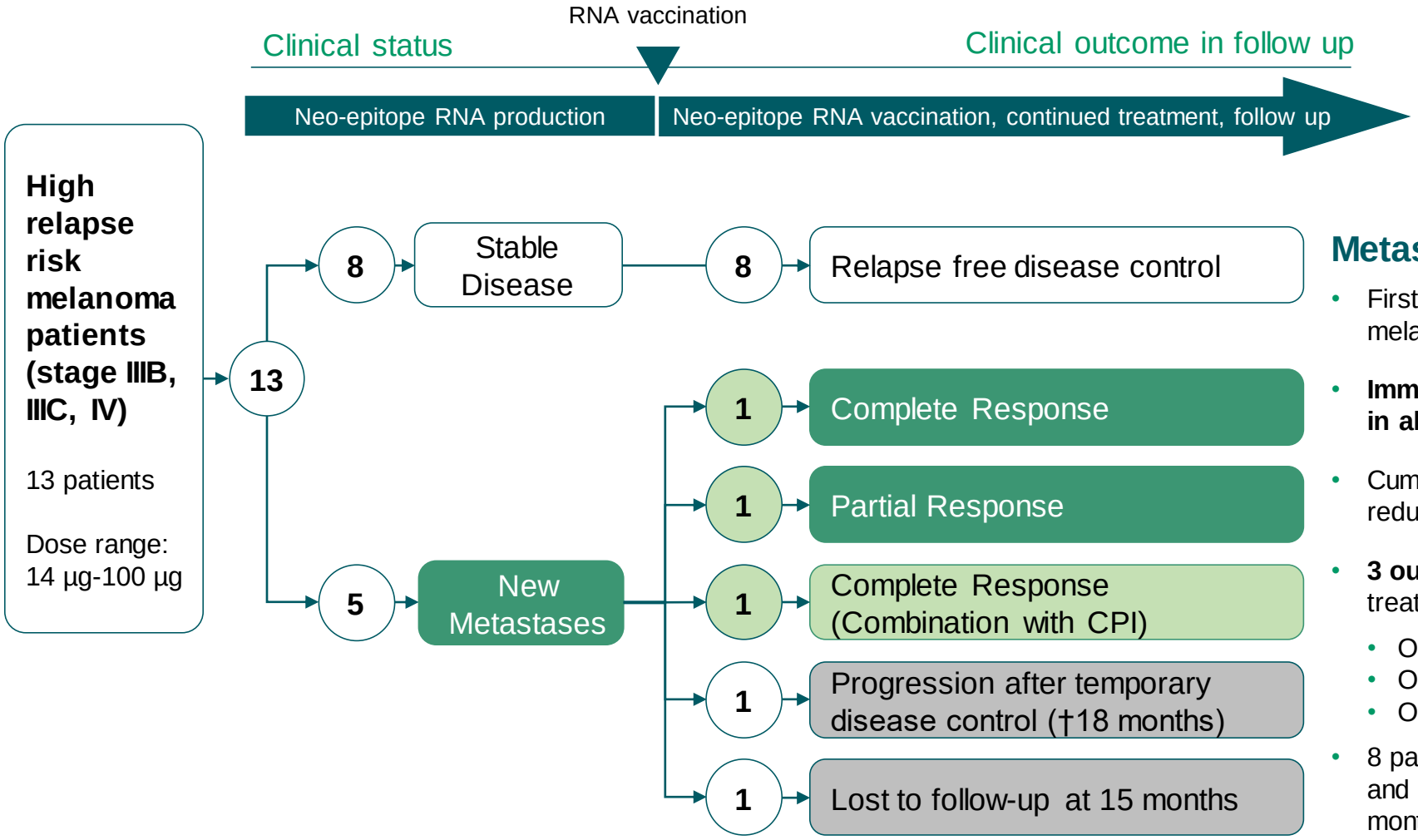
BNT121: Interim clinical activity data



Metastatic melanoma (N=13)

- First-in-human Phase 1 with 13 patients with melanoma stage IIIB, IIIC, and IV; intranodal delivery
- **Immune responses** against at least one neoantigen **in all patients**
- Cumulative rate of metastatic events significantly reduced, resulting in a sustained PFS
- **3 out of 5 pts with melanoma relapses** developed treatment-related **objective clinical responses**
  - One complete response (CR), relapse-free 26 mon
  - One immunotherapy-related partial response (PR)
  - One CR in combination with anti-PD1
- 8 patients (no detectable lesions at start) relapse free and recurrence-free for the whole follow-up (12 to 23 months)

Sahin et. al. Nature 2017

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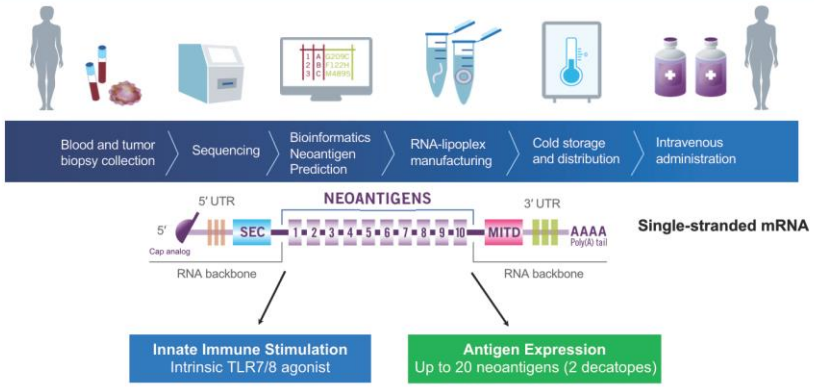
iNeST: BNT122 recent AACR data update

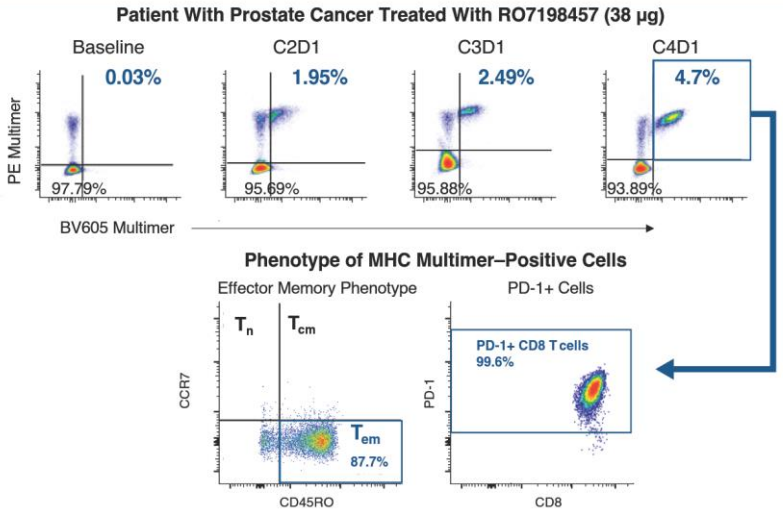
Ongoing Phase 1 trial of iNeST presented at AACR 2020

- Data from ongoing Phase 1 trial in heavily pre-treated, PD-1 low patients across multiple tumor types
- Demonstrated ability to elicit significant T cell responses of both effector and memory phenotype as monotherapy and in combination (multiple patients with > 5% T cell response per neoepitope)
- Treatment-related adverse events were primarily transient systemic reactions, manifesting as low grade CRS, IRR or flu-like symptoms
- Initial signals of clinical activity observed in monotherapy dose-escalation cohort (1 CR, 12 SD)

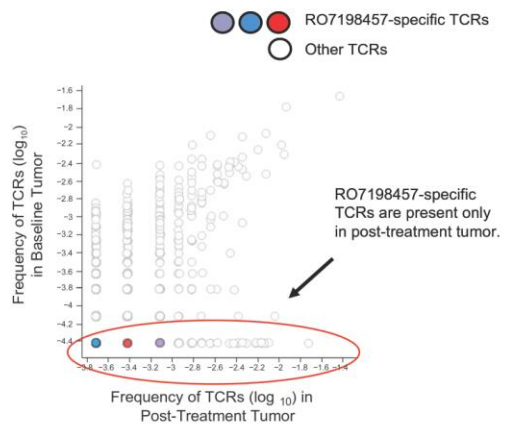
Evaluation of BNT122 safety & feasibility with/without Tecentriq in > 10 indications



BNT122 induces CD8+ T cells in CPI-sensitive and CPI-insensitive tumor types



BNT122 induces CD8+ T cell Infiltrates in tumors



iNeST: BNT122 recent AACR data update, Phase 2 adjuvant trials planned

Phase 1a dose escalation: Monotherapy in locally advanced or metastatic solid tumors

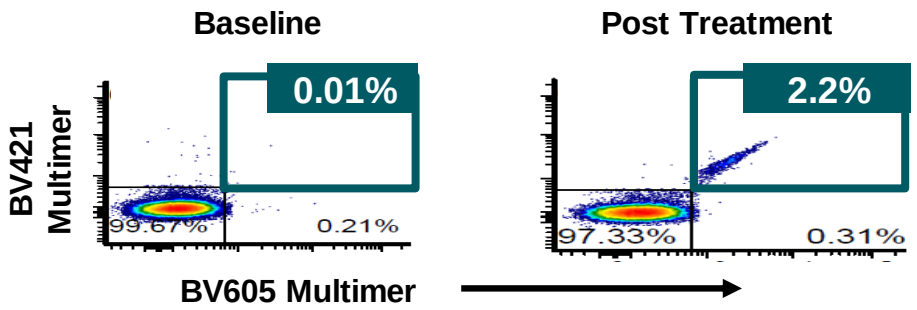
- **31 patients** enrolled, cohorts with **doses ranging from 25-100ug**
  - Most common tumor types were HR+/HER2+ breast, prostate, and ovarian cancer
  - ***Median of 5 lines of prior therapies (range 1-17)***
  - Most patients enrolled had low **level of PD-L1 expression** in tumor
- Neoantigen-specific **T cell responses** observed in peripheral blood in **86%** of patients, significant T cell expansion and **both naïve and memory activated phenotype**
- Of 26 patients with at least one tumor assessment,
  - **1** patient with **gastric cancer and metastatic liver lesions** had **confirmed CR** (ongoing for 10 months)
  - **12** patients had **SD**

- Demonstrates *ability to elicit significant T cell responses of both effector and memory phenotype as monotherapy and in combination*
- Successfully manufacturing patient-specific oncology vaccines

Phase 1b combination with atezolizumab demonstrated clinical activity in heavily pretreated patients

- **132 patients** enrolled, cohorts with **doses ranging from 15-50µg**
- Heavily pre-treated patient population
  - Both CPI experienced and inexperienced
  - **Most patients with low PD-1**
- Clinical responses associated with T cell response, correlating immune profiling of patients' T cells to cancer-specific response
- Of 108 patients with at least one tumor assessment
  - 1 patient had **CR as best response** (0.9%),
  - **8 patients had PR** (7.4%), and
  - **53 patients had SD** (49.1%)

Patient With TNBC (CPI experienced) Treated With RO7198457 (38 µg) + Atezolizumab 1200 mg IV q3w



Note: Patients in both cohorts received personalized product manufactured on per patient basis with **up to 20 patient-specific neoantigens, in both cohorts majority of AEs were Grad 1 or Grade 2**

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BNT122 iNeST randomized Phase 2 trials ongoing and planned

	First-Line Advanced Melanoma	Adjuvant Non-Small Cell Lung Cancer	Adjuvant Colorectal Cancer
Study Design and Patient Population	A Phase 2, open-label, multicenter randomized trial of the efficacy and safety of BNT122 in combination with pembrolizumab vs. pembrolizumab in patients with previously untreated Advanced Melanoma	A Phase 2, open-label, multicenter, randomized trial of the efficacy and safety of BNT122 in combination with atezolizumab vs. atezolizumab alone following adjuvant platinum-doublet chemotherapy in patients who are ctDNA positive after surgical resection of Stage II-III NSCLC	A Phase 2, open-label, multicenter randomized trial to compare the efficacy of BNT122 versus watchful waiting in patients with ctDNA positive, surgically resected Stage 2/3 rectal cancer, or Stage 2 high risk/stage 3 colon cancer
Rationale	• **Evaluate added benefit of 1L BNT122 in an advanced CPI-sensitive tumor (PFS, ORR)** • **Success ungates 1L use of iNeST in CPI-sensitive advanced cancers for combination therapy**	• **Evaluate added benefit of BNT122 in a micrometastatic CPI-sensitive tumor (RFS)** • **Success ungates adjuvant use of iNeST in CPI-sensitive ctDNA+ cancer types**	• **Evaluate added benefit of BNT122 in a micrometastatic CPI-insensitive tumor (RFS)** • **Success ungates adjuvant use of iNeST for CPI-insensitive ctDNA+ cancer types**
Status	***Enrollment update in 2H 2020***	***To start in 2H 2020***	***To start in 2H 2020***

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Digitization and automation for neo-antigen vaccine manufacturing

Paperless documentation

Semi-automatic manufacturing

- 2 mRNA GMP production facilities: Idar-Oberstein (GMP since 2011) and Mainz (GMP since 2018)
- Construction and GMP licensure of new Mainz facility for iNeST expected in 2022/2023
- Partnered with Siemens to develop automated production processes

SIEMENS

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Agenda

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Deeper dive on our key programs

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- Antibodies
- Small Molecule Immunomodulators
- CARVac platform – CLDN6 CAR-T
- RiboCytokines

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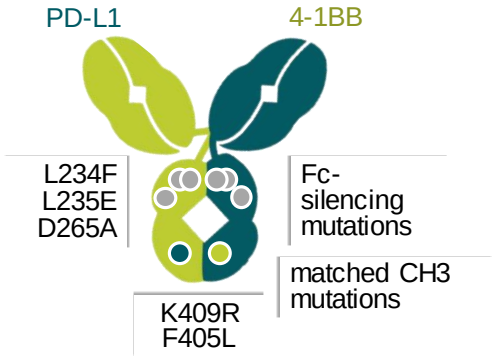
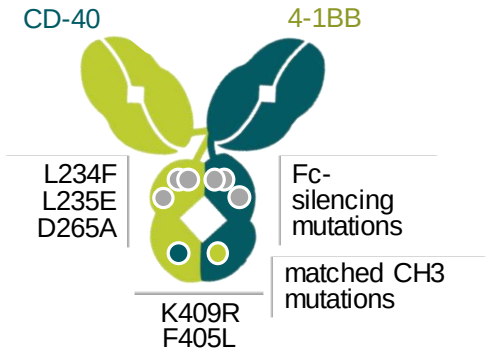
Bispecific Next-Gen CP immunomodulators and targeted cancer antibodies

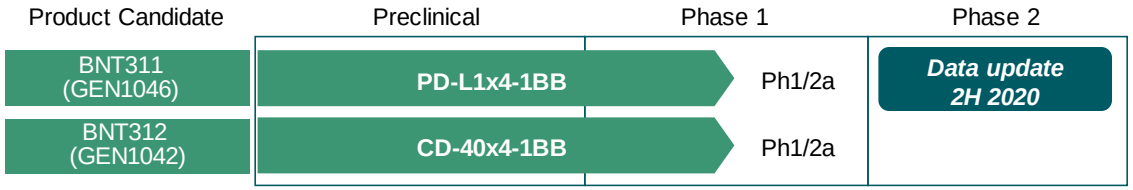
BNT311 and BNT312: Next-Gen checkpoint immunomodulators

Two bispecific antibodies partnered with Genmab

- Potential “first-in-class” bispecific antibodies
- Conditional activation of immuno-stimulatory checkpoint activity
- 50:50 profit/loss share
- Both programs are now in the clinic







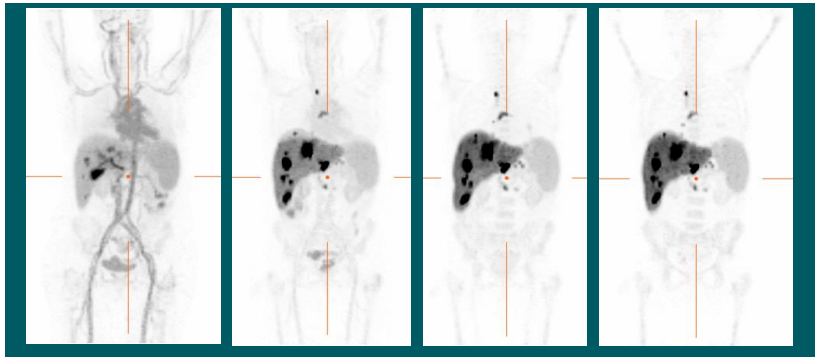
BNT321: Ab targeting Cancer Associated Carbohydrate sLe[a]

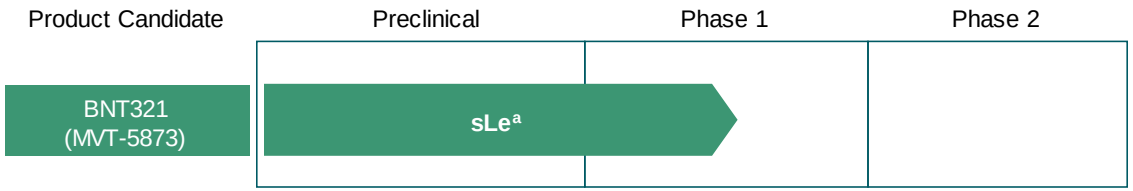
- Subnanomolar affinity, potent cell killing by ADCC &CDC
- Targets sialyl Lewis A epitope (sLe[a]) present in a range of glyco-proteins (CA19-9): specifically expressed in pancreatic and other cancers
- CA19-9 also a prognostic marker and functionally associated with carcinogenesis[1]

Preliminary data

- 6 patients evaluated in combo with chemotherapy
  - 4 / 6 met the criteria for PR and 2 / 6 met the criteria for SD
  - BNT321 was generally well tolerated by all 6 patients

PET/CT imaging study with MVT-2163 (PET conjugated Ab version; ^{89}Zr-DFO-HuMab-5B1)





[1] Engle et al, Science 2019: The glycan CA19-9 promotes pancreatitis and pancreatic cancer in mice
CP: checkpoint; PR: partial response; SD: stable disease

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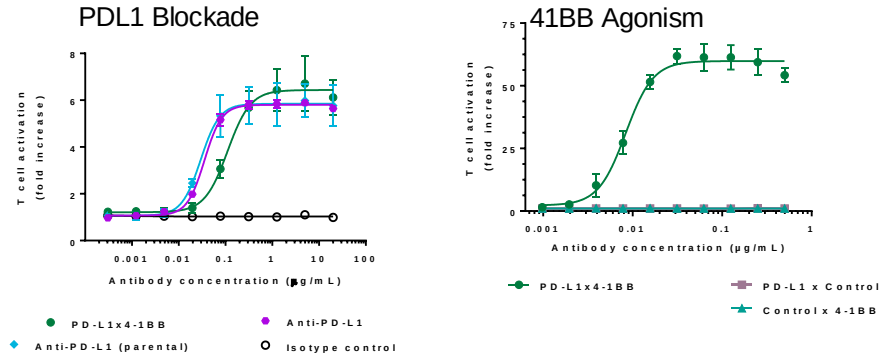
Next-Gen checkpoint immunomodulator: GEN1046 (BNT311)

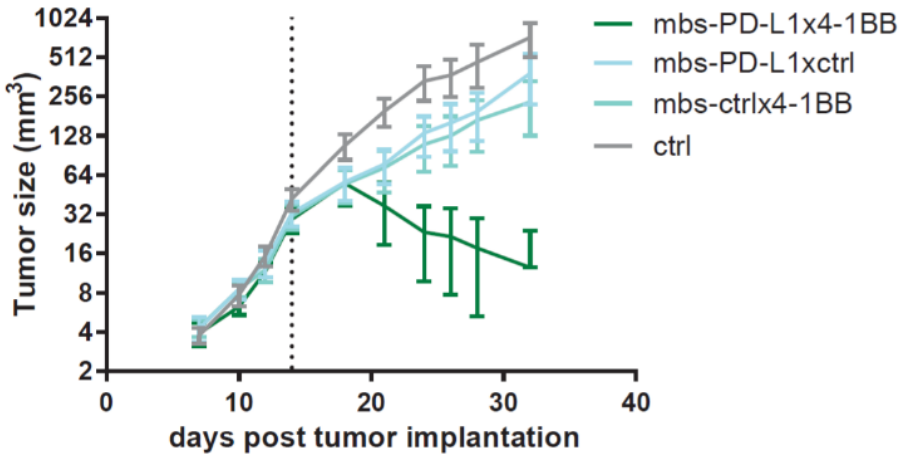
Characteristics

- Bispecific antibody combining constitutive CPI blockade and conditional co-stimulatory activity
- Enhanced proliferation of antigen specific activated T cells in the presence of PD-L1+ cells

Mode of Action



Preclinical antitumor activity beyond PDL1 blockade



1. **Constitutive PD-L1 blockade & conditional 4-1BB agonism**
2. **Increased tumor infiltrating lymphocyte (TIL) expansion in human tumor tissue cultures *ex vivo***
3. **Induced tumor regression of murine tumors superior to pure PD-L1 blockage and is associated with an increase in tumor-specific CD8 T-cells**

*SITC 2018, Altintas et al

Bispecific antibody GEN1046 (BNT311): Phase 1/2a in solid tumors

First-in-human, open-label, dose-escalation trial with expansion cohorts to evaluate safety of GEN1046 (PD-L1x4-1BB) in subjects with malignant solid tumors

- **Enrollment:** 192
- **Data update:** 2H 2020
- **Tumor types:** Malignant Solid Tumors

Intervention:

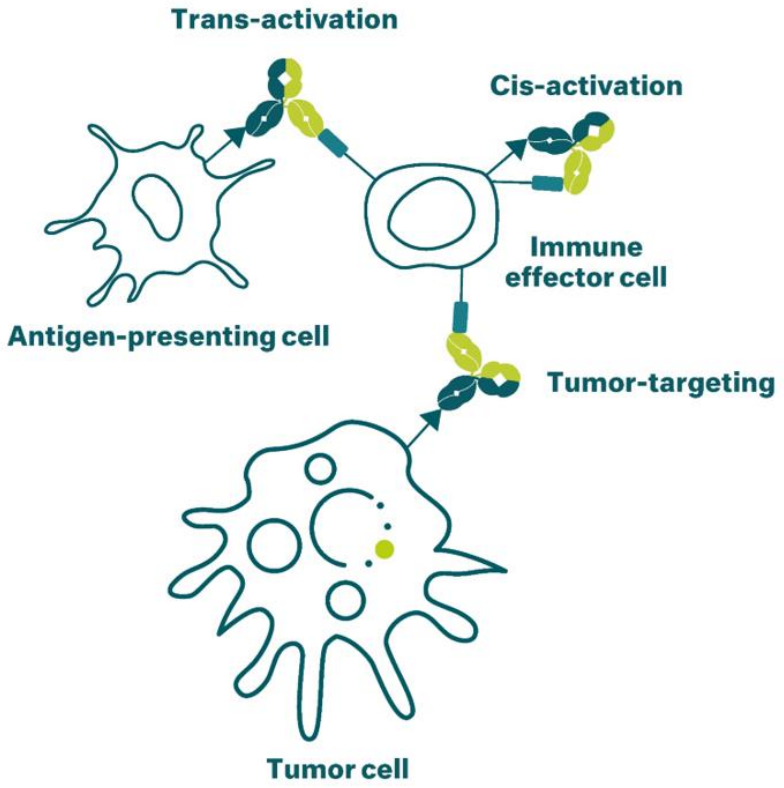
- GEN1046 (BNT311) is a PD-L1x4-1BB bispecific antibody that induces conditional activation of T cells through 4-1BB stimulation which is dependent on simultaneous binding to PD-L1
- GEN1046 (BNT311) IV once every 21 days
- Dose levels determined by the starting dose and the escalation steps taken in the trial

Description:

- Open-label safety trial
- Two parts, a dose escalation (phase 1, first-in-human) and an expansion part (phase 2a)

Key Primary endpoints:

- Dose limiting toxicity
- Adverse events
- Safety laboratory parameters



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Deeper dive on our key programs

- COVID-19 vaccine program (project “Lightspeed”)
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- Antibodies
- **Small Molecule Immunomodulators**
- CARVac platform – CLDN6 CAR-T
- RiboCytokines

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BNT411: initiated FIH Phase 1 trial for our TLR7 agonist in July 2020

- BNT411 is an intravenously administered small molecule TLR7 (toll-like receptor 7) agonist
- Engineered for high potency and high TLR7 receptor-selectivity at the therapeutically active dose range
- Activation of both adaptive and innate immune system has been observed, in particular in combination with cytotoxic therapies and CPIs
- Type 1 interferon-dominated release of cytokines and chemokines and potent stimulation of antigen-specific CD8+ T cells, B cells and innate immune cells such as NK cells and macrophages
- Expected to have therapeutic potential across various solid tumor indications
- Phase 1/2a clinical trial as a mono and combination therapy initiated in July 2020

Study design:

- Phase 1/2a, first-in-human, open-label, dose-escalation trial
- Evaluation of safety, pharmacokinetics, pharmacodynamics, and preliminary efficacy of BNT411 as a monotherapy in patients with solid tumors and in combination with atezolizumab, carboplatin and etoposide in patients with chemotherapy-naïve extensive-stage small cell lung cancer (ES-SCLC)
- Enrollment: ~60 participants

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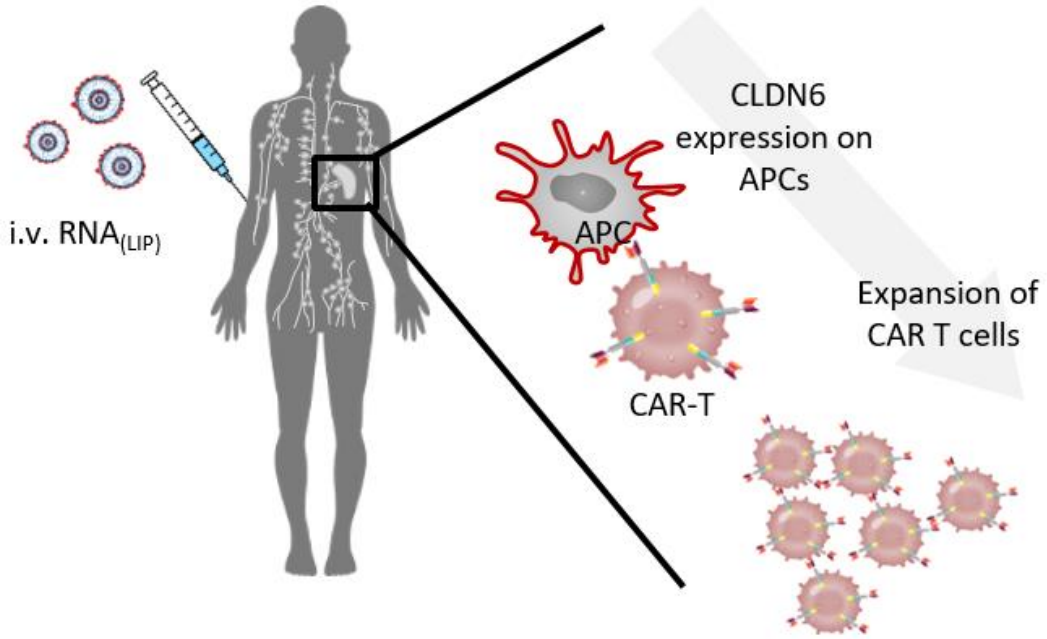
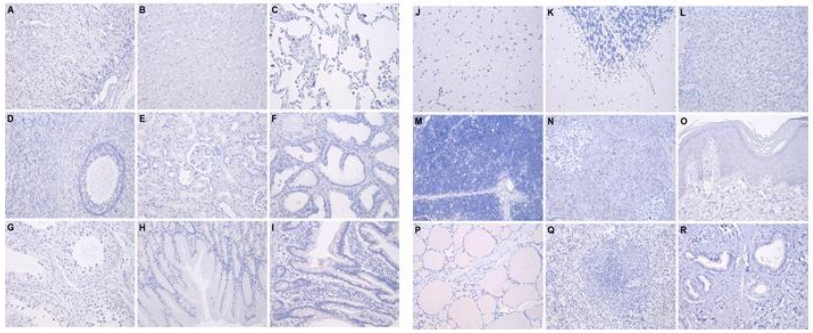
BNT211: Next generation CAR-T targeting CLDN6 with CARVac "primer"

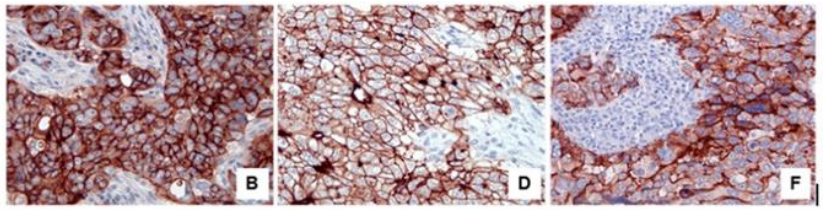


CAR-T cell therapy + RNA Vaccine to amplify CAR-T cell *in vivo*

CLDN6 is <u>not</u> present in healthy tissues



CLDN6 is expressed in multiple cancers



Ovarian cancer Testicular tumor Lung cancer

Eradication of advanced tumors demonstrated in an ovarian carcinoma xenograft model

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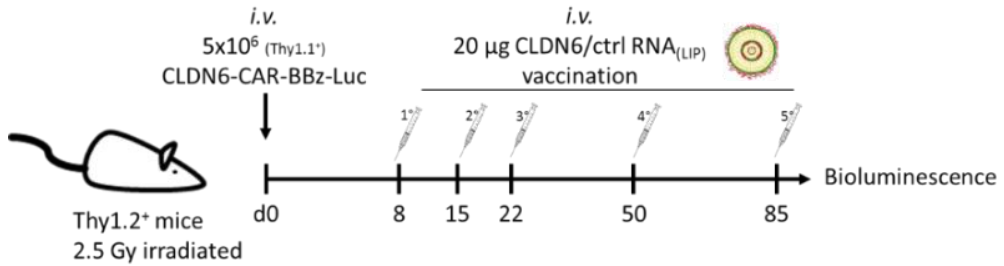
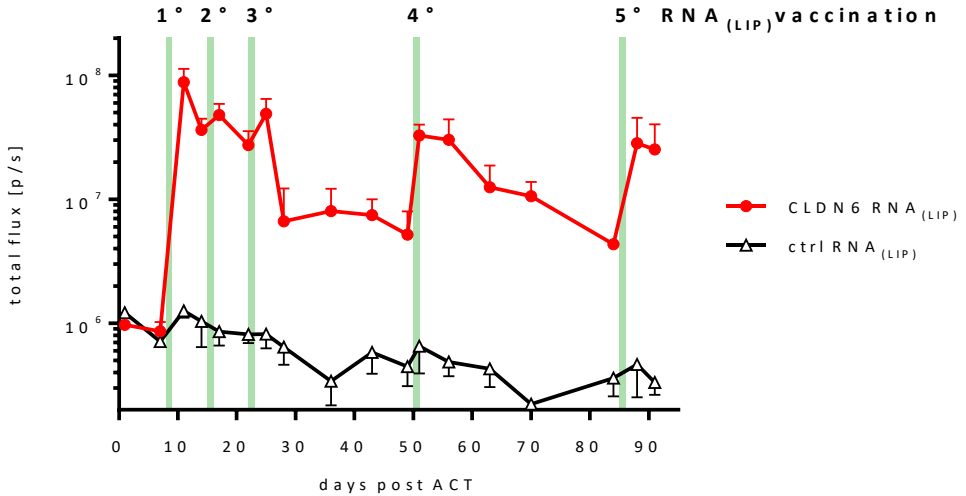
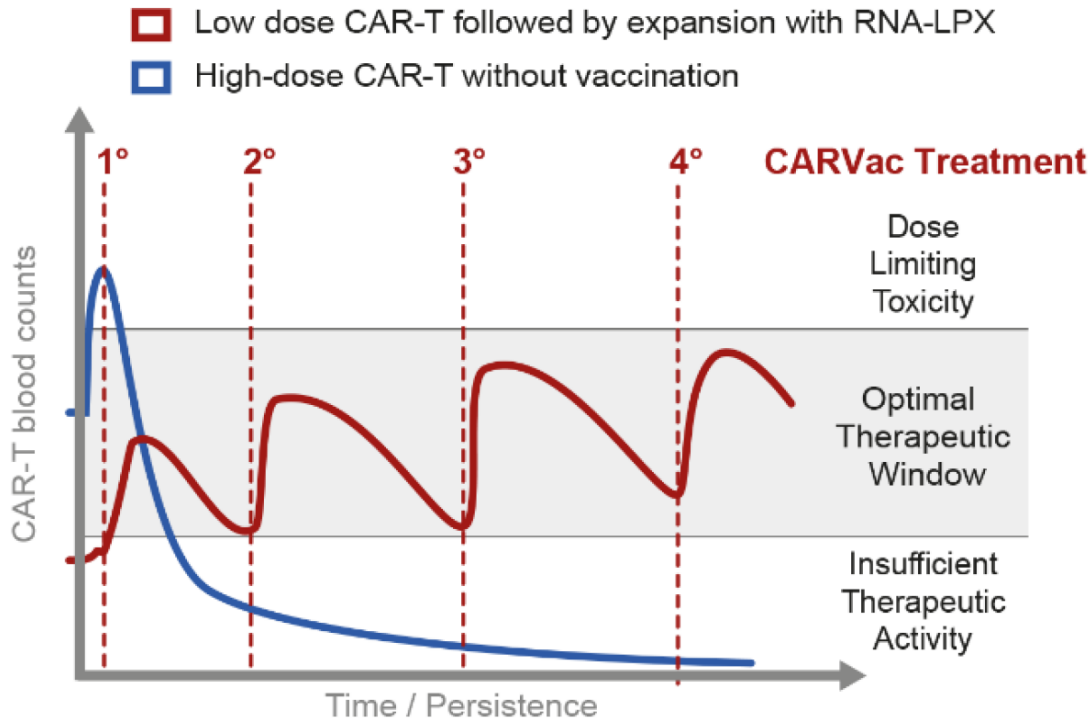
BNT211: Next generation CAR-T targeting CLDN6 with CARVac “primer”







Applicability shown for CLDN6, CLD18.2, CD19 CAR-T cells

RNA-lipoplex vaccine shown to enhance expansion & persistence of CAR-T

[1]Reinhard et al, Science 2020: An RNA vaccine drives expansion and efficacy of claudin-CAR-T cells against solid tumors

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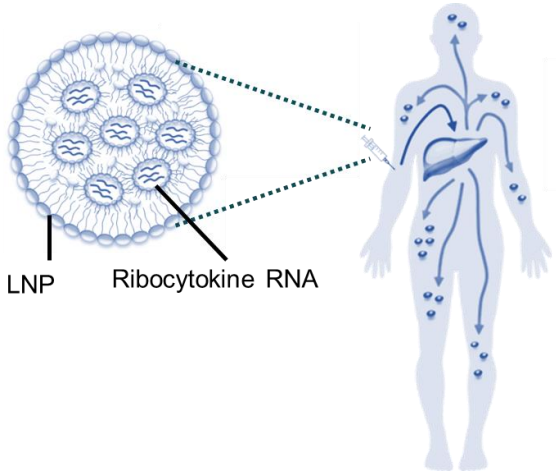
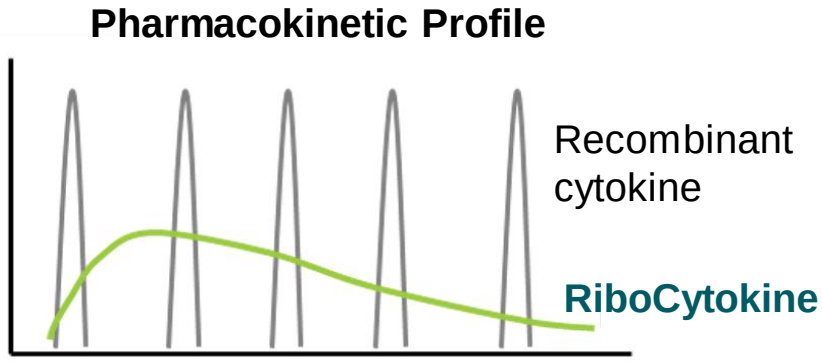
RiboCytokines: a novel therapeutic platform

The Concept

- Cytokines encoded by mRNA and produced in the patient
- Improved PK properties to improve tolerability and activity
- Cytokine design to improve immunological properties and tolerability

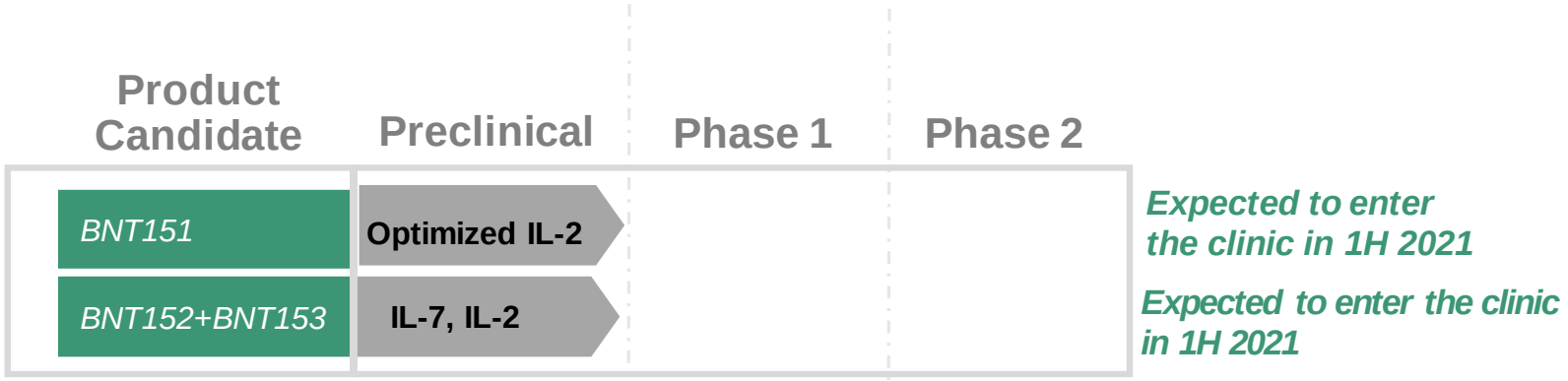




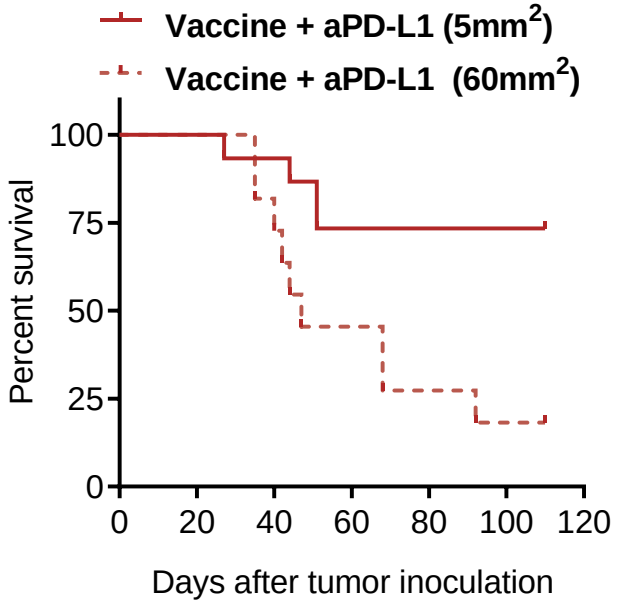
Therapeutic Goals

- Overcome resistance mechanisms by therapeutic synergy
- Improve activity of mRNA Vaccines

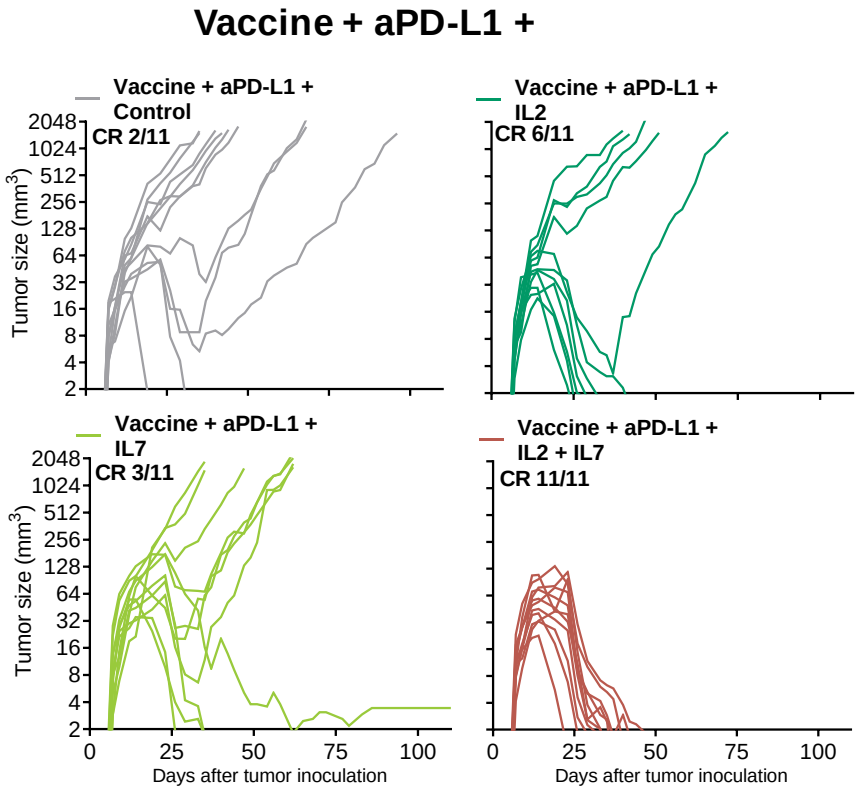
Worldwide rights; wholly owned

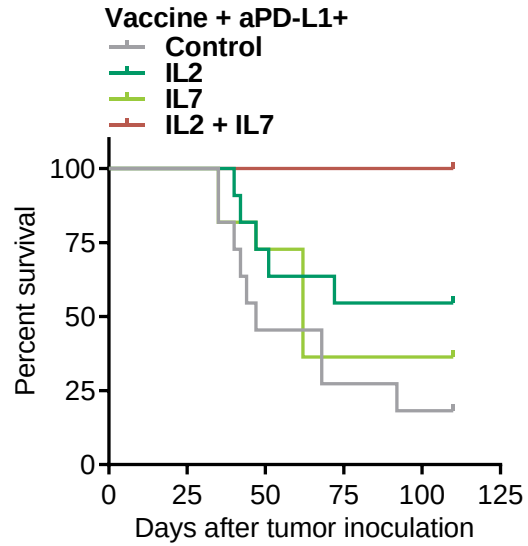


RiboCytokines boosted activity of vaccination and PD-L1 blockade in mouse model



CT26 tumor model, vaccine antigen: gp70





CT26 tumor model, tumor size: 60mm^2
CR: complete response,
vaccine antigen:gp70

Effect of tumor size on treatment success of vaccination + aPD-L1

RiboCytokines boost the clinical activity of vaccination + aPD-L1 in large tumors

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