Core Mission:

Orchestrating Cross Talk Between the Natural Killer Cell and the T Cell to Drive Immune Memory
Forward Looking Statement

This press release contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Statements in this press release that are not statements of historical fact are considered forward-looking statements, which are usually identified by the use of words such as “anticipates,” “believes,” “continues,” “could,” “estimates,” “expects,” “intends,” “may,” “plans,” “potential,” “predicts,” “projects,” “seeks,” “should,” “will,” and variations of such words or similar expressions. These forward-looking statements are neither forecasts, promises nor guarantees, and are based on the current beliefs of ImmunityBio’s management as well as assumptions made by and information currently available to ImmunityBio. Such statements reflect the current views of ImmunityBio with respect to future events and are subject to known and unknown risks, including business, regulatory, economic and competitive risks, uncertainties, contingencies and assumptions about ImmunityBio, including, without limitation, (i) potential adverse effects or changes to relationships with employees, suppliers or other parties resulting from the completion of the merger, (ii) the outcome of any legal proceedings that may be instituted against the parties and others related to the merger, (iii) unexpected costs, charges or expenses resulting from the merger, (iv) uncertainty of the expected financial performance of the combined company following completion of the merger, including the possibility that the expected synergies and value creation from the merger will not be realized or will not be realized within the expected time period, (v) the ability of ImmunityBio to continue its planned preclinical and clinical development of its development programs, and the timing and success of any such continued preclinical and clinical development and planned regulatory submissions, (vi) inability to retain and hire key personnel, and (vii) the unknown future impact of the COVID-19 pandemic delay on certain clinical trial milestones and/or ImmunityBio’s operations or operating expenses. More details about these and other risks that may impact ImmunityBio’s business are described under the heading “Risk Factors” in the Company’s Form 8-K filed with the U.S. Securities and Exchange Commission (“SEC”) on March 10, 2021 and in subsequent filings made by ImmunityBio with the SEC, which are available on the SEC’s website at www.sec.gov. ImmunityBio cautions you not to place undue reliance on any forward-looking statements, which speak only as of the date hereof. ImmunityBio does not undertake any duty to update any forward-looking statement or other information in this press release, except to the extent required by law.
Orchestrating Cross Talk of the Immune System

- Natural Killer Cell
- Cancer / Infected Cell
- iNKT Cell
- Memory B Cell
- Memory Killer T Cell
- Killer T Cell
- Infected w/ Virus
- Natural Killer Cell
- Infected w/ Virus
First-in-Class Immunotherapy Platforms

**Natural Killer Cells**
- NK-92 Off-the-Shelf
- Autologous m-ceNK
- iNKT Cells

**Memory B & T Cells**
- Adenovirus
- Yeast
- Toll Receptor Activators
- saRNA

**NK + T Cells**
- IL-15 Fusion Proteins
NANT Vaccine Platform: Clinical Development

Cancer

- 2009-2013

A Preliminary and Comparative Evaluation of a Novel Ad5 [E1-, E2b-] Recombinant Based Vaccine Used to Induce Cell Mediated Immune Response to Cancer

Cancer CEA - 2010

Anti-tumor immunotherapy despite immunity to adenovirus using a novel adenoviral vector Ad5 [E1-, E2b-]-CEA

Multiple Antigens - 2019

A Phase I Trial Using a Multitargeted Recombinant Adenovirus 5 (CEA/MUC1/Brachyury)-Based Immunotherapy Vaccine Regimen in Patients with Advanced Cancer

Neoepitope - 2019

Efficient Tumor Clearance and Diversified Immunity through Neoepitope Vaccines and Combinatorial Immunotherapy

QUILT Immunotherapy Trials - 2020

A Study of Combination Immunotherapies in Patients Who Have Previously Received Treatment With Immune Checkpoint Inhibitors

Infectious Disease

HIV - 2009

Novel Adenovirus type 5 vaccine platform induces cellular immunity against HIV-1 Gag, Pol, Nef despite the presence of Ad5 immunity

H1N1 Pandemic - 2009

Prevention of influenza virus shedding and protection from lethal H1N1 challenge using a conserved 2009 H1N1 HA and NA adenovirus vector vaccine

SIV - 2011

Induction and Comparison of SIV immunity in Ad5 Naive and Ad5 Immune Non-human Primates using an Ad5 [E1-, E2b-] based vaccine

Lassa Fever - 2019

Adenoviral vector-based vaccine is fully protective against lethal Lassa fever challenge in Hartley guinea pigs

COVID - 2021

Dual-Antigen COVID-19 Vaccine Subcutaneous Prime Delivery With Oral Boosts Protects NHP Against SARS-CoV-2 Challenge
Orchestrating the Immune System

First-in-Class Comprehensive Platform

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Late Stage Clinical Trial Update

- Bladder Cancer
- Lung Cancer
- Pancreatic Cancer
- 2nd Gen COVID Vaccine
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Late Stage Clinical Trial Update

- Bladder Cancer
  - Lung Cancer
  - Pancreatic Cancer
  - 2\textsuperscript{nd} Gen COVID Vaccine
Registrational Trial in Bladder Cancer

**Bladder Cancer Epidemiology**
- Bladder cancer is the 6th most common cancer in the U.S.
- Approximately 80,000 new diagnoses and 18,000 deaths in 2019
- Prevalence about 600,000 patients
- 75% of bladder cancer in the U.S. is Non-Muscle Invasive Bladder Cancer (NMIBC)

**NMIBC Current Standard of Care**

**First Line Standard of Care for CIS +/- Papillary Disease**
- **CIS ± papillary disease (Ta/T1)**
- **Transurethral Resection**
- **BCG induction + maintenance therapy for up to 3 years**

**BCG-Unresponsive CIS** is at especially high risk of progression to muscle invasive disease and metastasis

- **Radical cystectomy** (curative intent) - CR: 19%
- **Valrubicin** Approved 1998 - CR: 41%
- **Pembro** Approved Jan 2020 - CR: 72%
- **Investigational Agent e.g. Anktiva (N-803)**

Phase 1: Bladder Cancer - Complete Response in 9 of 9 Patients

N-803 + BCG in High-Risk NMIBC - Phase 1 Results
Durable Complete Responses (CR) or No Recurrence (NR) in 9 out of 9 Patients

<table>
<thead>
<tr>
<th>Dose (intravesicular instillation)</th>
<th>Patient</th>
<th>Stage</th>
<th>W12</th>
<th>0M</th>
<th>6M</th>
<th>9M</th>
<th>12M</th>
<th>15M</th>
<th>18M</th>
<th>21M</th>
<th>24M</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 µg</td>
<td>1</td>
<td>Pap T1</td>
<td>CR*</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>200 µg</td>
<td>2</td>
<td>Pap Ta</td>
<td>CR*</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>400 µg</td>
<td>3</td>
<td>Pap T1</td>
<td>CR*</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>5</td>
<td>CIS</td>
<td></td>
<td></td>
<td>IC</td>
<td>IC</td>
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<td>IC</td>
<td>IC</td>
<td>IC</td>
<td>IC</td>
<td>IC</td>
</tr>
<tr>
<td>6</td>
<td>Pap T1</td>
<td></td>
<td></td>
<td>CR*</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>7</td>
<td>Pap T1</td>
<td></td>
<td></td>
<td>CR*</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>8</td>
<td>CIS</td>
<td></td>
<td></td>
<td>CR*</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>9</td>
<td>Pap Ta</td>
<td></td>
<td></td>
<td>CR*</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
</tbody>
</table>

9 of 9 (100%) Patients Disease-Free at 24 Months

BCG naïve alone (SoC): Historical response rate is 55-75% at 3-6 months post BCG alone
Based on this data, FDA granted Fast Track Designation to the Pivotal Trial

*CR termed as No Recurrence (NR) in Papillary Disease
**Negative Cystoscopy Inconclusive Cytology

Original Research
Safety, Tolerability, and Long-Term Clinical Outcomes of an IL-15 analogue (N-803) Admixed with Bacillus Calmette-Guérin (BCG) for the Treatment of Bladder Cancer
Charles J. Rossier, Sergey Tikhonenkov, Jeffrey W. Nia, Owen T. M. Chan, Inna Lenculescu, Sandeep Reddy & ... Show all
Article: 191.2085 | Received 03 Mar 2021, Accepted 31 Mar 2021, Published online 03 May 2021
https://doi.org/10.1080/2162402X.2021.1912885
QUILT 3.032: NMIBC Trial Rationale
Anktiva Synergistic with BCG: Enhances Proliferation of NK and T Cells

Prime: BCG Activates Natural Killer Cells

Boost: Anktiva IL-15 Proliferates Natural Killer Cells & T Cells

Activation of Natural Killer Cells by Bacillus Calmette-Guérin

Sven Brandau*, Andreas Böhle†, h

*Division of Immunotherapy, Research Center Borstel, and †Department of Urology, Medical University of Lübeck, Germany
**BCG Unresponsive CIS NMIBC**

<table>
<thead>
<tr>
<th>Primary Endpoint</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Response Rate at Any Time (3 or 6 months) – All Subjects</td>
<td>• 58/81</td>
</tr>
<tr>
<td></td>
<td>72% (95% CI: 60.5, 81.1)</td>
</tr>
<tr>
<td>Subjects Not Re-inducted (early responders)</td>
<td>• 44/57</td>
</tr>
<tr>
<td></td>
<td>77% (95% CI: 64.2, 87.3)</td>
</tr>
</tbody>
</table>

**BCG Unresponsive Papillary NMIBC**

<table>
<thead>
<tr>
<th>Primary Endpoint</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease-Free Survival Rate at 12 months</td>
<td>• 57.1%</td>
</tr>
<tr>
<td></td>
<td>95% CI (43.7%, 68.5%)</td>
</tr>
</tbody>
</table>

For primary endpoint to be met, the lower limit of the 95% confidence interval should be >20%.
Durable Response with High Cystectomy Avoidance and Overall Survival

**BCG Unresponsive CIS NMIBC**

### Durable Progression Free Survival

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progression-Free Survival Rate</td>
<td>12 months: 88% 95% CI (78.0%, 93.5%)</td>
</tr>
<tr>
<td></td>
<td>18 months: 88% 95% CI (78.0%, 93.5%)</td>
</tr>
<tr>
<td></td>
<td>24 months: 85% 95% CI (73.5%, 92.0%)</td>
</tr>
</tbody>
</table>

### Cystectomy Avoidance

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cystectomy-Free Rate</td>
<td>12 months: 89% 95% CI (80.1%, 94.6%)</td>
</tr>
<tr>
<td></td>
<td>18 months: 88% 95% CI (77.4%, 93.4%)</td>
</tr>
<tr>
<td></td>
<td>24 months: 85% 95% CI (72.7%, 91.8%)</td>
</tr>
</tbody>
</table>

### Overall Survival

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder Cancer Specific Survival Rate</td>
<td>12 months: 100.0% 95% CI (100.0, 100.0)</td>
</tr>
<tr>
<td></td>
<td>18 months: 100.0% 95% CI (100.0, 100.0)</td>
</tr>
<tr>
<td></td>
<td>24 months: 100.0% 95% CI (100.0, 100.0)</td>
</tr>
</tbody>
</table>

Data Extraction: September 2021, Data Analyzed by Kaplan Meyer Method
High Benefit Risk Ratio:
No Treatment Related SAEs or Deaths

Safety Analysis in BCG Unresponsive NMIBC (CIS & Papillary)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CIS (N=81)</th>
<th>Papillary (N=73)</th>
<th>CIS (N=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment-related grade 3-5 AE</td>
<td>2 (2%)</td>
<td>2 (3%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Treatment-related SAE</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Treatment-related Deaths</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Treatment-related AE Causing</td>
<td>2 (2%)</td>
<td>1 (1%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Discontinuation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Comparison: Merck & ImmunityBio

## Immune Related SAEs

<table>
<thead>
<tr>
<th>Subjects in the Population</th>
<th>Merck</th>
<th>ImmunityBio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Adverse Immune Mediated Events</td>
<td>KEYNOTE-057 Cohort A</td>
<td>QUILT 3.032 All Cohorts</td>
</tr>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>21 (20.6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Hyperthyroidism</td>
<td>8 (7.8%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Pneumonitis</td>
<td>5 (4.9%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Adrenal Insufficiency</td>
<td>3 (2.9%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Colitis</td>
<td>1 (1.0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>1 (1.0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Hypophysitis</td>
<td>1 (1.0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Nephritis</td>
<td>1 (1.0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Type 1 Diabetes Mellitus</td>
<td>1 (1.0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Severe Skin Reaction</td>
<td>1 (1.0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Uveitis</td>
<td>1 (1.0%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

https://www.fda.gov/media/133542/download

Table 17: KEYNOTE-057 AEs by Decreasing Frequency (APaT Population)

Data Extraction: September 2021

11/14/21
## Safety & Efficacy Comparison: Merck & ImmunityBio

<table>
<thead>
<tr>
<th>ENDPOINT</th>
<th>KEYNOTE-057</th>
<th>QUILT 3.032</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=97</td>
<td>N=81</td>
</tr>
<tr>
<td>CR Rate (95% CI)</td>
<td>41% (31%, 52%)</td>
<td>72% (61%, 81%)</td>
</tr>
<tr>
<td>Median Duration of CR in Months (range)</td>
<td>16.2 (0.0+ – 26.8)</td>
<td>19.9 (7.9, 26.6)</td>
</tr>
<tr>
<td>% Cystectomy Free</td>
<td>63%</td>
<td>88%</td>
</tr>
<tr>
<td>Median Duration of Follow-up</td>
<td>24.1 months</td>
<td>21.3 months</td>
</tr>
<tr>
<td>Treatment Related SAEs</td>
<td>5%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Data Extraction: September 2021
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Late Stage Clinical Trial Update

- Bladder Cancer
- Lung Cancer
- Pancreatic Cancer
- 2nd Gen COVID Vaccine
Median Overall Survival of Anktiva Compared to Any Therapy in Patients Who Progressed on Checkpoint Inhibitor

Additional Therapy Following Checkpoint Inhibitor Progression

**Median OS: 6.1 Months**

- Treatment of non-small-cell lung cancer after progression on nivolumab or pembrolizumab

- $p = 0.148$

Anktiva IL-15 Therapy Following Checkpoint Inhibitor Progression

**Median OS: 14.1 Months**

FIGURE 3  Post-progression survival after cessation of PD-1 monoclonal antibody (Ab) in 22 patients who received post-progression therapy and 72 patients who did not within 30 days of PD-1 Ab cessation.

doi: 10.3747/co.27.5495
Anktiva Selected by LUNG-MAP for 2nd Line Patients who Progressed on Checkpoint Therapy

National Cancer Institute Selects ImmunityBio’s N-803 IL-15 Receptor Agonist to Combine with Keytruda in 700-Site Lung-MAP Clinical Trial of a Chemo-Free Therapy

October 4, 2021

- ImmunityBio’s study will test its IL-15 receptor superagonist complex N-803 (Anktiva) in combination with Merck’s pembrolizumab (Keytruda) in up to 478 second-line patients with tumors that are not targetable with a drug, which accounts for the majority of NSCLC cases.

- The study is one of the National Cancer Institute’s largest lung cancer clinical trials with more than 700 sites and enrollment is anticipated to begin in Q4 2021.
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Exploratory Trial of PD-L1 t-haNK and Anktiva in Combination with Chemo Modulation in Metastatic Pancreatic Cancer

PD-L1 targeting high-affinity NK (t-haNK) cells induce direct antitumor effects and target suppressive MDSC populations

Historical >2L Survival Rate (12 weeks)

Median Overall Survival: **13 months**

Patients (2nd Line or Greater)

- Natural Killer Cell
- Memory Killer T Cell
- Memory B Cell
- iNKT Cell

Weeks of Follow Up or Until Death

Ongoing Treatment
Pancreatic Cancer: An Unmet Need

Actively Enrolling

Phase 2 Trial of PD-L1 t-haNK and Anktiva in Combination with Chemo Immunomodulation in Advanced Metastatic Pancreatic Cancer

NCT04390399 (QUILT-88) N=248

Status:  Enrolling  •  **Cohort A** 1st Line therapy (Randomized)

Enrolling  •  **Cohort B** 2nd Line therapy (Randomized)

Enrolling  •  **Cohort C** 3rd Line or greater therapy (Single-Arm)

ImmunityBio Completes Enrollment in Phase 2 Study of Nant Cancer Vaccine for 3rd Line or Greater Metastatic Pancreatic Cancer Patients—90% of Patients Have Exceeded Historical Survival Rates to Date

October 13, 2021

- More than 50 participants in third-line cohort of QUILT 88 trial have received the Nant Cancer Vaccine, which includes ImmunityBio’s off-the-shelf, targeted natural killer cells (PD-L1 t-haNK), IL-15 receptor agonist Anktiva (N-803), and Aldoxorubicin, plus low-dose chemotherapy.

- Of the evaluable patients in the study’s third cohort (third-line or greater disease state), 90% (43/48) have exceeded the historical survival rates of approximately two months with standard-of-care chemotherapy.

- Of the 48 evaluable patients, approximately half had extremely advanced disease upon enrollment (i.e. had progressed after three to six prior lines of therapy) and, of these patients, 87% (20/23) have exceeded historical survival rates.

- Mature data is expected in Q1 2022 and the company plans to meet with the FDA in 2022 to discuss the path for the approval of combination therapies for pancreatic cancer.
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2nd Gen COVID Vaccine
Next Generation Platforms for Accessible, Durable, and Broadly Protective Coronavirus Vaccines

The Universal COVID Vaccine with Cross Reactivity to Memory B & T Cells
Current COVID-19 Vaccine Challenges

**Access**

Requirement for deep cold storage of mRNA vaccines

Vaccine hesitancy in the US has left nearly half the population unvaccinated

**Durability**

Immune protection may wane after several months with current vaccine candidates, necessitating regular boosters

**Breadth**

Preliminary results show that the efficacy of all currently authorized COVID vaccines is markedly reduced against emerging viral variants.

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Emergence of the Mu Variant and Reduced Protection from RNA Vaccine

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SARS-CoV-2 Vaccine Efficacy in Health Care Workers in 2021

Keehner J, NEJM 2021

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Next Generation Vaccine Platforms

DNA

RNA

hAd5 S+N

SASA S
SASA S+N

Transcription

Translation

RBD-Trimer + Alum 3M052

Protein & Adjuvant
Next Generation Vaccine Platforms

hAd5 S+N → Transcription → RNA → Translation → RBD-Trimer + Alum 3M052

Protein & Adjuvant

DNA

SASA S

SASA S+N
hAd5 S+N: Harnessing T & B Cell Memory and Nucleocapsid Antigen

**DNA Vaccine**
Adenovirus (hAd5)  
**hAd5 S-Fusion + N-ETSD**

A. hAd5 [E1, E2b, E3]

B. Spike-Fusion (S-Fusion)

C. Nucleocapsid-Enhanced T-cell Stimulation Domain (N-ETSD)

D. hAd5 S-Fusion + N-ETSD

Investigational Agent Name:  
**hAd5 S-Fusion+N-ETSD**

- Unique and only clinically available human Adenovirus (hAd5) vector technology without adenoviral fiber production (E1-, E2b-, E3- Deleted): **potent, long-lasting protein production for maximal cellular and humoral immunity.**

- **Proven safety profile** of hAd5 in 13 Phase I / II clinical trials in over 125 elderly and immuno-compromised cancer patients.

- Proven antigen specific CD4+ and CD8+ T cell generation in patients **even with previous adenoviral immunity.**

- Unique vaccine construct maximizing cell mediated immunogenicity and **reducing the risk of antibody dependent enhancement.**

- Established cell line: **high yields, scalable, fully industrialized.** GMP plant activated.

- **Stable at simple refrigeration** (2-8°C).
The Significance of Nucleocapsid (N) in Vaccine Design

Memory T Cells with 17 Year Protection Against SARS-CoV

July 2020

T Cell Viral Protection in the Absence of Antibodies

November 2021

Nucleocapsid Protein Prevents Breakthrough Infection in Brain

September 2021

Memory T cells induced by previous pathogens can shape susceptibility to, and the clinical severity of, subsequent infections. Little is known about the presence in humans of pre-existing memory T cells that have the potential to recognize severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Here we studied T cell responses against the structural nucleocapsid (N) protein and non-structural (NSP) and endoNSP of SARS-CoV-2 in individuals convalescing from community-acquired COVID-19 (COVID-19+). In all but one of these individuals, we found CD4 and CD8 T cells that recognized multiple epitopes in the N protein. Next, we showed that patients (n=28) who recovered from SARS-CoV-2 disease associated with SARS-CoV-2 infections possess long-lasting memory T cells that are reactive to the N protein of SARS-CoV-17 years after the outbreak of SARS in 2003. These T cells displayed robust cross-reactivity to the N protein of SARS-CoV-2. We also detected SARS-CoV-2 specific T cells in individuals with no history of SARS-CoV-19. We contact with individuals who had SARS-CoV-1 and COVID-19 (n=76). SARS-CoV-2 specific T cells in contact with individuals exhibited a higher pattern of immuno-dominance, and frequently targeted NSP1 and NSP3 as well as the Nproteins. Epitope characterization of NSP1-specific T cells showed the recognition of protein fragments that are conserved among all betacoronaviruses, but have low homology to common cold human-associated coronaviruses. Thus, infections with betacoronaviruses induce multi-specific and long-lasting T cell memory against the structural N protein. Understanding how pre-existing N-specific T cells that are present in the general population affect the susceptibility to pathogens of SARS-CoV-2 infection is important for the management of the current COVID-19 pandemic.
The Important Revelation of Memory B & T Cell Cross Reactivity for a Universal COVID Vaccine

Cross Reactive Memory B Cells

June 2020

Cross Reactive Memory T Cells

June 2021

Serologic cross-reactivity of SARS-CoV-2 with endemic and seasonal Betacoronaviruses

Jennifer Hicks \(^1\) \(^2\), Carleen Klumpp-Thomas \(^3\) \(^2\), Heather Kalish \(^1\) \(^2\),

Cross Reactive with

SARS-CoV-2
COVID-19

SARS
Common Cold

Pre-existing polymerase-specific T cells expand in abortive seronegative SARS-CoV-2
hAd5 S+N Vaccine Generates Cross Reactive Memory B Cell in Healthy Volunteers: The Potential for a Universal COVID Vaccine

B Cells From Common Cold Coronavirus Cross Reacts with SARS-CoV-2

June 2020

Serologic cross-reactivity of SARS-CoV-2 with endemic and seasonal Betacoronaviruses

Jennifer Hicks, Carleen Klumpp-Thomas, Heather Kalish

SARS-CoV-2 COVID-19

Cross Reactive with

SARS

Common Cold

SARS-CoV
MERS-CoV
OC43-CoV
HKU1-CoV

% identities to SARS-CoV-2

NTD
RBD
S1/S2
FP
HR1
HR2

SARS-CoV
MERS-CoV
OC43-CoV
HKU1-CoV

hAd5 S+N Generates Antibodies that Cross React with MERS-CoV and Common Coronaviruses

December 2021 (Unpublished)

Cross Reactive to N

Cross Reactive to S

C_NP IgG vs. C_SP IgG for Immunity Bio as of day 1

hAd5 S+N (SARS-CoV 2)
hAd5 S+N Vaccine Generates Cross Reactive Memory B Cell in NHP Studies and in Healthy Volunteers

**Cross Reactive B Cells in NHP**

hAd5 S+N Induces Cross Reactive Memory B Cells to N of SARS-CoV-2

September 2021

**Cross Reactive B Cells in Healthy Subjects Phase 1**

hAd5 S+N Induces Cross Reactive Memory B Cells to N of SARS-CoV-2

November 2021 (Unpublished)

Dual-Antigen COVID-19 Vaccine Subcutaneous Prime Delivery With Oral Boosts Protects NHP Against SARS-CoV-2 Challenge

Potent Neutralizing Antibody Response to Challenge

- RA3949
- RA4011
- RA3936
- RA3942
- RA3999
- RA4014
- RA4001
- Vaccination
- SARS-CoV-2 Challenge

\[ *p = 0.0137 \text{ (Day 70)} \]

MERS-CoV

HCoV-HKU1 (Common Cold)

HCoV-OC43 (Common Cold)
hAd5 S+N Vaccine Generates Cross Reactive Memory T Cell in Phase 1 Studies and in Healthy Volunteers

Cross Reactive Memory T Cells in Healthy Subjects Phase 1

November 2021 (Unpublished)

USA - Phase 1
Cross Reactive T Cell Response

IFN-γ Normalized to WT

Pre Post Vaccine
Summary: A 2nd Generation SARS-CoV-2 Vaccine Generating Memory B & T Cells Which Are Cross Reactive to MERS and Common Cold Coronaviruses

The Potential for a Universal COVID Vaccine

**hAd5 Induced Memory B Cells**

- September 2021
- hAd5 S + N vaccination induces memory B cells with complete protection following viral challenge in NHP

**hAd5 Induced Memory T Cells**

- November 2021 (Unpublished)
- hAd5 vaccine induces cross reactive memory B cells to S & N following vaccination in healthy subjects

- November 2021 (Unpublished)
- hAd5 S + N vaccination induces both memory T cell and cross reactive memory B cells in healthy subjects

Cross Reactive Memory T Cells
Heterologous DNA / DNA Prime/Boost

SISONKE BOOST TRIAL (Phase I / II / III)

**PRIME IM**
- DNA Vaccine
  - Adenovirus Type 26 (Ad26) with Spike (S)

**BOOST SC**
- DNA Vaccine
  - Human Adenovirus Type 5 (hAd5) with S-Fusion + N-ETSD

OR

Phase I & II Enrollment Completed
N = 60
Next Generation Vaccine Platforms

DNA

RNA

hAd5 S+N

SASA S
SASA S+N

Transcription

Translation

RBD-Trimer + Alum 3M052

Protein & Adjuvant
RNA Prime Overcomes Current Vaccine Challenges and Leads to Strong Antibody and Cellular (CD4) Responses

SASA Vaccine
Self-Amplifying Self-Adjuvant RNA (SASA) Nanoparticle Lipid Carrier (NLC) with Spike (S)

Investigational Agent Name: SASA
Self-Amplifying Self Adjuvant

<table>
<thead>
<tr>
<th>Limitation</th>
<th>Current RNA Vaccines</th>
<th>ImmunityBio RNA Vaccines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage / Distribution</td>
<td>Requirement for deep-cold chain.</td>
<td><strong>NLC formulation</strong> allows for storage at room temperature for years</td>
</tr>
<tr>
<td>Potency</td>
<td>Elicit immunity at levels similar to recovered patients, which may allow re-infection.</td>
<td><strong>Self replicating RNA</strong> allows for increased potency, allowing for potential single shot protection</td>
</tr>
<tr>
<td>Duration of Immunity</td>
<td>Modest immunogenicity may be associated with short durability</td>
<td><strong>Self-Adjuvanting RNA vaccine platform</strong> may increase duration and breadth of immunity</td>
</tr>
<tr>
<td>Protection against</td>
<td>RNA sequence encapsulated within delivery vehicle making adaptations to new strains challenging</td>
<td><strong>RNA decorated on outside of NLC</strong>, allowing for easy swapping of genetic sequence. Demonstrated ability to vaccinate with multivalent strains</td>
</tr>
<tr>
<td>mutant SARS-CoV-2 strains</td>
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</table>
RNA + DNA: “Mix and Match”

• Heterologous prime boost ("Mix and Match") has been shown to elicit some of the strongest and potentially most durable immune responses to COVID
  • “Prime” with RNA vaccine leads to strong antibody response
  • “Boost” with adenovirus vaccine makes strong cellular immune responses
• IBRX has both technologies together ready for commercial-scale manufacturing and global distribution
Heterologous RNA / DNA Prime/Boost

THEMBA TRIAL (Pending)

**PRIME (Day 1) IM**

**SASA Vaccine**
Self-Amplifying Self-Adjuvating (SASA) RNA with Spike (S) and Nucleocapsid (N)

**BOOST (Day 22) SC**

**DNA Vaccine**
Human Adenovirus Type 5 (hAd5) with S-Fusion + N-ETSD

- **Strong Antibody Response:** Potent Th1 Antibodies to Both Wildtype and Beta Variant
- **Strong Immune Cell Response:** Potent CD8+ T Cells to Both S and N for Wildtype and Beta Variant
- Potent CD4+ T Cells to Both S and N for Wildtype and Beta Variant
Next Generation Vaccine Platforms
3M-052-Alum Adjuvant Formulation Shows Potential for Durable, Broad, and Potent Protection from COVID Variants

- Adjuvant: a molecule that enhances the body's immune response to a vaccination.

- Adjuvant formulation, 3M-052-Alum, developed by IDRI and 3M, was used in Duke's experimental "pan-coronavirus" vaccine.

- Preliminary studies show that vaccines combining 3M-052 adjuvant formulation with coronavirus proteins:
  - provide protection against SARS-CoV-1, SARS-CoV-2 (and variants of concern), and animal coronaviruses.
  - generate higher antibody levels against a wide range of COVID strains compared with mRNA vaccines.
  - protect lab animals from COVID infection and pathology (e.g., damage to lung tissue).

A Potential Pan-Coronavirus Vaccine
Subunit Protein with Adjuvant (THEMBA 2)

July 2021

SCIENCE IMMUNOLOGY | RESEARCH ARTICLE

CORONAVIRUS

A yeast-expressed RBD-based SARS-CoV-2 vaccine formulated with 3M-052-alum adjuvant promotes protective efficacy in non-human primates

RBD Subunit Protein with 3M-052 Adjuvant

In collaboration with Baylor and IDRI

“THEMBA 2” COVID-19 Vaccine Clinical Trial Pending – South Africa
Next Generation Vaccine Platforms

hAd5 S+N

SASA S
SASA S+N

DNA

RNA

RBD-Trimer + Alum 3M052

Protein & Adjuvant
First-in-Class Immunotherapy Platforms

Natural Killer Cells
- NK-92 Off-the-Shelf
- Autologous m-ceNK
- iNKT Cells

Memory B & T Cells
- Adenovirus
- Yeast
- Toll Receptor Activators
- saRNA

NK + T Cells
- IL-15 Fusion Proteins
# ImmunityBio: A Leading Immunotherapy Company

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>NASDAQ:</strong></td>
<td>IBRX</td>
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<tr>
<td><strong>First in Human</strong></td>
<td>Immunotherapy Molecules and cells</td>
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<tr>
<td><strong>Actively Recruiting Clinical Trials</strong></td>
<td>20</td>
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<tr>
<td><strong>Patients Studied</strong></td>
<td>1,800+</td>
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<tr>
<td><strong>Active Phase II / III Clinical Trials</strong></td>
<td>13</td>
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<tr>
<td><strong>Antibody Cytokine Fusion Proteins</strong></td>
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<td><strong>Chemo Immuno Modulators</strong></td>
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<td><strong>Vaccine Technologies</strong></td>
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<td><strong>Natural Killer Cells</strong></td>
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<tr>
<td><strong>A Leading Immunotherapy Platform in Oncology &amp; Infectious Diseases</strong></td>
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<tr>
<td><strong>Square Feet of Manufacturing and R&amp;D Facilities</strong></td>
<td>400,000</td>
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<tr>
<td><strong>Worldwide Patents Extending to 2035 and Beyond</strong></td>
<td>2038+</td>
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<tr>
<td><strong>Over 5 Trillion Natural Killer Cells Manufactured to Date</strong></td>
<td>&gt;5 Trillion</td>
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