IMUGENE

ASX:IMU

HARNESSING B-CELLS FOR CANCER IMMUNOTHERAPY: A Paradigm Shift in Play

Nicholas Ede, PhD
Chief Technology Officer
Bioshares Biotech Summit
July 27 / 2018

IMUGENE

NOTICE: FORWARD LOOKING STATEMENTS

Imugene Limited
(ASX:IMU)

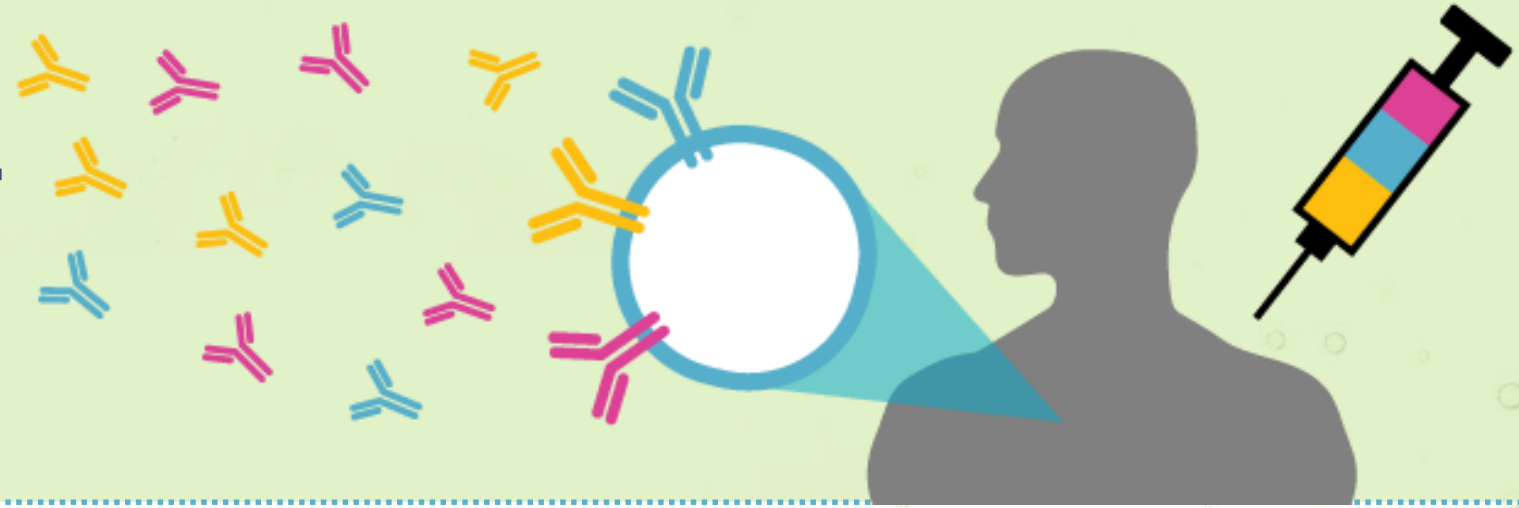
Level 3,
62 Lygon Street
Carlton VIC 3053

Dr. Nick Ede
Chief Technology Officer

m: +61 (0) 400 642 254
e: nede@imugene.com
w: imugene.com

Any forward looking statements in this presentation have been prepared on the basis of a number of assumptions which may prove incorrect and the current intentions, plans, expectations and beliefs about future events are subject to risks, uncertainties and other factors, many of which are outside Imugene Limited's control. Important factors that could cause actual results to differ materially from any assumptions or expectations expressed or implied in this brochure include known and unknown risks. As actual results may differ materially to any assumptions made in this brochure, you are urged to view any forward looking statements contained in this brochure with caution. This presentation should not be relied on as a recommendation or forecast by Imugene Limited, and should not be construed as either an offer to sell or a solicitation of an offer to buy or sell shares in any jurisdiction.

Imugene **develops vaccines** to boost and direct the body's immune system to specifically target and attack cancer cells.



IMUGENE

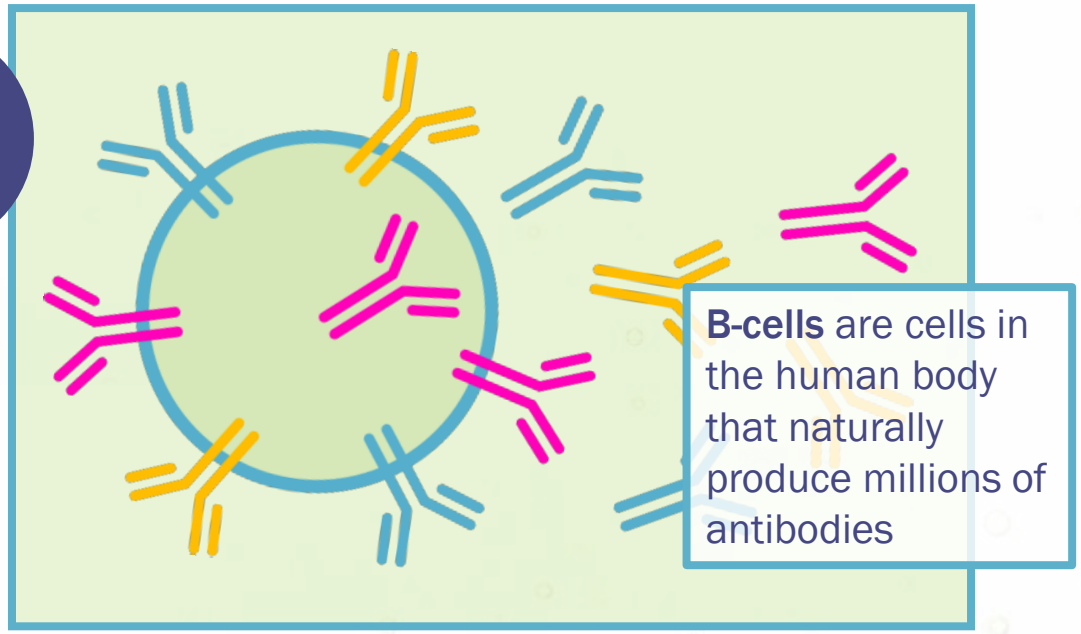
A BETTER WAY TO MAKE ANTIBODIES TO TREAT CANCER?

In a facility:

For example, Merck's PD-1 inhibitor Keytruda

VS

Using B-cells in your body



B-cells are cells in the human body that naturally produce millions of antibodies

Teaching B-cells to make antibodies using peptide antigens

IMUGENE

MONITORING THE COMPETITION: DIFFERENTIATION IN A CROWDED MARKET

Constant monitoring of competitive landscape

Constant monitoring of Imugene position – SWOT analysis

Turn threats into opportunities / weaknesses into strengths

Synergistic technology acquisition from Ohio State University and The Mayo Clinic

IMUGENE

STRATEGIC ACQUISITION

Ohio State University and Mayo Clinic B-cell peptide vaccine portfolio

- Opportunity to create the pre-eminent, dominant position globally in B-cell peptide vaccines and therapeutics. **A catalyst for value creation.**

- Professor Kaumaya's work in the area of check-point inhibitors and tumor-associated antigens such as Her-2, is highly complementary to Imugene's existing platform and portfolio.
  - Six patent families including composition of matter and method of use patents covering PD-1, Her-1, Her-2, Her-3, VEGF, IGF-1R, CD28 peptide vaccines and therapeutics.
  - Commercially attractive upfront payment; royalty rate in low single digit royalty on sales; exclusive, world-wide and sub-licensable until expiry of the last patent.

- Broadens and accelerates key Imugene Research and Clinical programs
  - PD-1 and HER2 + PD-1 combination **programs accelerate by 24+ months**

OSU

THE OHIO STATE UNIVERSITY

MAYO CLINIC

WORLDWIDE, EXCLUSIVE LICENSE

- Six patent families, 22 patents
- IND ready PD-1 clinical trial (Phase 1)
- Ongoing Her-2 clinical trial (Phase 2)
- Six additional clinical candidates Her-1, Her-2, Her-3, VEGF, IGF-1R CD28
- Three year R&D contract with access to Ohio translational labs

Access to experience and expertise with Prof. Pravin Kaumaya and team

IMUGENE

WHY SELECT AND TARGET PD-1 FOR B-CELL VACCINATION?

Monoclonal antibody immunotherapies Keytruda® (Merck) and Opdivo® (BMS) targeting PD-1 sold **USD$3.8B and $4.9B**, respectively, in 2017.

In industry-recognized mouse cancer models (colon cancer), the PD-1 targeting B-cell vaccine is **more superior than the gold standard mouse PD-1 monoclonal antibody** (used in preclinical model testing for Keytruda and Opdivo).

Whilst acknowledging the rapid rise in clinical trials involving PD-1 and their combination with other treatments*, a PD-1 B-cell vaccination approach represents a **paradigm shift in cancer immunotherapy.**

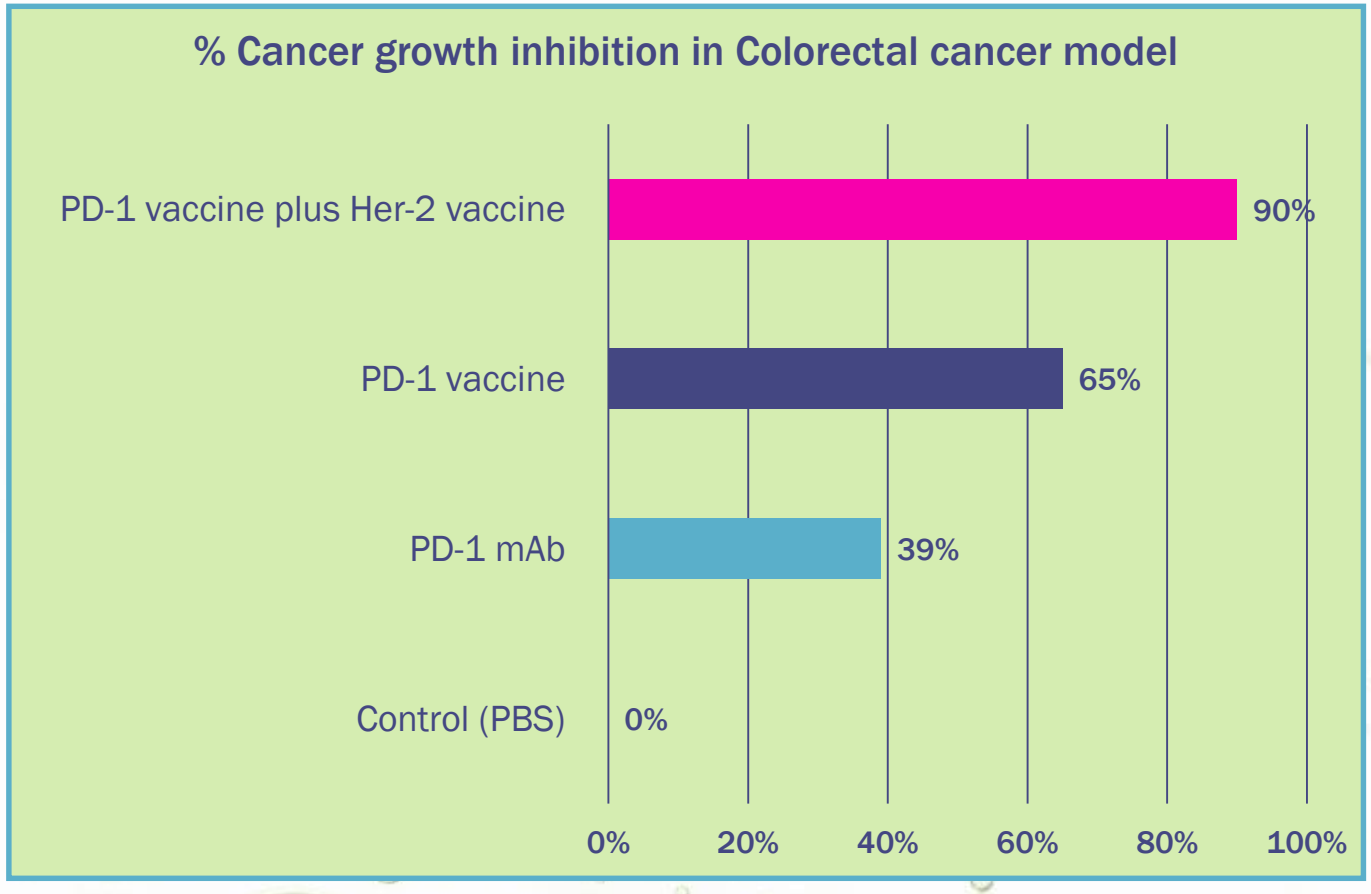
** Tang etal. Comprehensive analysis of the clinical immuno-oncology landscape, Annals of Oncology, 2017*

The combination of the PD-1 vaccine with the acquired Phase II Her-2 vaccine **significantly inhibits tumor growth** c/w mAb control in a Her-2+ model of colon cancer.

IMUGENE

PD-1/HER-2 VACCINE COMBINATION ACTIVE IN MODEL OF COLORECTAL CANCER WITH NO SIGNS OF TOXICITY

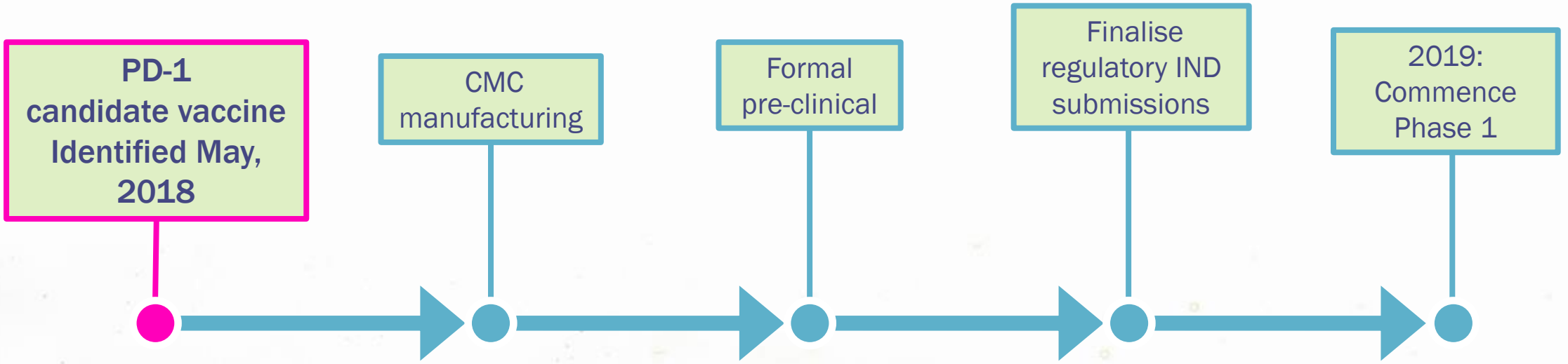
- All mice vaccinated over a period of 9 weeks showed no signs of scruffiness, lesions, and lethargy
- Organs (spleen, liver, heart, lung, kidney, and tumor) from the Balb/c mice vaccinated with combination peptides (HER-2 and PD-1) were collected from mice and submitted for analysis
- No significant lesions were noted in any of the organs submitted for histologic evaluation.
- There were also no overt biochemical abnormalities noted.



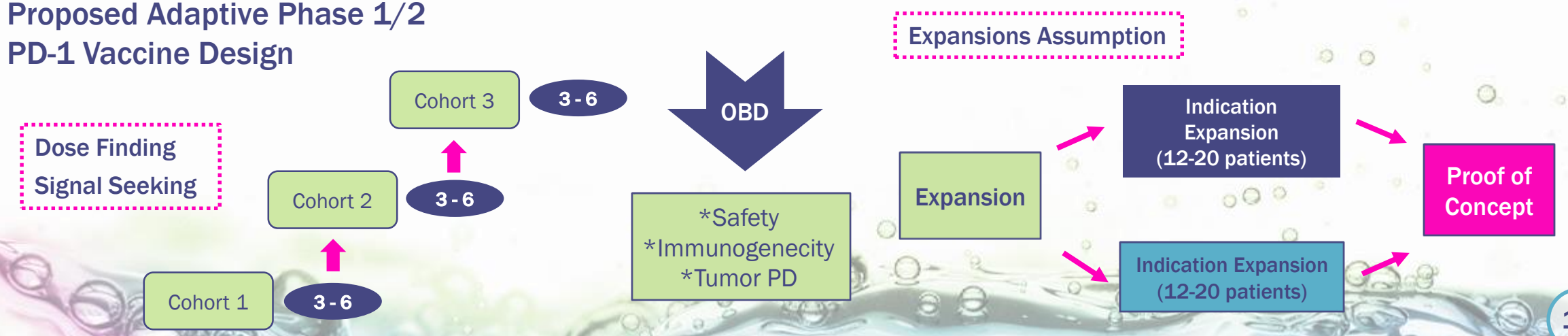
Inhibition of cancer growth 16 days after infusion of cancer cells

IMUGENE

PD-1 "KEY-VAXX" VACCINE PHASE 1 DEVELOPMENT PATH 2018-2019



Proposed Adaptive Phase 1/2 PD-1 Vaccine Design



IMUGENE

IMMUNO-ONCOLOGY COMBINATIONS DRIVING VALUE

- Combining drugs for better I/O outcomes is **driving value creation** presently
- Big Pharma are looking for novel combinations or "elusive blends" that:
  - **Combine without increasing toxicity**
  - **Combine with minimal cost increase**
  - **Combine for better response rates and efficacy**
- **Imugene's cancer vaccines potentially tick all three boxes**

IMUGENE

COMBINATION EXAMPLE

July 2018, FDA approves Opdivo plus Yervoy combination for a certain subset of patients with metastatic colorectal cancer

The FDA approval of combination Opdivo and Yervoy provides a novel therapeutic option with a higher response rate than that from monotherapy immunotherapy, BUT

Unfortunately, more significant toxicity is noted with the combination, and diligence is needed to monitor these immune-mediated side effects

Although early in development, Imugene's PD-1 and Her-2 cancer vaccines potentially provide efficacy and response rate with minimal toxicity

IMUGENE

PROFESSOR PRAVIN KAUMAYA & DR. TANIOS BEKAII SAAB

Could precision-engineered peptide epitopes/vaccines be the key to a cancer cure?

"Combination cancer vaccines with peptide mimics have the potential to treat existing cancer and prevent its recurrence."

Pravin TP Kaumaya
The Ohio State University, Department of Obstetrics & Gynecology, Suite 316 Medical Research Facility, 420 W. 12th Ave., Columbus, OH 43210, USA ■ kaumaya.1@osu.edu

THE OHIO STATE UNIVERSITY

MAYO CLINIC

A TEAM WITH TRACK RECORD IN DRUG DEVELOPMENT

Leslie Chong (Sydney, Australia)

Managing Director & Chief Executive Officer

- Over 20 years of oncology experience in Phase I – III of clinical program development
- Leadership role involvement in two marketed oncology products
- Previously Senior Clinical Program Lead at Genentech, Inc., in San Francisco

Dr Axel Hoos (Philadelphia, U.S.A.)

Non-Executive Director

- Senior Vice President and Head of Oncology at GSK
- Former Medical Lead for Yervoy, the first survival improving medicine in Immuno-Oncology
- Chairman of the BoD of the Sabin Vaccine Institute
- Co-Chair of the Cancer Immunotherapy Consortium Think-Tank

Paul Hopper (Sydney, Australia)

Executive Chairman

- International & ASX biotech capital markets experience particularly in immuno-oncology & vaccines
- Former Chairman of Viralytics, Founder & Director of Prescient, Founder of Imugene & Polynoma LLC, former Director pSivida, Somnomed & Fibrocell Science

Dr Nick Ede (Melbourne, Australia)

Chief Technology Officer

- Over 25 years peptide vaccine and drug development
- Former CEO Adistem, CEO Mimotopes
- VP Chemistry Chiron (now Novartis), Research Fellow CRC Vaccine Technology

Dr Anthony Good (Sydney, Australia)

Vice President of Clinical Research

- Over 20 years global clinical development experience.
- Integral to the development of significant new medicines including Viagra, Revatio, Lipitor, and Somavert.
- Ex Pfizer Global Research and Development, Ex Covance Clinical Services.

Mr. Charles Walker (Brisbane, Australia)

Non-Executive Director

- Experienced listed biotech CEO and CFO (ASX;ACL)
- Experienced in financial markets including executing 55 international tech corporate transactions
- Clinical experience includes managing pipeline of drugs in all stages form discovery, through to Phase III to launched products

IMUGENE

IMUGENE SCIENTIFIC ADVISORY BOARD

Professor Peter Schmid (Barts Cancer Inst., London)

Chair of Cancer Medicine, Queen Mary Hospital London

- Expertise in breast and lung cancer, cancer immunotherapy and early drug development
- Leads the Centre of Experimental Medicine at Barts Cancer Institute

Prof Ursula Wiedermann (Vienna, Austria)

Chief Scientific Officer

- Co-inventor of HER-Vaxx
- Professor of Vaccinology at Medical University of Vienna

Dr Yelina Janjigian (MSKCC, U.S.A.)

Medical Oncologist

- Expertise in esophageal and stomach (gastric) cancer
- Active in GI clinical trials testing combinations of Her-2 and checkpoint inhibitor therapies

Dr Neil Segal (MSKCC, U.S.A.)

Medical Oncologist

- Expertise in GI, Colon, Pancreatic cancers
- Active clinical immuno-oncology researcher
- Clinical lead in several trials using PD-L1 inhibitors

Our competition is cancer, and in that fight, we're collaborating with an outstanding team of medical researchers and oncologists

IMUGENE

EXECUTIVE SUMMARY

Imugene B-cell Vaccine Pipeline

Broadened and strengthened clinical programs globally, brings the Imugene platform and technology into **US and European focused clinical trials**

Synergistic Technology Acquisition from Ohio State University and The Mayo Clinic

Full spectrum of indications and targets to choose from, including check point inhibitors and combination therapies. **Accelerates** and advances Imugene PD-1 vaccine program by **24 months**

Experienced Management & Board

Meeting milestones and successful M&A activity