IMUGENE LIMITED

ASX:IMU

B Cell Based Antibodies for Immuno-Oncology

Leslie Chong
Chief Executive Officer
09-January-2017

Notice: Forward Looking Statements

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What Does Imugene Do?

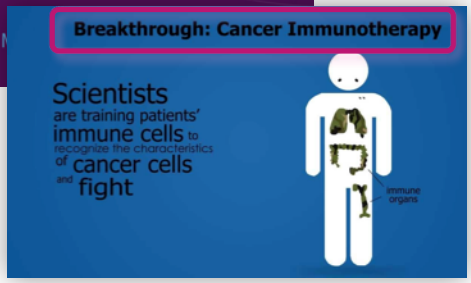
We are developing cancer immunotherapy drugs based on antibodies

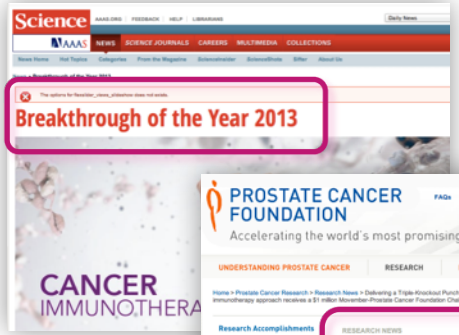
IMU's Value Proposition

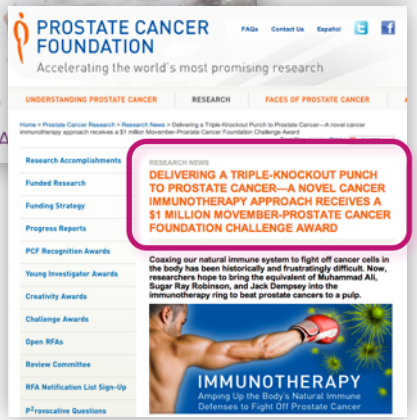
- ✓ Promising science with impeccable provenance in the hottest area of cancer today – immuno oncology
- ✓ Broad Pipeline: HER-Vaxx & Mimotopes
- ✓ Breast Cancer clinical trial complete & on the cusp of recruitment on our second Phase 1b/2 clinical trial in gastric cancer
- ✓ Tight share register with leading Fund Manager, Platinum Asset Management
- ✓ Frequent, rich, quality news flow ahead
- ✓ Axel Hoos Sr. VP of immuno – oncology at GSK, plus team with successful track record in drug development
- ✓ Low market cap - undervalued against ASX peers

Imugene Operates in the most Promising area of Oncology Today…

Imugene is an immunotherapy company developing B-cell based vaccines in the most promising area of oncology today – IMMUNO-ONCOLOGY

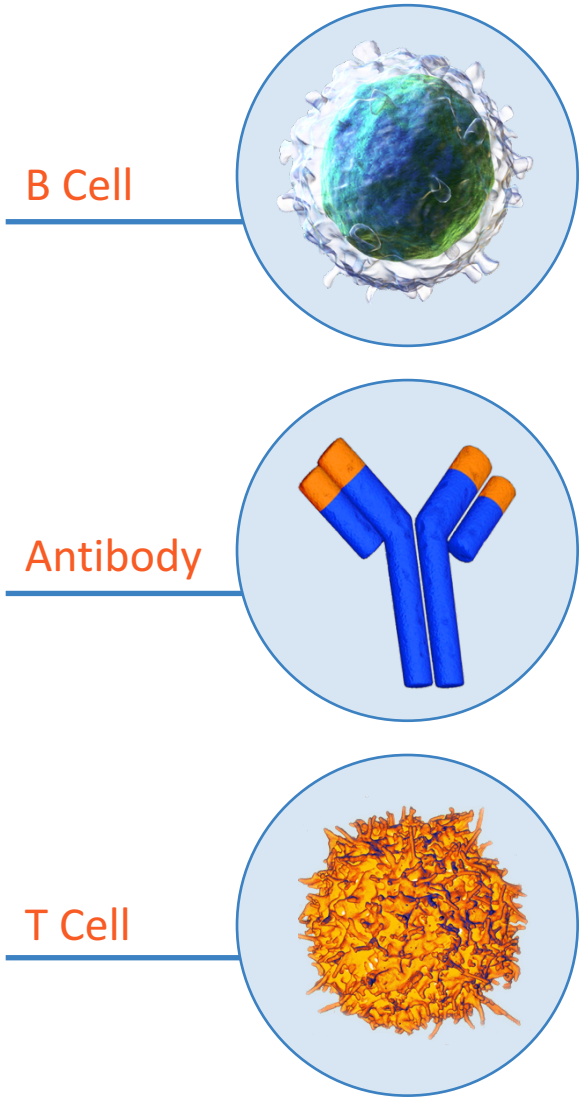




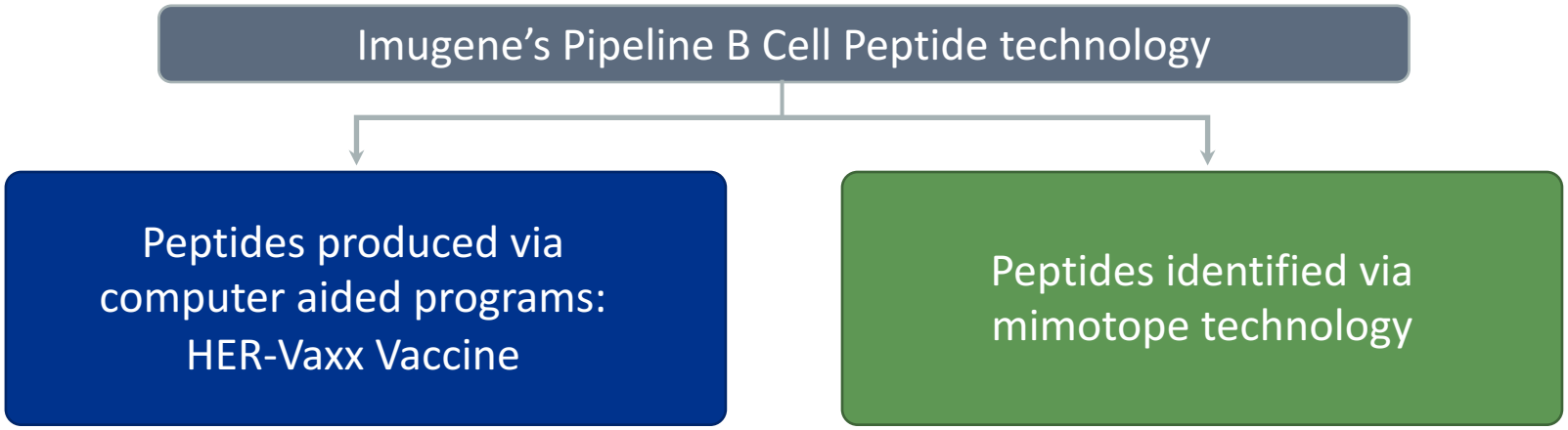


What is Cancer Immunotherapy?

- Immunotherapy is the treatment of cancer with substances or drugs that stimulate the patient's immune response – known as active immunisation
- Unlike chemotherapy, immunotherapy drugs do not target the cancer directly
- Immunotherapy helps the patient's own immune system recognise & attack cancer cells
- Typical immune responses are:
  - B Cells making antibodies to attack the cancer
  - T Cells developed by the thymus to attack the cancer



Two Compelling Antibody Programs and Commercial Opportunities

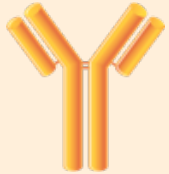


Building on the multi-levels of your own immune system

- Identification of cancer targets for variety of cancer indications
- Immune responses from conjugates and adjuvants
- B-Cell Peptide vaccines against checkpoint targets

What is an Antibody?
A key Defense of the Immune System

Antibodies – Large Y-shaped protein. They are exquisitely made to attach themselves to a target sitting on an invading organism

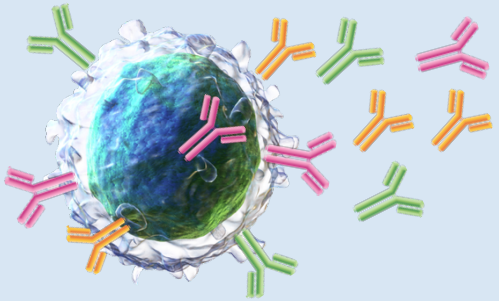


There are 2 ways to make antibodies

In a factory

For example,
Roche's Herceptin

Using B cells in your own body



B Cells – are like little antibody factories producing millions of antibodies against cancer targets

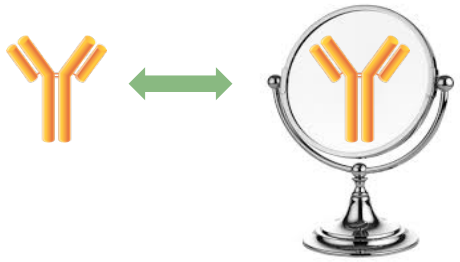
Advantages of B-Cell Based Antibodies

Issue	B-Cell Immunotherapy	Monoclonal Antibodies
Safety	• Stimulates the immune system to produce natural Abs, potentially safer, as demonstrated by HER-Vaxx	• Synthetic Ab, with side effects (including ventricular dysfunction, CHF, anaphylaxis, immune mediation)
Efficacy	• Polyclonal Ab response reduces risk of resistance and potentially increases efficacy	• Monoclonal Ab - single shot
Durability	• Antibodies continuously produced a lasting immune response to inhibit tumor recurrence	• Half life up to 12 days sometimes less
Usability	• Potentially low numbers of vaccinations required per year	• Requires regular infusion
Cost	• Low cost of production enables greater pricing flexibility facilitating combinations and opening up additional markets	• Expensive course of treatment >USD100K per year in the US

B-Cell Vaccines offer a unique opportunity to intervene at multiple points in the immune system and create immune memory which enhances durability of response.

A Mimotope Produces a Copy of an Antibody

- A mimotope is a small molecule, often a peptide, which mirrors the structure of an epitope, the specific target an antibody binds to. Because of this property it induces an antibody response similar to the one elicited by the epitope.
- A mimotope causes your B cells to produce an antibody copy of the antibody you want to “mimic”
- Potential tool for selecting novel vaccine candidates against a variety of tumors
- Greatly extends IMU’s oncology franchise and pipeline.
- Monoclonal antibody market currently at US$60bn annually
- **December, 2016 progressed the mimotope platform with filing of 4 new patent applications**



HER-Vaxx is a peptide vaccine being developed for HER2^{+} gastric cancer

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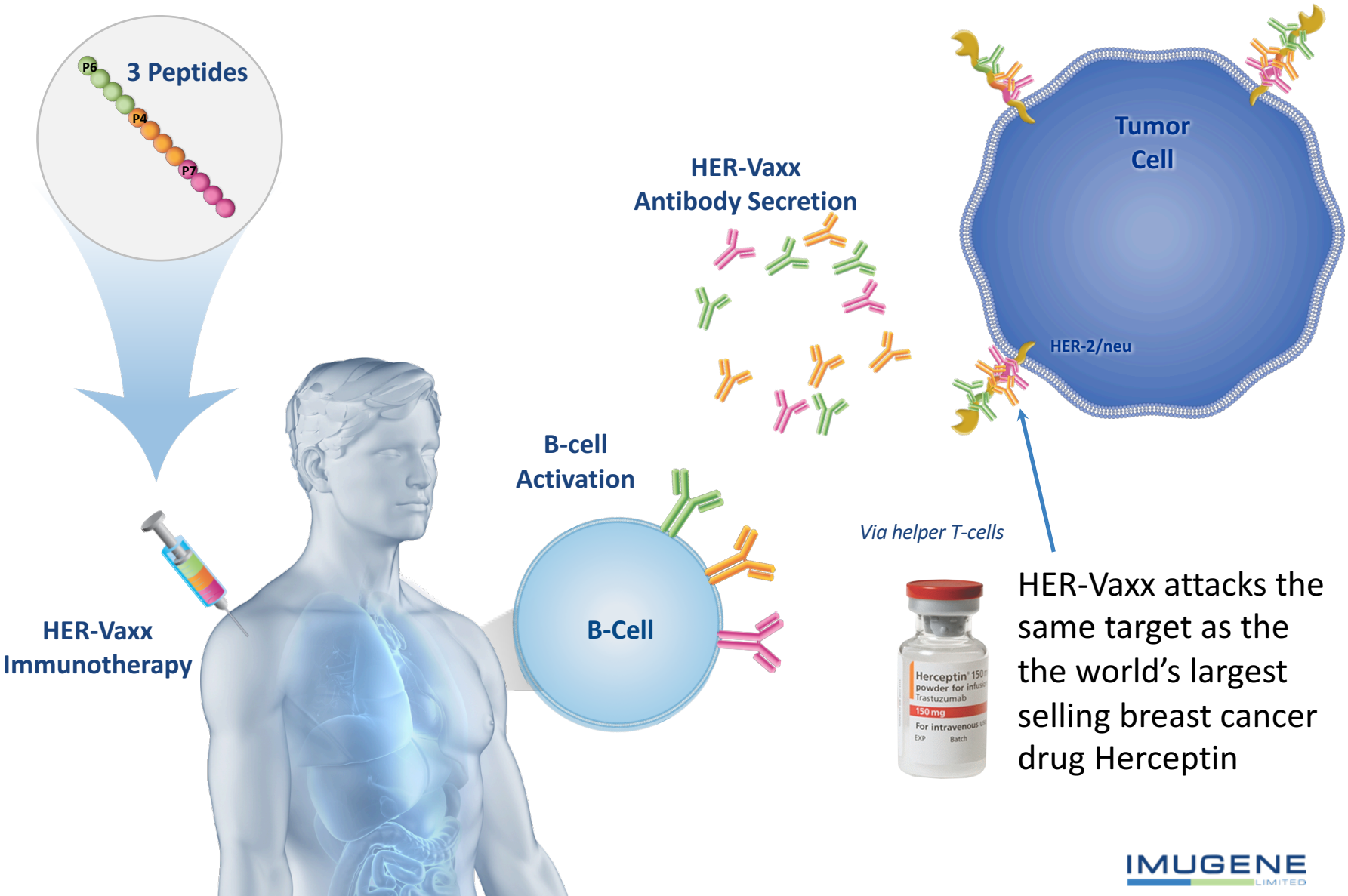
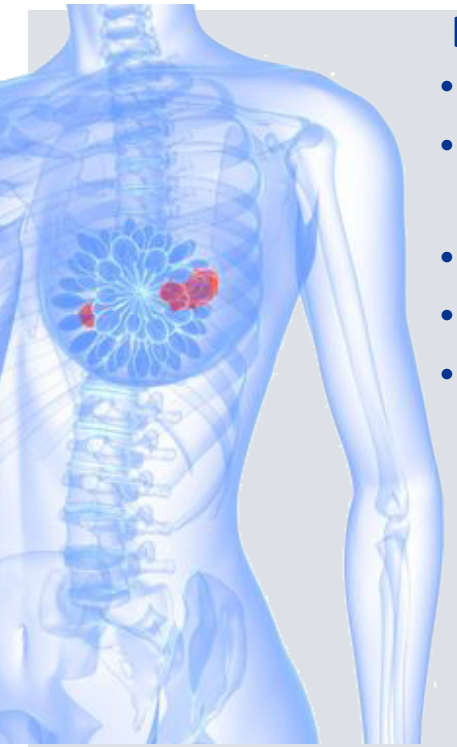
HER-Vaxx: Mechanism of Action – How it Works



HER-Vaxx attacks the same target as the the world's largest selling breast cancer drug Herceptin

Phase 1 in Breast Cancer, Completed at Medical University of Vienna



Design

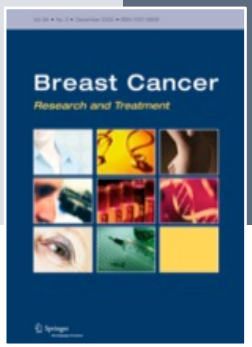
- 10 patients
- All late stage breast cancer patients
- HER-2 +/++
- Life expectancy > 4 months
- Conducted at Medical University of Vienna

Clinical Endpoints

1. Safety and Tolerability
2. **Immunogenicity:** antibodies and cellular responses

Results

- Patients developed anti-HER-2 antibodies
- Induction of cytokines (Th1 biased; IFNγ)
- Induction of memory T & B cells post vaccination
- Reduction in T reg cells post vaccination, indicating strong vaccine response
- Antibodies induced displayed potent anti-tumor activity
- Promising results - Patients were end stage and not primary target group
- Reviewed in Peer Publication



* Wiedermann et. al., Breast Cancer Res Treat. 2010 Feb;119(3):673-83.

HER-Vaxx Has Been Considerably Optimised Since Phase 1a

First Generation

- Three separate B Cell epitopes delivered in virosomes (used in Phase 1a).

Second Generation

- incorporated the three B Cell epitopes into a single 49-mer peptide
- > 2x increase in antibody response *in vivo* compared to three single epitopes (extended patent life to 2030)

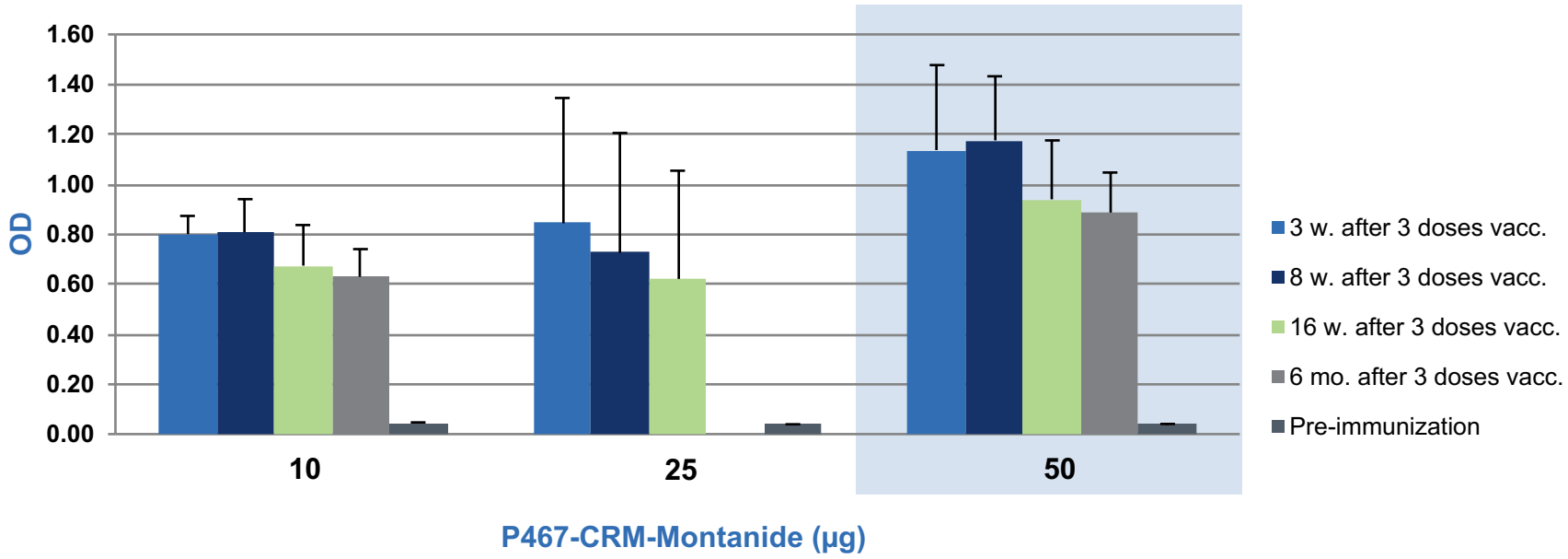
Ph1b/2 Formulation

Third Generation

- changed the delivery system from virosomes to CRM197 (which gave CD4 T-Helper response), and added a montanide adjuvant
- >20x increase in antibody response *in vivo* (potentially extends patent life to 2036)

HER-Vaxx Has Been Significantly Enhanced by the Carrier System and Adjuvant

Her-2/neu specific IgG kinetic, after last immunization



In the mouse model the new formulation sees circulating antibodies maintained for 6 months which equates to many years in humans.

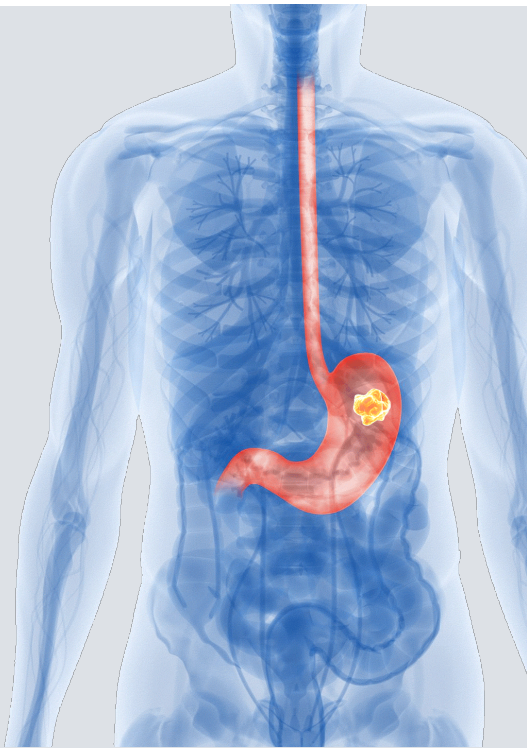
Phase 1b/2, in Gastric Cancer

Phase 1b lead-in

- Open label
- ~18 patients in 3 cohorts of up to 6 pts per cohort
- Combination with chemo
- Endpoints:
  - Recommended Phase 2 Dose of HER-Vaxx
  - Safety: any HER-Vaxx toxicity
  - Immunogenicity (anti-HER-2 antibody titres))

Phase 2

- Open label
- ~68 patients from sites in Asia
- Combination with chemo
- Randomized
- Primary Endpoints:
  - Overall Survival
  - Progression-Free Survival
- Secondary endpoint:
  - Immune response



✓ *08-Nov, 2016: Phase 1b/2 Commences*

★ *Q1, 2017: Patient Enrolled*

★ *Q1-Q2, 2017: Early Patient Data Available*

★ *Q3 2017: Interim Ph1b Patient Data Available*

★ *Q4 2017: Final Ph1b Patient Data Available*

Huge Gastric Market Opportunity

- Gastric cancer is the second leading cause of cancer mortality in the world & its management, especially in advanced stages, has evolved relatively little
- ~20% patients with metastatic gastric cancer are HER-2 positive
- Surgery, chemotherapy, radiation & Herceptin are the key treatments
- In many countries, particularly Asia, chemotherapy such as capecitibine and 5-FU, is the standard of care, not Herceptin
- Asia is the largest market for gastric cancer globally

Chemotherapy

Monoclonal antibody

2015 Big Pharma Antibody Deals

20% of the top 10 Big Pharma deals in 2015 were in the antibody space

Top ten 2015 licensing transactions by announced total size

	Licensee	Licensor	Total Size (US $M)	Upfront (US $M)	Subject	Stage	Primary Rx Area
1	Sanofi	Hanmi	$4,266	$445	Sanofl to develop Hanmi's Portfolio (specifically 3 assets) of long-acting diabetes treatment	Reformulation	Endo/Meta
2	AstraZeneca	lonis (fka Isis)	$4,090	$65	Discovery and development of antisense therapies for cardiovascular, metabolic and renal diseases	Discovery	Diversified
3	Vertex	CRISPR	$2,625	$75	Vertex and CRISPR to use CR1SPR-cas9 gene editing technology to discover and develop new treatment for genetic diseases	Discovery	Diversified
4	Gilead	Galapagos	$2,075	$300	Gilead Sciences to develop and commercialize Galapagos' filgotlnlb against rheumatoid arthritis	Phase II	Al/Inflam
5	Pfizer	Heptares	$1,890	Undisclosed	Heptares and pfizer to develop novel drugs targeting GPCR against multiple therapeutic indications	Discovery	Diversified
6	BMS	Five Prime	$1,740	$350	BMS to develop and commercialize Flve Prime's CSFlR antibody program, including FPA-008 for immunology and oncology	Phase I	Diversified
7	Sanofi	Lexicon	$1,730	$300	Sanofi to develop and commercialize Lexicon's sotagliflozin against diabetes, with an option to license	Phase III	Endo/Meta
8	Amgen	Xencor	$1,702	$45	Amgen to develop and commercialize Xencor's bispecific cancer immunotherapy and inflammation programs	Preclinical	Diversified
9	Sanofi	Regeneron	$1,665	$640	PD-1 inhibitor and other new immuno-0ncology antibodies, with an option	Phase I	Cancer
10	Ultragenyx	Arcturus	$1,570	$10	Arcturus and Ultragenyx to discover and develop mRNA therapeutics using UNA Oligomer chemistry and LUNAR nanoparticle delivery platform	Discovery	Diversified

Bristol-Myers Squibb
$350M up-front
Phase 1

SANOFI
$640M up-front
Phase 1

What Could an IMU Deal Look Like?

Top 20 Licenses with Upfront Payments > $50m

Licensee	Licensor	Upfront ($M)	Equity ($M)	Stage	Rx Area
Sanofi	Regeneron	$640		Phase I	Cancer
Celgene	Med Immune / AZ	$450		Phase III	Cancer
Sanofi	Hanmi	$445		Reformulation	Endo/Meta
Bristol-Myers Squibb	Five Prime	$350		Phase I	Diversified
Astellas	Immunomic	$300		Discovery	Al/Inflam
Gilead	Galapagos	$300	$425	Phase II	Al/Inflam
Sanofi	Lexicon	$300		Phase III	Endo/Meta
MedImmune / AZ.	Innate	$250		Phase II	Cancer
Allergan	Merck	$250		Phase II	Neurology
Novartis	Aduro	$200	$25	Preclinical	Cancer
Celgene	Juno	$150	$850	Phase II	Diversified
Celgene	Nurix	$150		Discovery	Diversified
MerckKGaA	Intrexon	$115		Discovery	Cancer
Celgene	Lycera	$105		Phase I	Cancer
Janssen	Hanmi	$105		Phase I	Endo/Meta
Bayer	Ionis (fka ISIS)	$100		Phase II	Cardiovascular
DiaVax	City of Hope	$100		Phase I	Viral Infection
Bayer	Ionis (fka ISIS)	$100		Phase II	Hematologic
Merck	NGM	$914	$106	Preclinical	Endo/Meta
Vertex	Parion	$80		Phase II	Pulm/Resp

Highlights indicate Phase I Licensing

Source: Thomson Reuters 11 Jan 16, "Life Sciences Dealmaking 2015"

Valuation and Licensing Deals in Immuno-Oncology

Valuation of Companies

Licensing Deals

Company	Valuation (USDm)	Development Stage of lead drug
Agios Pharmaceuticals, Inc.	$1.829	Phase 3
Karyopharm Therapeutics, Inc.	$288	Phase 2
Dicerna Pharmaceuticals, Inc.	$68	Phase I
Immune Design Corp.	$167	Phase 2
Heat Biologics, Inc.	$14	Phase 2
Loxo Oncology, Inc.	$514	Phase I
Epizyme, Inc.	$597	Phase 2
Kite Pharma, Inc.	$2,609	Phase 1/2
Idera Pharmaceuticals, Inc.	$185	Phase 1/2
Ignyta, Inc.	$213	Phase 1/2
Inovio Pharmaceuticals, Inc.	$716	Phase 2
Five Prime Therapeutics, Inc.	$1.150	Phase I
OncoMed Pharmaceuticals, Inc.	$387	Phase 2
Mean	**$672**	

Licensing Deals	Upfront (includes equity & cash) USDm	Milestone payments (USDm)	Upfront Payment as % of Total	Total deal size
High	999.8	1835	100%	2,012.3
Mean	87.6	433	22.9%	514.6
Median	35.0	309	10.3%	363.5
Low	1.0	0	0.7%	1.0

The average total deal size is $514.6m, and the median deal size is $363.5m

Sample News Flow in the next 12 Months

- ✓ Patent filings on mimotopes (2H, 2016)
- ✓ Patients dosed in the Phase 1b/2 trial in gastric cancer (1H, 2017)
- ✓ Recruitment progress and interim Phase 1b/2 data (1H, 2017)

- ✓ First mimotope drug candidate identified (1H, 2017)
- ✓ Preclinical *in vivo/vitro* results (2H, 2017)
- ✓ Final Phase 1b/2 trial readout (2H, 2017)

HER-Vaxx mimotope

IMU broadens pipeline with acquisition from Baker IDI

- ✓ Exclusive agreement with Baker IDI
- ✓ Oncology rights to develop a portfolio of small molecule arginine modulators for cancer treatment
- ✓ Arginine is a critical amino acid for the health of cancer fighting T-cells and depletion of it limits the effectiveness of T-cells to fight tumors
- ✓ Baker IDI compounds increase the availability of arginine in the cellular environment
- ✓ Minimal cost and resources required for POC in 2017
- ✓ New patent filed to protect compounds in the field of cancer and immuno-oncology, including combination with checkpoint inhibitors

A Team with Track Record in Drug Development

Leslie Chong

Chief Executive Officer

- Over 19 years of oncology experience in Phase I - III of clinical program development
- Leadership role involvement in 2 marketed oncology products
- Previously Senior Clinical Program Lead at Genentech, Inc., in San Francisco

Dr Axel Hoos

Non-Executive Director

- Currently Vice President Oncology R&D at GlaxoSmithKline
- Previously Clinical Lead on Ipilumimab at Bristol-Myers Squibb
- Co-Director of the think-tank Cancer Immunotherapy Consortium; **Imugene is his only Board seat worldwide**

Paul Hopper

Executive Chairman

- International & ASX biotech capital markets experience particularly in immuno-oncology & vaccines
- Chairman of Viralytics, Director of Prescient, Founder of Polynoma LLC, former Director pSivida, Somnomed & Fibrocell Science
- Head of Life Sciences Desk & Australia Desk at Los Angeles-based investment bank, Cappello Group

Prof Ursula Wiedermann

Chief Scientific Officer

- Co-inventor of Her-Vaxx; inventor of mimotope platform technology
- Professor of Vaccinology at Medical University of Vienna

Dr Nick Ede

Chief Technology Officer

- *Over 25 years peptide vaccine and drug development*
- Former CTO Consegna, CEO Adistem Ltd, CEO Mimotopes P/L, COO EQiTX Ltd (ZingoTX & VacTX)
- VP Chemistry Chiron (now Novartis), Research Fellow CRC Vaccine Technology

Dr Anthony Good

Clinical Program Manager

- Over 15 years oncology & immunology experience in global clinical development programs. Integral to the development of significant new medicines including Viagra, Revatio, Lipitor, Selzentry and Somavert.
- Ex Pfizer Global Research and Development, Covance Clinical and Periapproval Services and Western Sydney University

Business Strategy and Partnering Opportunities

2017 2017-2018 2017-2018?

Phase 1b Gastric Study

Phase 1b Mimotope + others

Big Pharma?

License /Partner

Our Stock

ASX:IMU, ISIN: AU000000IMU9

Market Cap (22/Dec/16)	$32.5M AUD, $23.5M USD
Ordinary Shares	2.17 billion
12 month price range	0.7 cents – 2.1 cents AUD
Avg daily volume	10.5M shares (last three months)
Investment to Date	~$12.2 m
Cash & Equivalents	$3.82M as of 22/Dec/2016

Options on issue (as at Dec. 2016)

	No of options	Exercise Price	Expiry
Listed (IMUO)	371,166,262	$0.015	31-Mar-17
Unlisted	49,000,000	$0.0173*	30-Oct-17*
TOTAL	420,166,262	$0.0155*	18-May-17*

* Average

Substantial holders (as at Dec. 2016)

	No. of Shares	% Capital
Platinum Asset Management	213,846,553	9.88%
Webinvest Pty Ltd <OLSB Unit A/C>	101,000,000	4.66%
National Nominees Limited	66,424,732	3.07%
Tisia Nominees	65,666,666	2.39%
Sarah Cameron	51,817,073	1.39%

IMU's Value Proposition

- ✓ Promising science with impeccable provenance in the hottest area of cancer today – immuno oncology
- ✓ Broad Pipeline: HER-Vaxx & Mimotopes
- ✓ Breast Cancer clinical trial complete & on the cusp of recruitment on our second Phase 1b/2 clinical trial in gastric cancer
- ✓ Tight share register with leading Fund Manager, Platinum Asset Management
- ✓ Frequent, rich, quality news flow ahead
- ✓ Axel Hoos Sr. VP of immuno – oncology at GSK, plus team with successful track record in drug development
- ✓ Low market cap - undervalued against ASX peers

Contact

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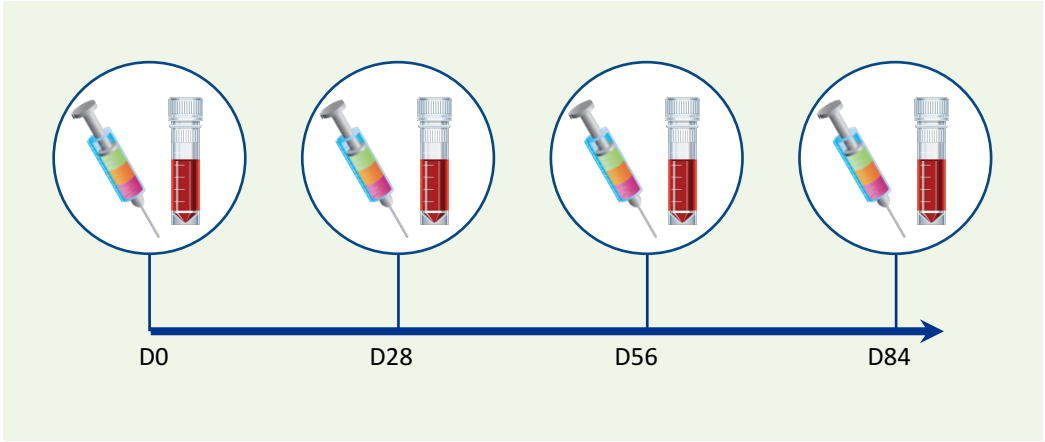
Appendix

Imugene Science Advisory Board

Christoph Zieliniski MD	• Director, Clinical Division of Oncology and Chairman, Department of Medicine at Medical University Vienna, Austria. • Coordinator of the Comprehensive Cancer Center at Medical University Vienna and the General Hospital in Vienna, Austria. • President, Central European Cooperative Oncology Group (CECOG).
Ursula Wiedermann MD, PhD	• Chief Science Officer • Professor of Vaccinology and Head of the Institute of Specific Prophylaxis and Tropical Medicine of the Medical University Vienna. • Speaker of the newly founded Centre for Geographic Medicine at the Medical University Vienna
Neil Segal MD, PhD	• Oncologist at the Memorial Sloan Kettering Cancer Center. • He holds a Doctorate of Medicine and Philosophy from University of the Witwatersrand in South Africa.
Yelena Janjigian MD	• Medical oncologist at the Memorial Sloan Kettering Cancer • Specializes in the treatment of malignancies of the gastrointestinal tract, including esophagus and stomach cancers.

Phase Ia Study Design*

Administration & Readout Schedule



Vaccination with 10µg of each peptide antigen

Blood draw

Patient inclusion criteria

- Metastatic breast cancer
- HER2 +, ++
- ER/PR pos.
- Life expectance > 4 mo

Primary endpoint

- Safety & Tolerability

Secondary endpoint

- Immunogenicity
  - Specific antibodies
  - Cellular responses

* Breast Cancer Res Treat. 2010 Feb;119(3):673-83.

Patient Characteristics – Ages 55-84 *

Patient ID	Age	Metas. disease since	Prior chemotherapy	Current antihormonal therapy
1	55	Oct. 2006	no	Anastrozol
2	66	May 2004	yes (1 adj)	Fulvestrant
3	84	Mar. 1999	no	Anastrozol
4	79	Sept. 2003	no	Anastrozol
5	67	Apr. 2004	no	Fulvestrant
6	69	Sept. 2004	no	Anastrozol
7	60	Aug. 2002	yes (3 met)	Fulvestrant
8	76	Apr. 1999	no	Fulvestrant
9	63	Jun. 2006	yes (1 met)	Exemestan
10	70	Apr. 2008	No	Anastrozol

* Breast Cancer Res Treat. 2010 Feb;119(3):673-83.

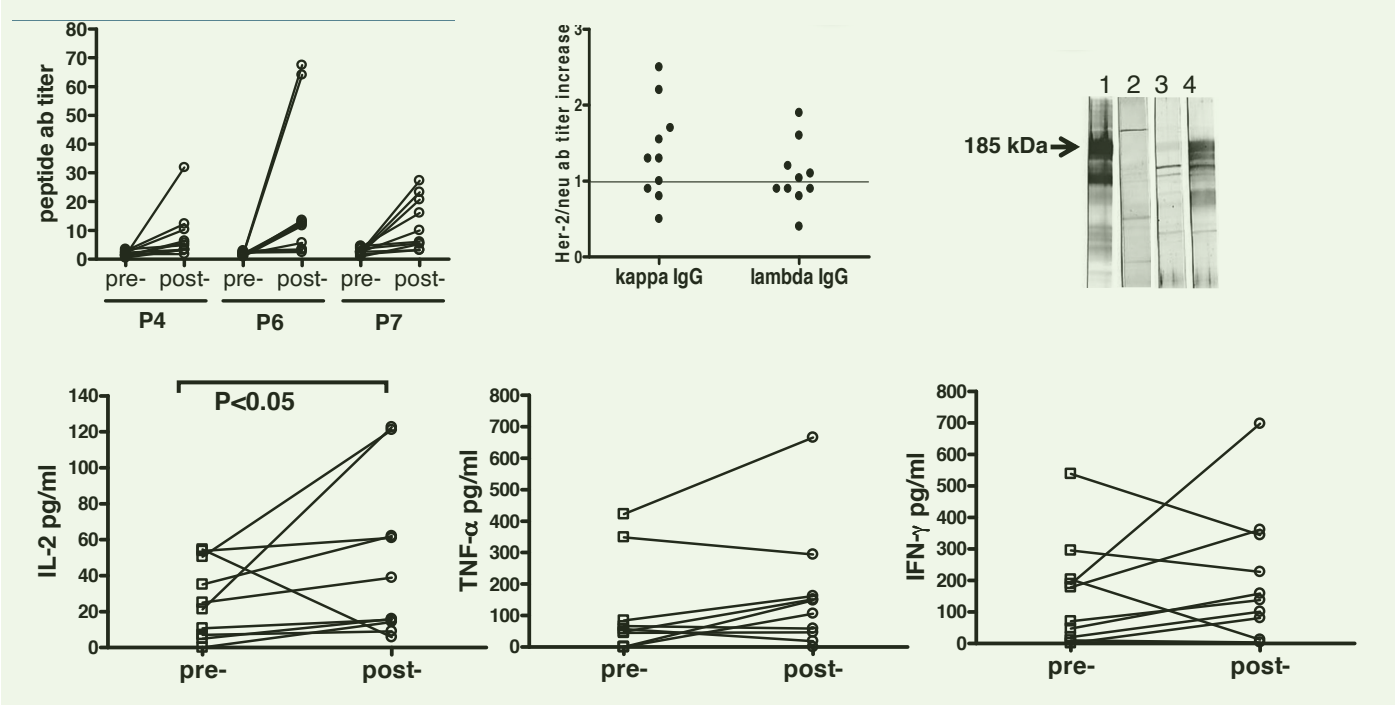
Safety and Tolerability – Few Grade 1 Local Reactions, None Systemic*

Patient ID	Local vaccination reaction grade	Systemic grade 3/4 toxicity
1	1	no
2	0	no
3	0	no
4	1	no
5	1	no
6	0	no
7	0	no
8	0	no
9	1	no
10	0	no

* Breast Cancer Res Treat. 2010 Feb;119(3):673-83.

Phase 1 Secondary Endpoint – Immunologic Responses

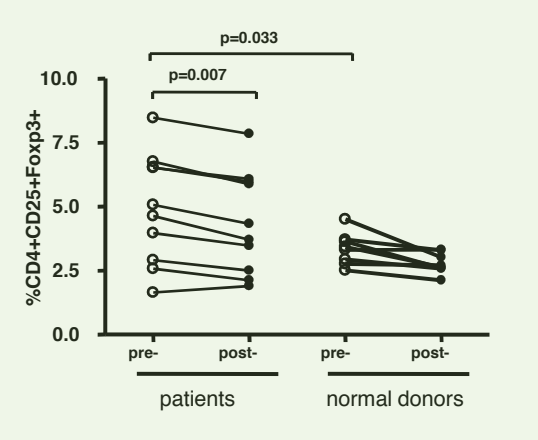
Cellular responses show Th2 profile



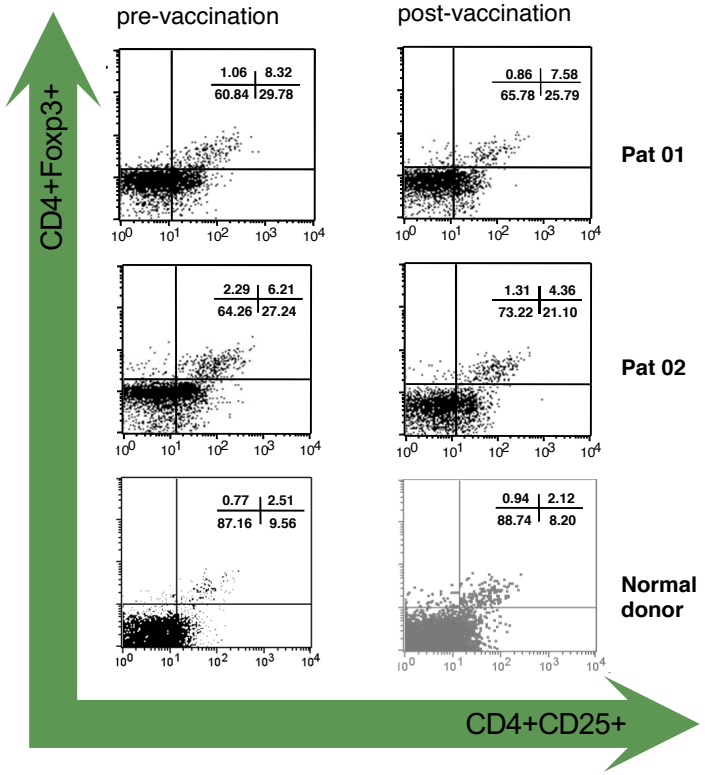
- 8/10 developed significant anti-peptide antibody levels
- In all but one the antibodies were also directed against Her-2/neu
- The majority also showed a 4-fold increase in influenza titres (HI)

* Breast Cancer Res Treat. 2010 Feb;119(3):673-83.

Reduction in Regulatory T Cells*



- Significantly higher number of CD4+Foxp3+ regulatory T cells in tumour patients than healthy controls
- Vaccination significantly reduced T reg cells in both groups



* Breast Cancer Res Treat. 2010 Feb;119(3):673-83.

Excellent Immunogenicity, even at low dose, and in Patients ages up to 84 years, with no Cardiotoxicity

Antibody and cellular responses in human

Pat. #	Peptide-specific ab P4, P6, P7	HER2-specific ab	Infl. HIT	IL-2, IFNγ, TNF	T reg
1	↑ ↑ ↑	↑	-	- - -	↓
2	↑ ↑ ↑	↑	↑	↑ ↑ ↑	↓
3	↑ ↑ ↑	↑ (+/-)	-	↑ - -	↓
4	↑ ↑ ↑	↑	↑	- ↑ ↑	↓
5	↑ ↑ ↑	↑	↑	↑ ↑ ↑	↓
6	- - -	-	-	↓ ↓ ↓	↓
7	↑ ↑ ↑	↑	↑	- - -	↓
8	↑ ↑ ↑	↑ (+/-)	↑	↑ ↑ -	↑
9	↑ +/- +/-	↑	↑	↑ ↑↑	↓
10	- - -	-	-	+/- ↓ +/-	↓

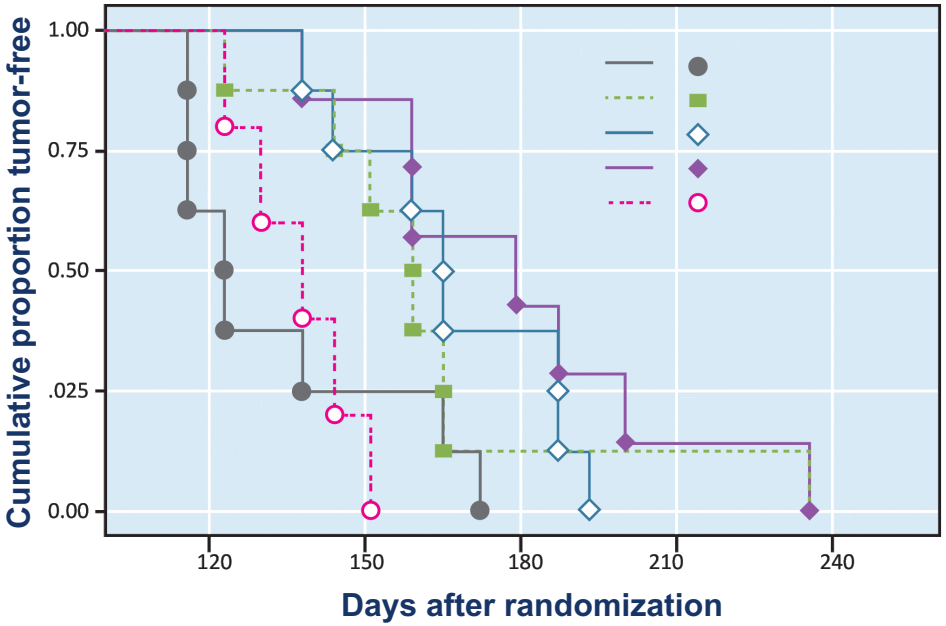
HER-Vaxx breast cancer vaccine – Phase 1 trial 10 µg group

- Strong immunogenicity in 8/10 patients in Phase 1 study with 10 µg of peptide antigen
- Good correlation with cellular responses (cytokines)
- Safe and well tolerated, in particular no cardiotoxicity
- Protective efficacy of peptides demonstrated in preclinical tumor model in mice showing delay of onset and reduced tumor growth

* Breast Cancer Res Treat. 2010 Feb;119(3):673-83.

Tumor Growth Inhibition *in vivo**

Time to disease progression



Preclinical study with tetanus toxoid–conjugated peptide antigens

- Prolonged time to disease progression
- Immunization of c-neu transgenic mice (recognized HER2 cancer model) with tetanus toxoid-conjugated peptides P4, P6 and P7
- Vaccinated animals show significant delay in tumor onset and reduced growth kinetics
- Co-administration of IL-12 further improves the vaccine performance

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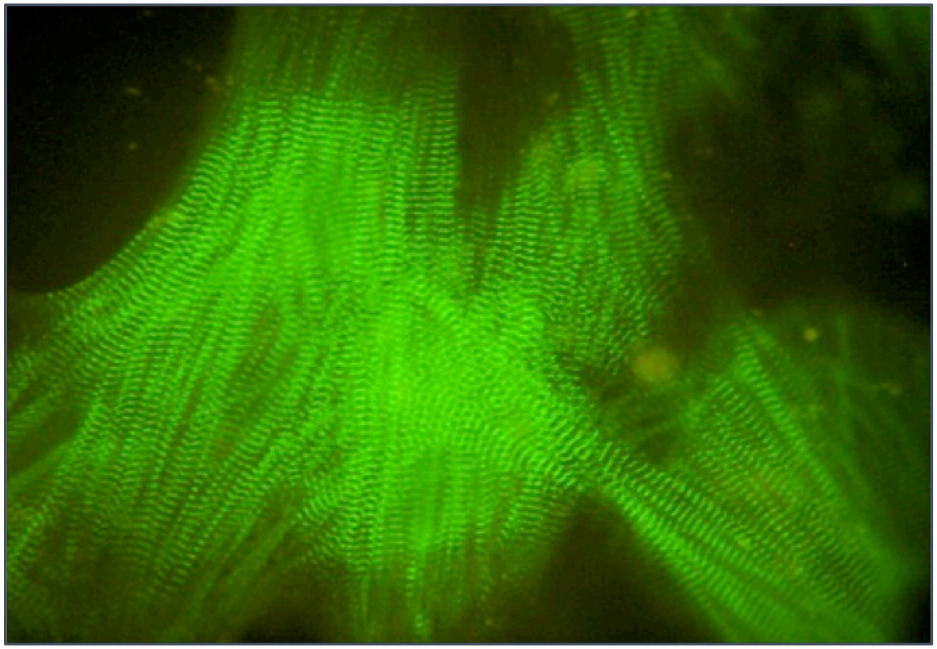
No toxicity, in Particular No Cardiotoxicity

Rat cardiomyocytes



In vitro toxicity study on rat cardiomyocytes

- Repeat dose toxicity study with TT-conjugated peptides in mice
- Repeat dose toxicity study with HER-Vaxx in rats
- Local tolerability & immuno-genicity study with HER-Vaxx in rabbits
- In vitro toxicity study with purified serum from immunized animals on rat cardiomyocytes

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