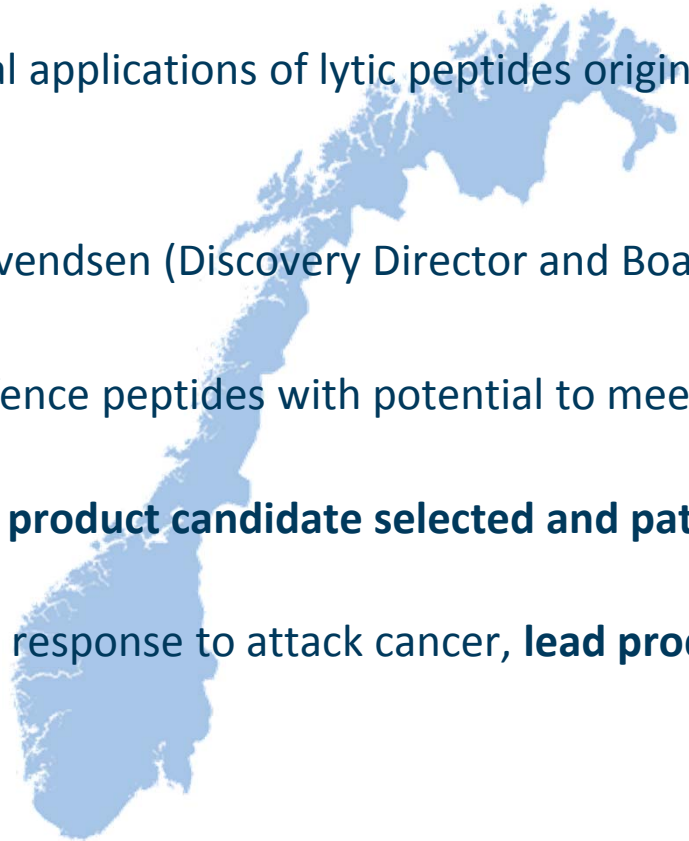
LTX-315 – Oncolytic Peptide Immunotherapy

BIO International , Philadelphia 2015

Lytix Biopharma – company background

- Established in 2003 to develop and commercialize medical applications of lytic peptides originating from the University of Tromsø
- Founders: Professors Øystein Rekdal (CSO), John Sigurd Svendsen (Discovery Director and Board member)
- Technology platform based on de novo designed host defence peptides with potential to meet two substantial medical challenges:
  - Treatment of infections regardless of resistance, **lead product candidate selected and patent filed in 2007 – LTX-109**
  - Cancer therapy that increase patient specific immune response to attack cancer, **lead product candidate selected and patent filed in 2009 – LTX-315**



Lytix Biopharma – cancer immunotherapy focused

Lead Product LTX-315

- Potential first-in-class oncolytic peptide immunotherapy
- Induces potent stimulation of an extended range of tumor specific T-cells attacking cancer – increasing patient specific immune response
- Ideal combination partner for immune checkpoint inhibitors (ICIs) – potential to augment efficacy without adding toxicity

Market

- Potential for multiple, high value indications
- Targeting malignant melanoma as first indication

Evidence

- Strong pre-clinical anticancer activity and confirmed pre-clinical synergy with ICI`s
- Emerging clinical evidence of anti-tumor and immune effects

Strategy

- Develop LTX-315 to phase II - with partner for late stage development and commersialization

Team

- Extensive experience from drug development, business development and commercialization of oncology products

Malignant Melanoma represents a serious unmet medical need

- Global incidence rate for melanoma is 232.130 patients/year
- Melanoma is considered epidemic in US,Europe and Australia
  - Doubling of incidence every 10-20 yrs
- New treatment options:
  - Immune Checkpoint Inhibitors allow T-cells to attack cancer cells
  - BRAF inhibitors stop cancer cell growth by blocking a signaling pathway
- However - high unmet need remains for relapsed and non-responding patients despite new treatment options

Malignant melanoma – challenges with new treatment options

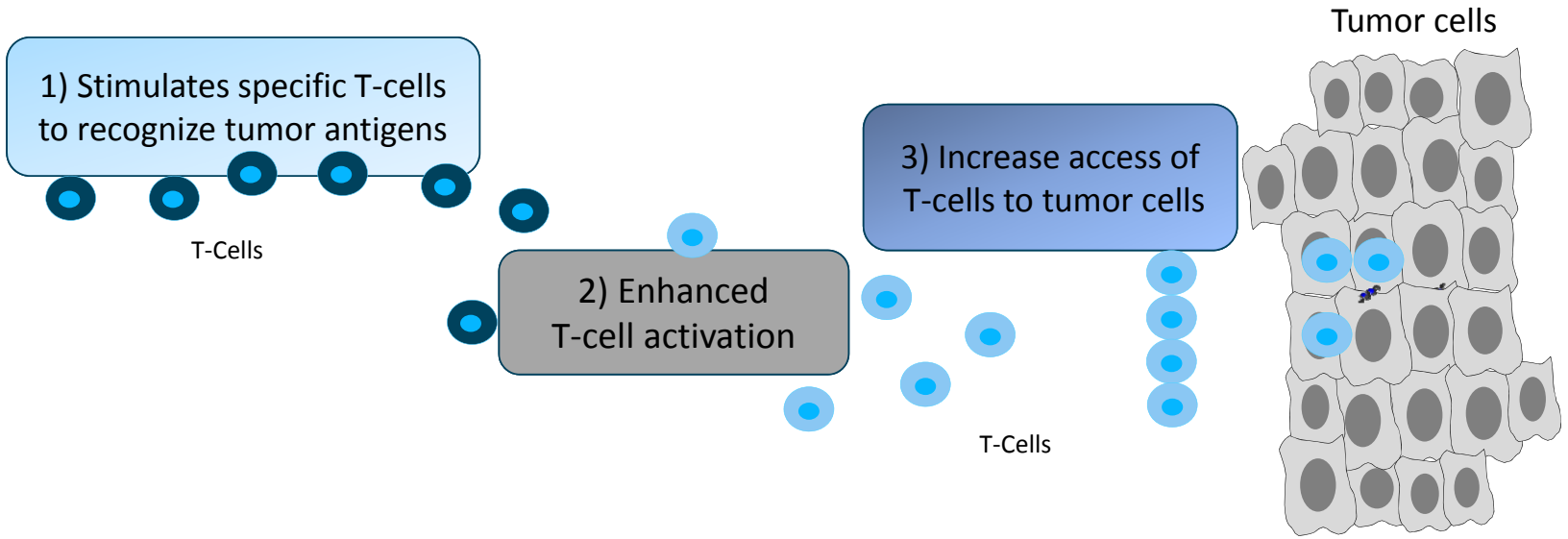
Treatment	Responders (CR or PR)	non-responders (≤ SD)	median PFS (Progression-free survival)	grade 3/4 AE`s (related)	discontinue
Dacarbazine[5] (chemotherapy)	3%	**97%**	1.5 Months	<10%	<1%
Yervoy (CTLA4)[2]	20%	**80%**	2,9 Months	20-30%	15%
Opdivo (PD-1)[3]	40%	**60%**	6,9 Months	10-20%	8%
Keytruda[1] (PD-1)	33%	**67%**	4.1 Months	10%	Not reported
Opdivo + Yervoy [4]	55%	**45%**	11,5 Months	55%	33%

Immune stimulants with a favourable toxicity profile offer an attactive combination with Immune Checkpoint Inhibitors

[1] C. Robert NEJM 2015;[2]M.Postow NEJM 2015; [3]C. Robert NEJM 2015; [4] I. Postow NEJM 2015;[5] M. Midleton JCO 2000[5]; A. Hauschild Lancet 2012[6]; P. Chapman NEJM 2011[7]

Goals of combining immunotherapies

Therapies to increase the strength of immune responses against tumors:*



3) Checkpoint inhibitors - “take the brakes off” T-cells however they do not stimulate the immune system

* Immunotherapy: Using the Immune System to Treat Cancer; National cancer Institute October 2014 cancer.gov

LTX-315 – immune stimulant with a favourable safety profile

Oncolytic Peptide Immunotherapy

- **Potent stimulation of an extended range of tumor specific T-cells attacking cancer – increasing patient specific immune response**
- **MoA makes LTX-315 an ideal combination partner for immune checkpoint inhibitors (ICIs) – potential to augment efficacy without adding toxicity**
- **Favourable side effect profile**

LTX-315 is a complementary combination partner for Immune Checkpoint Inhibitors

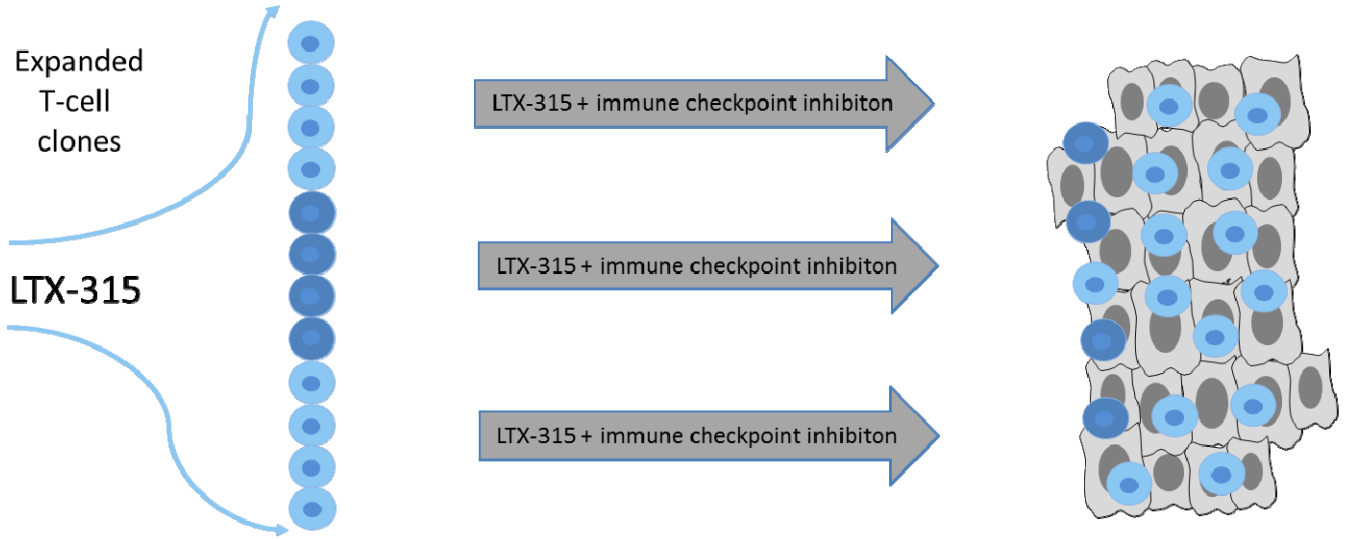
LTX-315
Potent stimulation of an extended range of tumor specific T-cells

+

Immune checkpoint inhibitors
Increase activity and access of T-cells to tumor cells

=

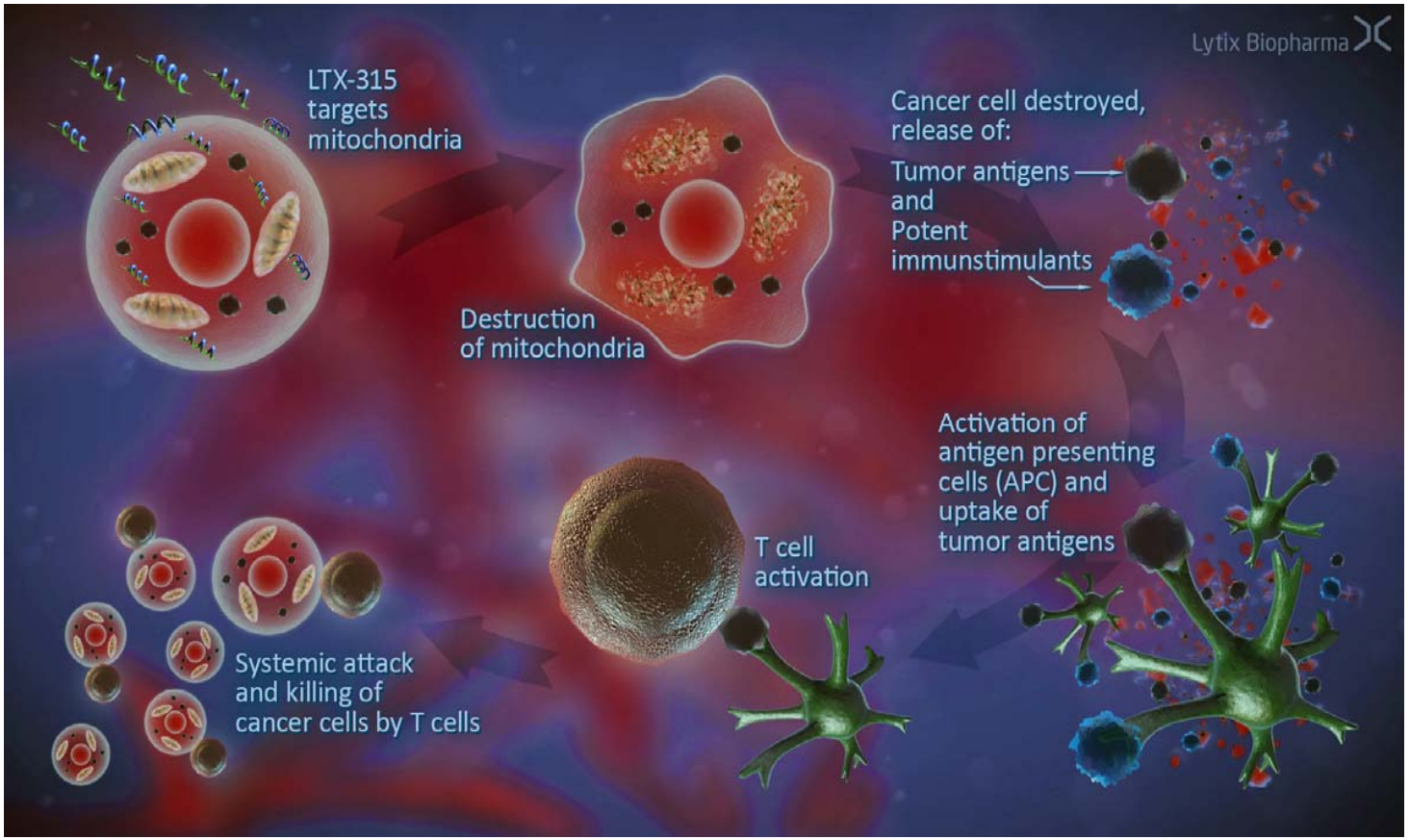
Enhanced and Diverse T-cell activation



- Fuel the engine
- Push the accelerator

- Remove the brakes

LTX-315 releases immune stimulants and induces strong and diverse T-cell responses



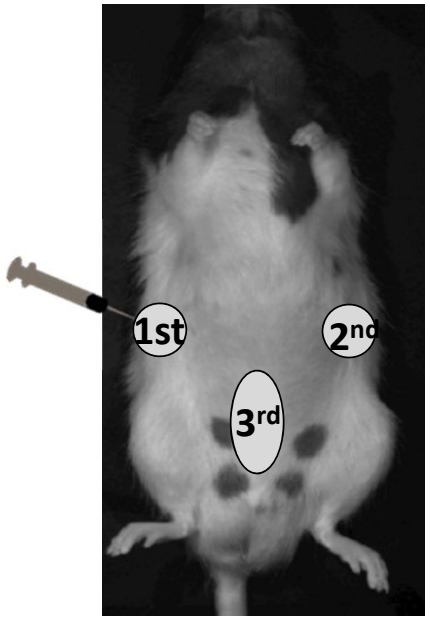
LTX-315`s unique mode of action:

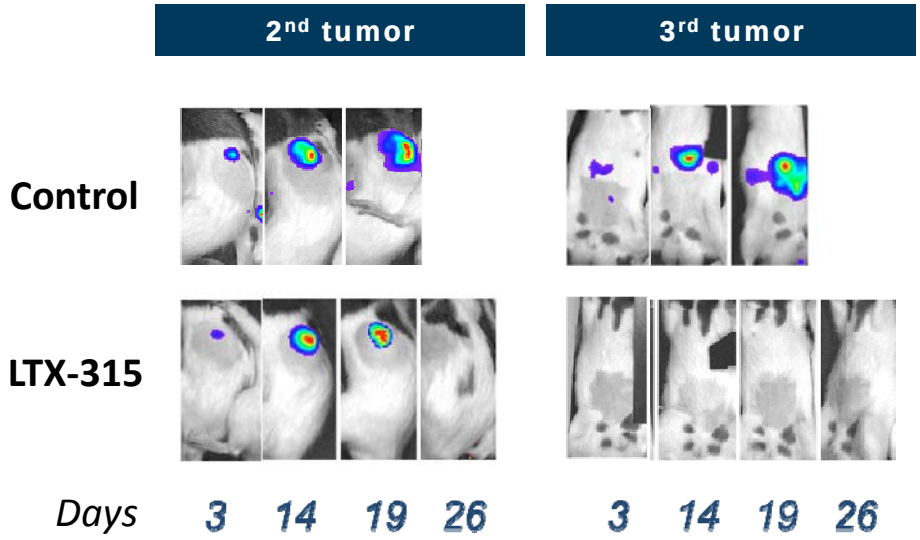
- Release of an extended range of tumor specific antigens from the whole cancer cell
- Release of potent immune stimulants from mitohcondria activates immune cells

Strong and diverse tumor specific T-cell responses

LTX-315 induces systemic immune response

- Eliminates non-treated tumors

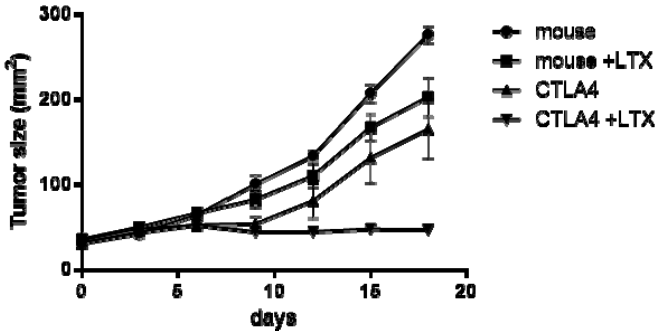




The effect on distant tumors demonstrate an immediate systemic immune response.

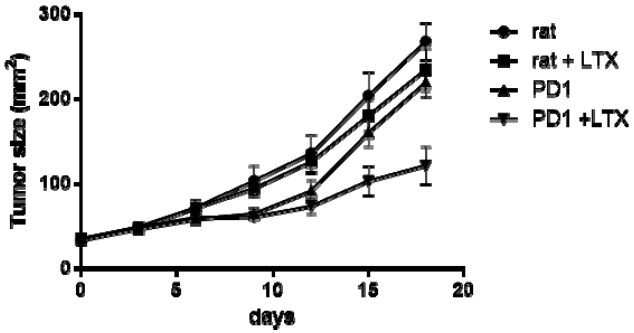
LTX-315 is a complementary combination therapy to Immune Checkpoint Inhibitors

Anti-CTLA4 and LTX-315



- LTX-315 show strong pre-clinical synergistic effect with anti-CTLA-4

Anti-PD1 and LTX-315

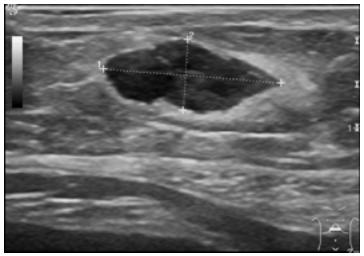


- LTX-315 show pre-clinical synergy with anti-PD-1 in animals

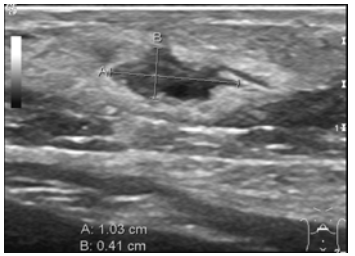
Source: Laurence Zitvogel, Institut de cancerologie Gustave Roussy, data on file

LTX-315 induces tumor specific immune response in cancer patients

Complete and partial regression of injected lesions

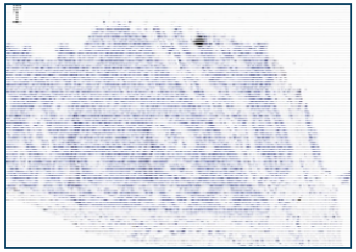


Baseline

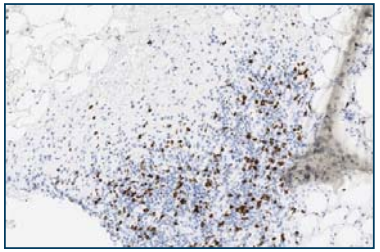


After treatment

Infiltration of Cytotoxic CD8$^+$ T-cells in injected lesions



Before:
Few CD8$^+$ T-cells



After treatment:
Increase of CD8$^+$ T-cells

LTX-315 has a favourable and predictable side effect profile

Grade 3 and 4 treatment related adverse events					
Dose Patients		Grade 3	4	hypotension	other
10mg/ml	3	0	0	0	0
20mg/ml	5	1	1	2	0
4mg	6	0	0	0	0
2mg x 2	3	0	0	0	0
3mg x 2	3	0	0	0	0
4mg x 2	3	0	0	0	0
Total	23	1	1	2	0

- 2/23 patients experienced grade 3/4 hypotension, which was transient and reversible
- All related AEs (except for 1 Gr2 headache and grade 2 pain at injection site) were clinically insignificant
- Dose escalation is ongoing with a 5mg cohort opened
- X mg dose selected for combination studies

Straight forward manufacturing (CMC)

- Freeze dried powder for injection
- Long shelf life
- Scalable manufacturing

- Cost effective manufacturing and logistics

Intellectual property rights

LTX-315 - Strong patent protection up to 2035

Covers various methods of use, composition of matter, major markets (US, EU, etc.) and additional functions

Conclusion

Immunotherapy	• Cancer immunotherapy market is fast growing and predicted to reach US$ 5,6 by 2023 • Still high unmet medical need despite introduction of Immune Checkpoint Inhibitors
LTX-315	• Potential first-in-class oncolytic peptide immunotherapy • Induces potent stimulation of an extended range of tumor specific T-cells attacking cancer – increasing patient specific immune response • Ideal combination partner for immune checkpoint inhibitors (ICIs) – potential to augment efficacy without adding toxicity
Evidence	• Strong pre-clinical anticancer activity and confirmed pre-clinical synergy with ICI`s • Emerging clinical evidence of anti-tumor and immune effects

- Lytix Biopharma is open to discuss research collaborations or investment proposals

1) Source: Global Data,2015

Thank you for your attention!