

Peptomyc: Treating cancer with anti-MYC mini proteins

Laura Soucek
Co-founder and CEO



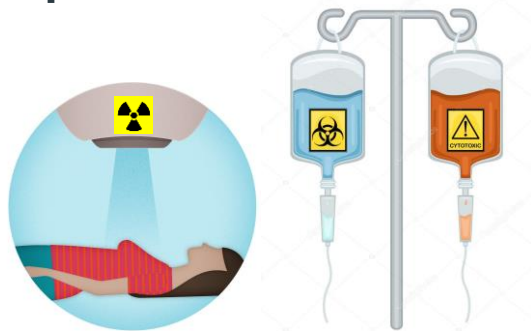
June 23rd, 2020

Cancer incidence in the world exceeds 14 million cases/year and causes >9 million deaths annually (CRUK)

2018
9.6M
cancer deaths



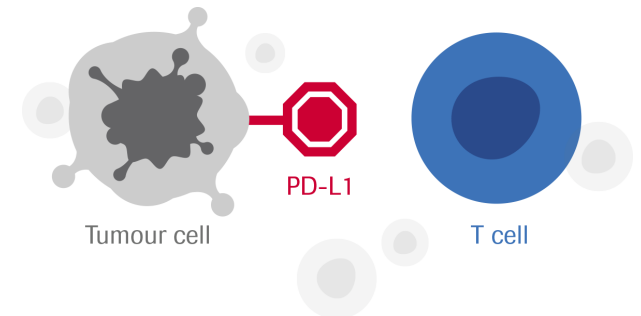
Current therapies:



Radio- and Chemotherapy



Personalized medicine

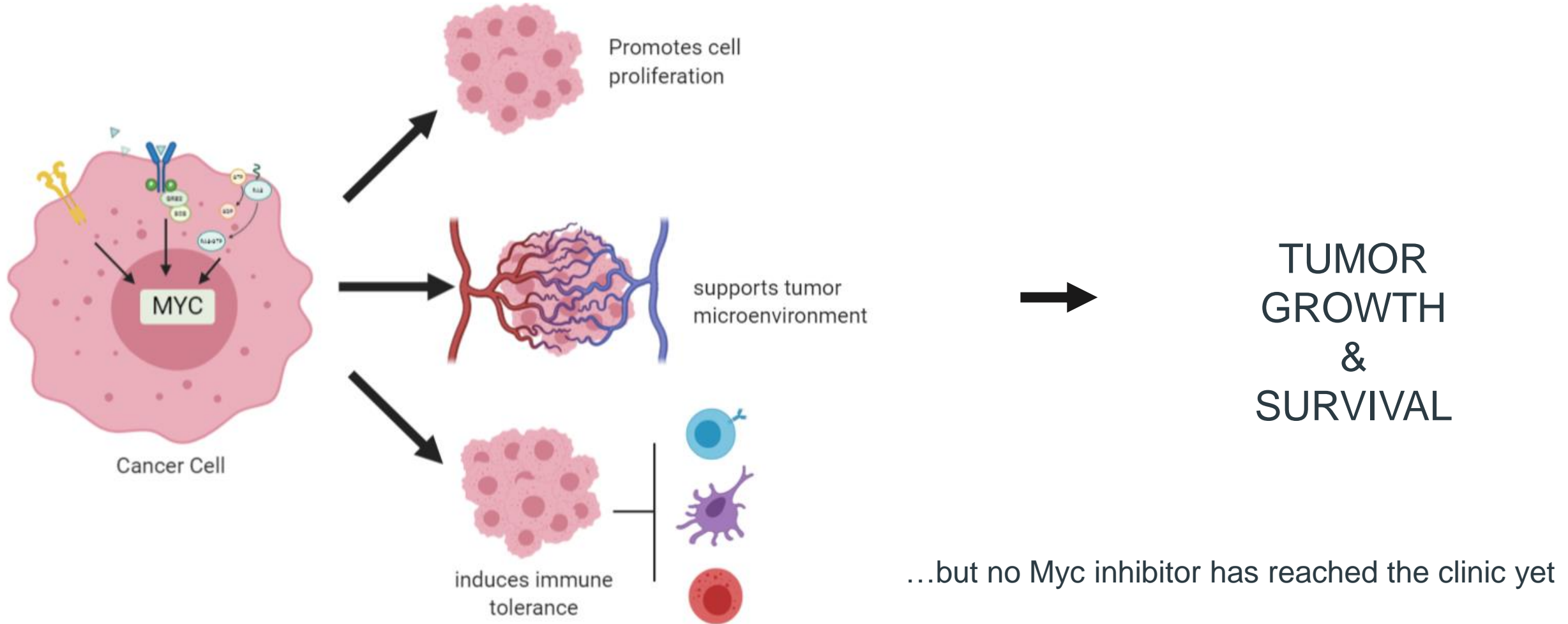


Immuno-therapy

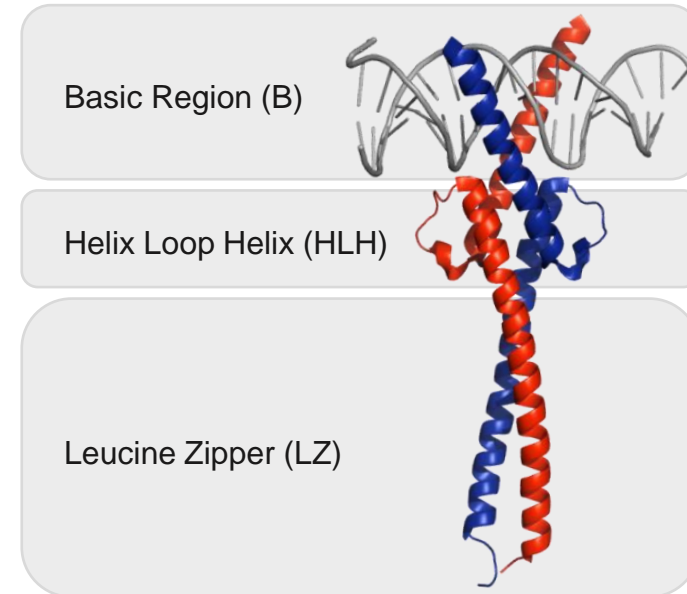
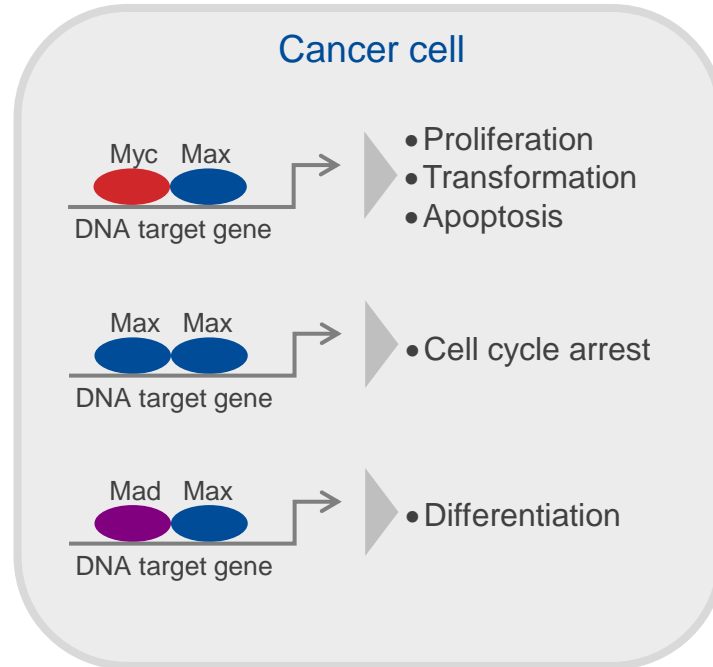
Challenges:

Resistance, lack of efficacy, toxicity

Myc is a transcription factor deregulated in the majority of human cancers and essential for tumors to thrive (but not survival of normal cells)



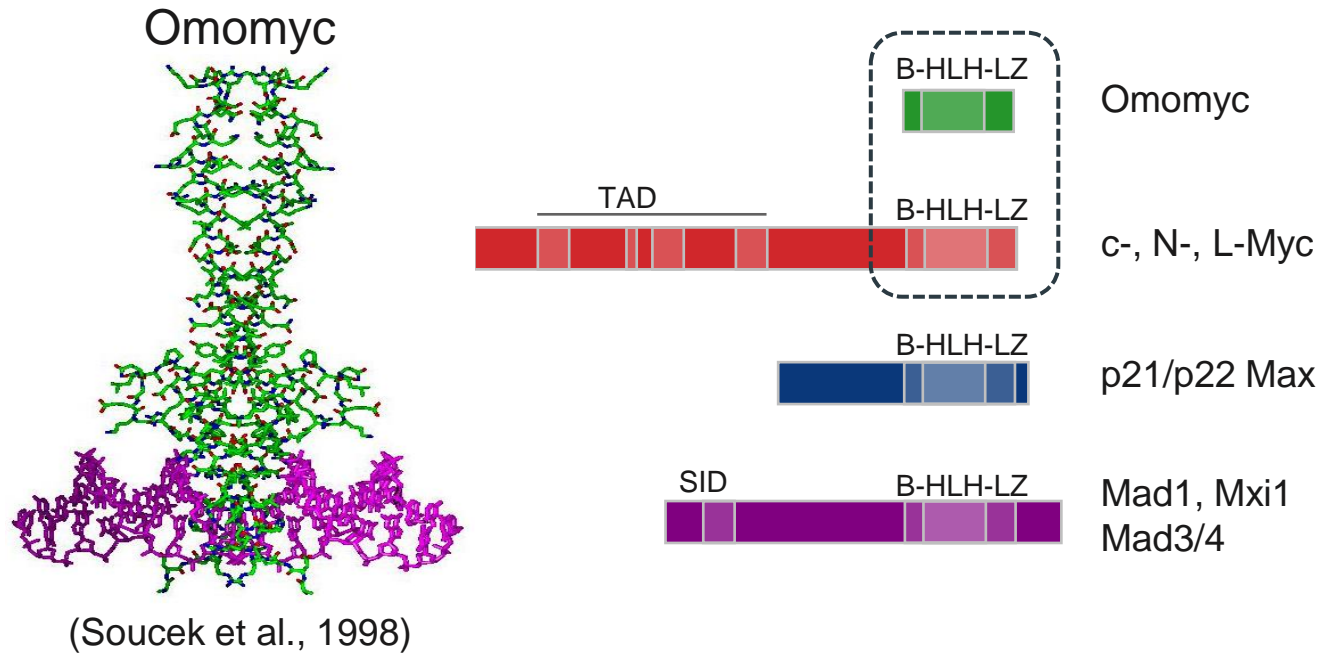
The Myc/Max/Mad family of transcription factors controls cell proliferation, transformation, apoptosis and differentiation



Crystal structure of the B-HLH-LZ of c-Myc/Max
(Nair & Burley, 2003)

- Myc belongs to the network of transcription factors [Myc/Max/Mad](#).
- Members of this family form homo- or heterodimers to bind DNA via their [B-HLH-LZ domain](#).
- Neither Myc nor Mad proteins can form homodimers: they [must heterodimerize with Max](#) to bind DNA and recruit other cofactors to regulate the transcription of their target genes.
- In contrast to Myc, the Max protein can form homodimers, and these are capable of binding to DNA but not to recruit co-regulators of transcription.
- The Max homodimers and Myc/Max heterodimers compete for a common DNA target site (the E-box). Rearrangement among these dimers provides a complex system of transcriptional regulation.

Omomyc is a Myc inhibitor based on a truncated form of the c-Myc protein bearing mutations in the LZ

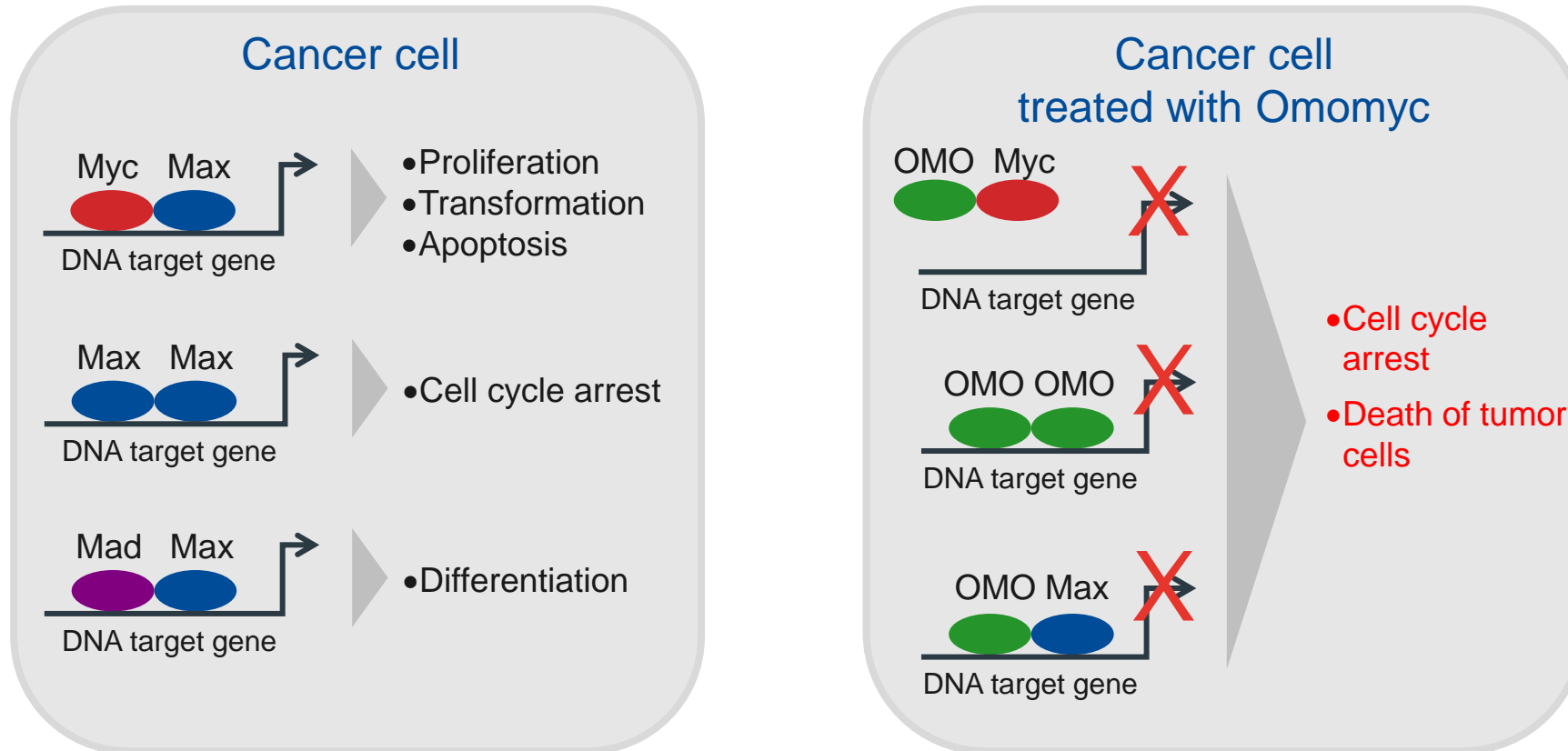


LZ:

c-MYC	QAE E QKLI S E E DL L R K R R EQLKHKLEQL
OMOMYC	--- T ----- I ----- QN -----

- Myc/Max/Mad proteins share a **B-HLH-LZ domain** that enables them to form dimers and bind DNA.
- **Omomyc consists of the B-HLH-LZ domain of c-Myc bearing 4 amino acid mutations in the LZ.** Omomyc was designed by Dr. Soucek and published for the first time in 1998.
- The product of the Omomyc transgene is a **91 aa mini-protein**.
- Omomyc is the **best direct Myc inhibitor known to date** (Whitfield et al., 2017).

Omomyc interferes with Myc binding to Max and to its targets on the DNA



- Omomyc's mutations alter its dimerization specificity compared to Myc and enable Omomyc to [displace the oncogenic Myc/Max heterodimers from their DNA binding sites](#) and act as a potent Myc dominant negative.
- As a consequence, [Omomyc induces cell cycle arrest and death of tumor cells](#).

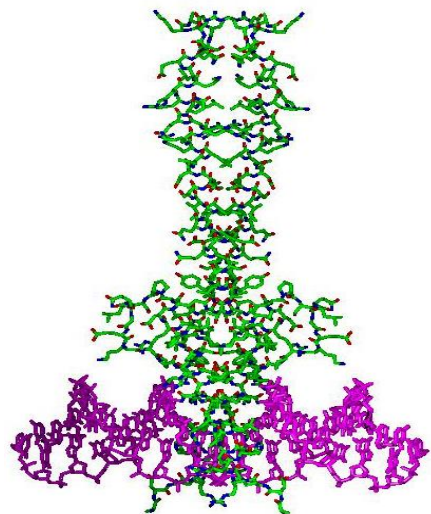
The US experience (2001-2011)



Omomyc showed efficacy in various mouse models of cancer without severe side effects



Omomyc



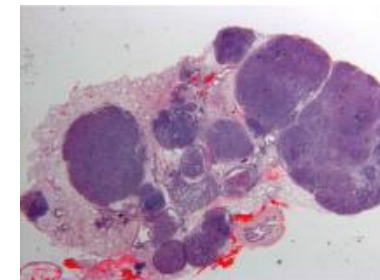
(Soucek et al., 1998)

Lung cancer

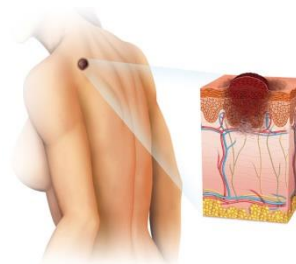


Soucek et al., Nature 2008;
Soucek et al., Genes & Dev 2013

Kras^{G12D}

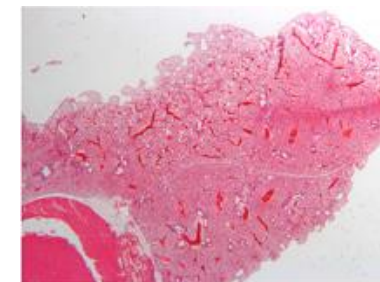


Skin Cancer

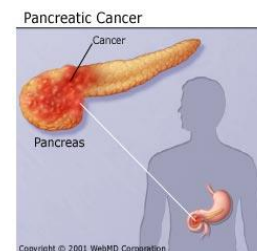


Soucek et al., Cell
death and diff 2004

Kras^{G12D} + Omomyc



Pancreatic cancer



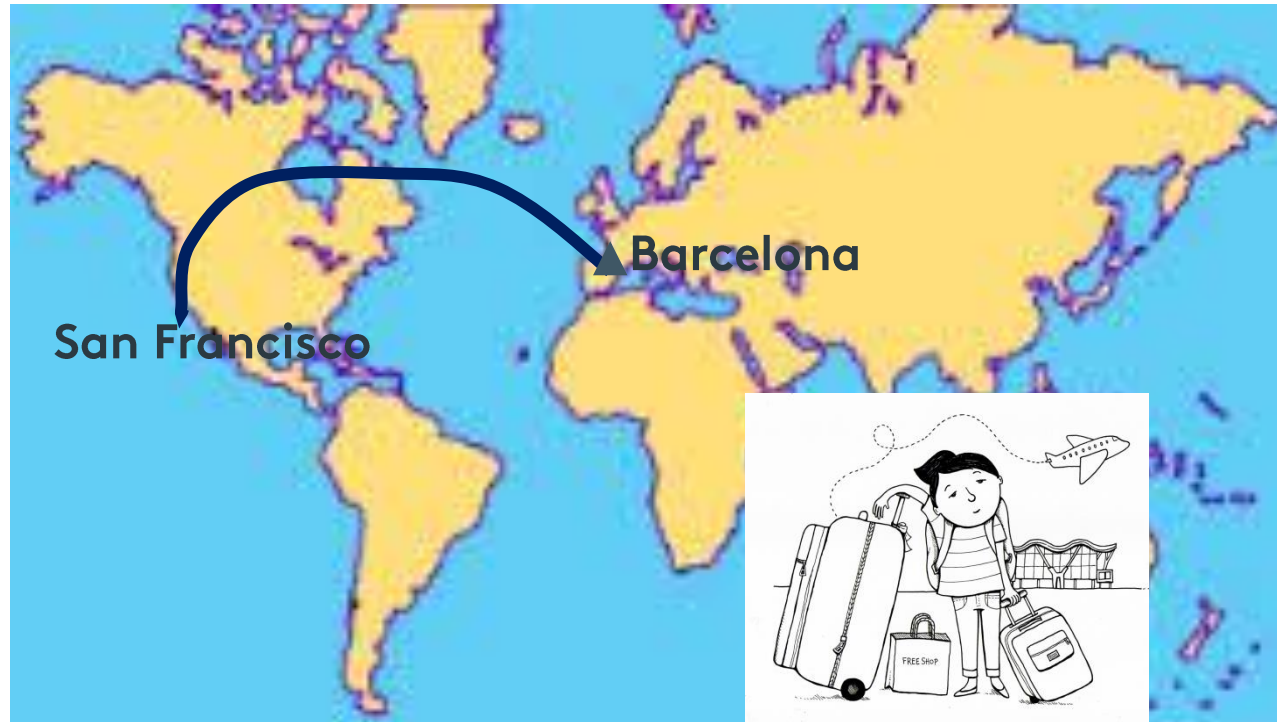
Sodir et al., Genes
& Dev 2011

Glioblastoma

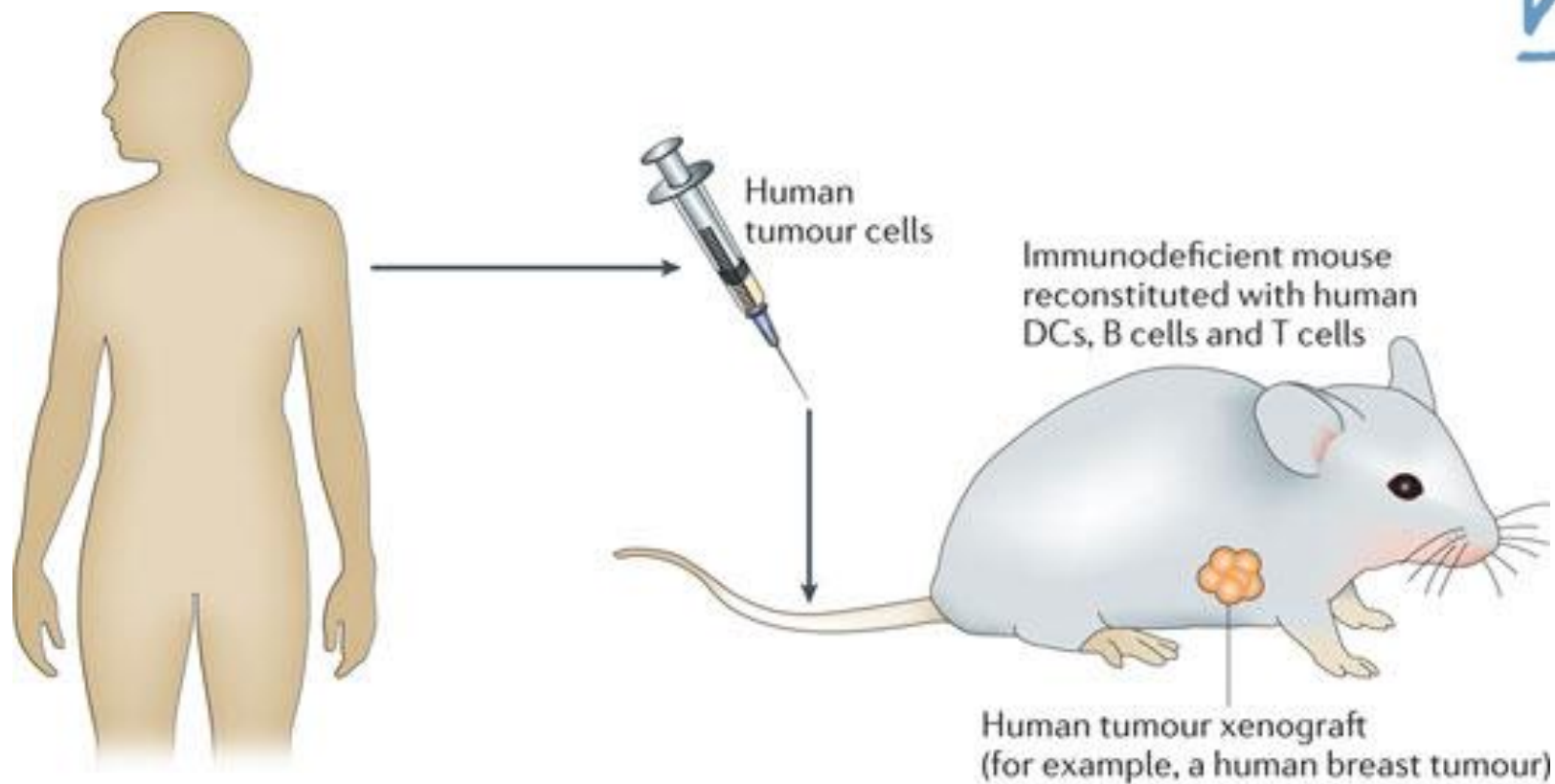


Annibali et al., Nat
Comm 2014

Back to Europe (2011)



Omomyc showed efficacy in the first patient-derived tumor samples



Nature Reviews | Immunology

Can Omomyc itself be a drug?

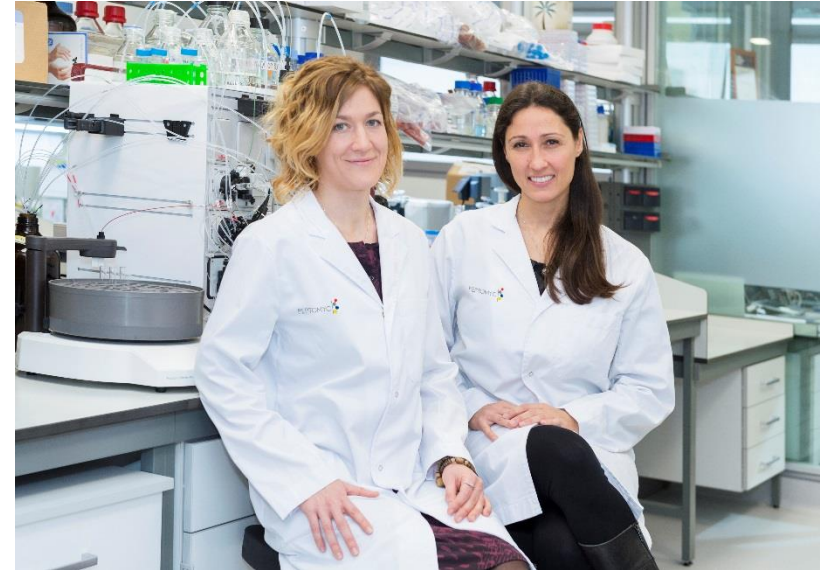
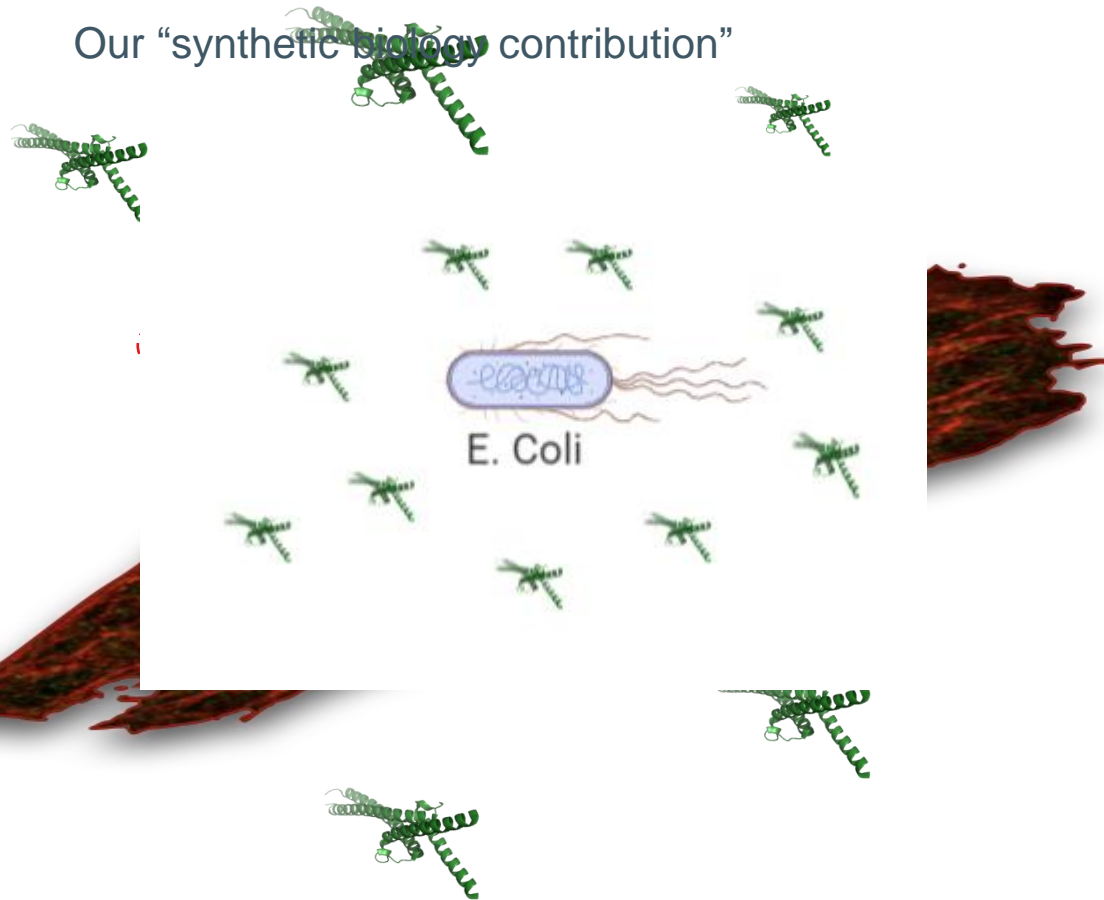


The biggest challenge: It is a molecule too big and bulky to be directly delivered to cells.

“Omomyc is essentially just a proof of concept and can only work as gene therapy.”

Our pharmacological tool: Omomyc-derived peptides

Our “synthetic biology” contribution”



Peptomyc's founders

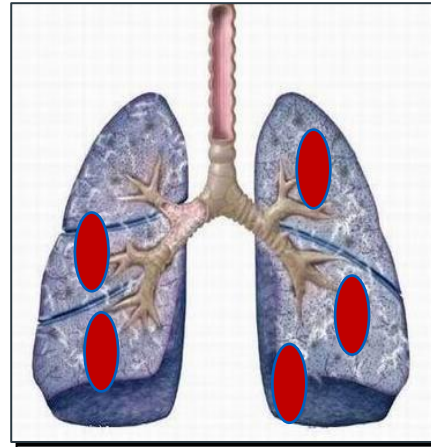
www.peptomyc.com



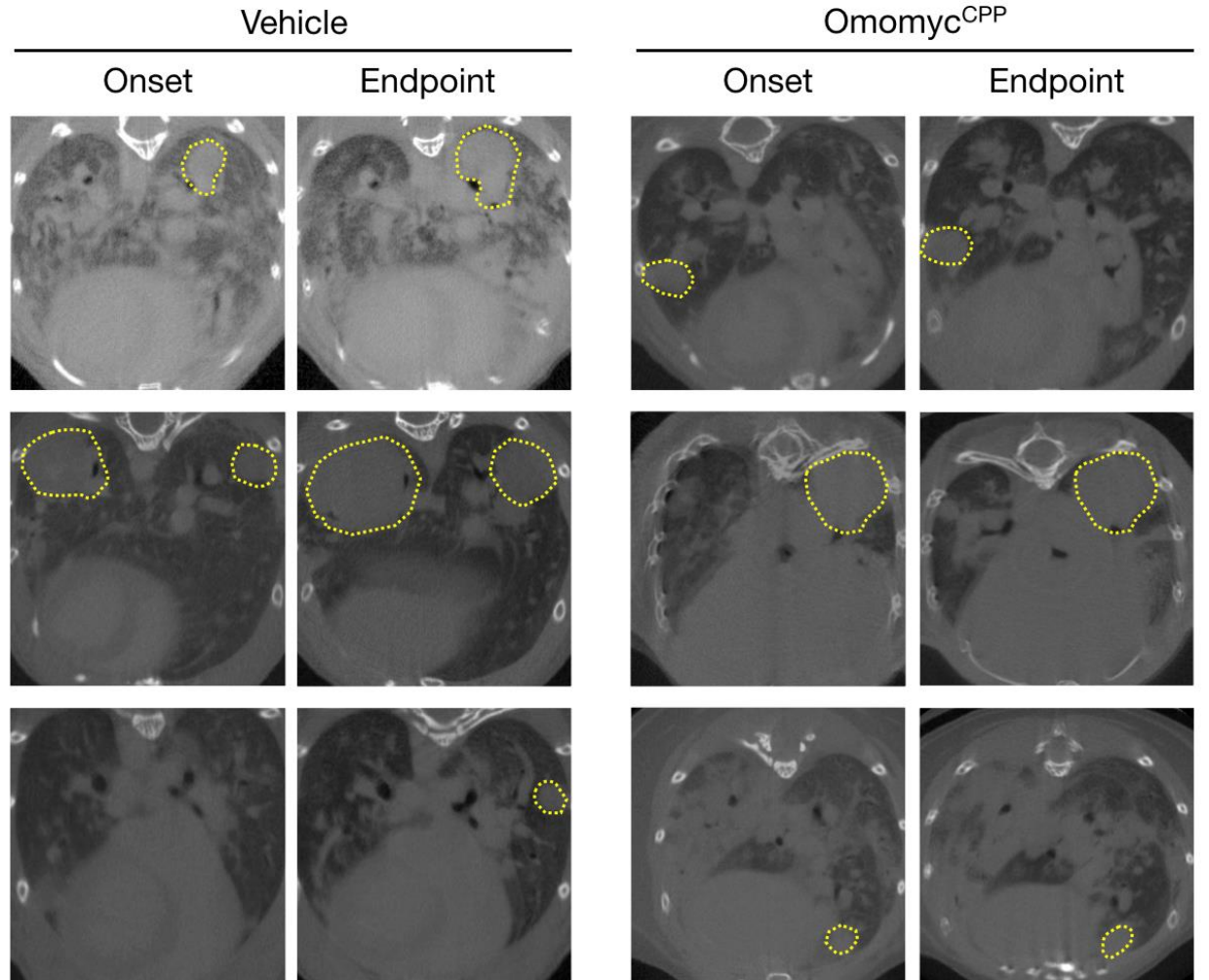
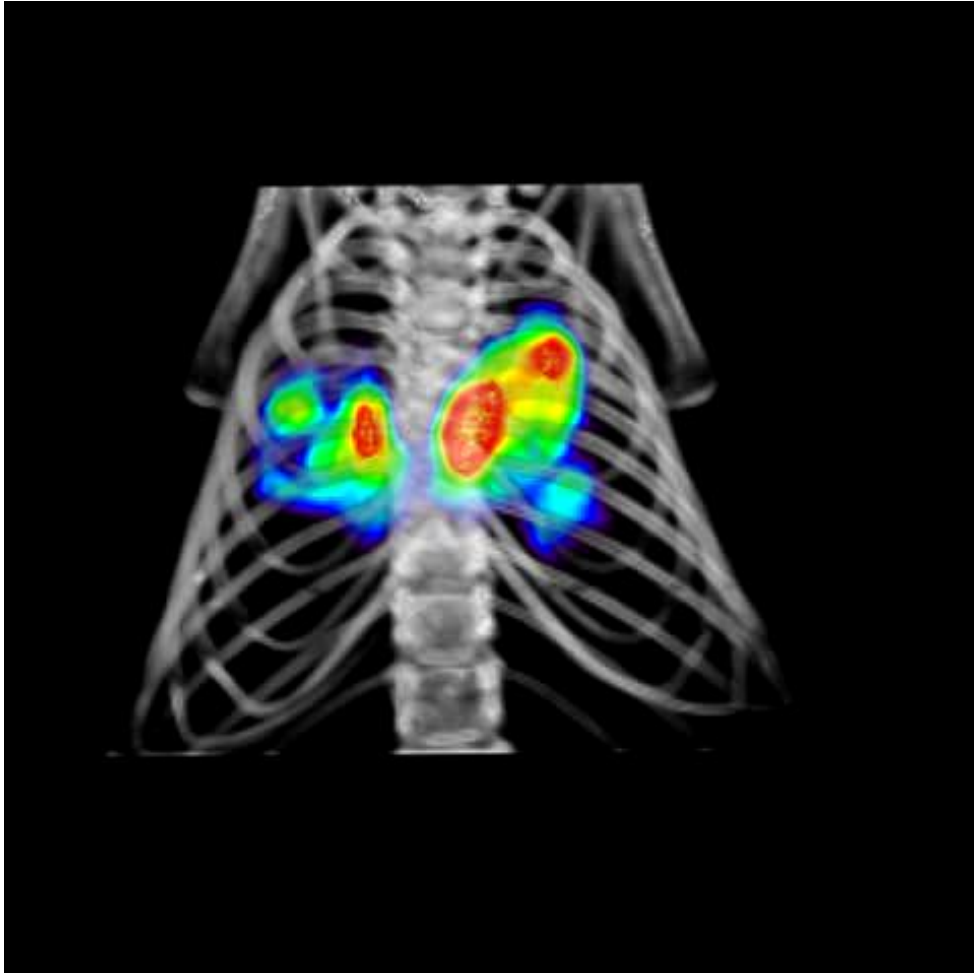
VALL D'HEBRON
Institute of Oncology



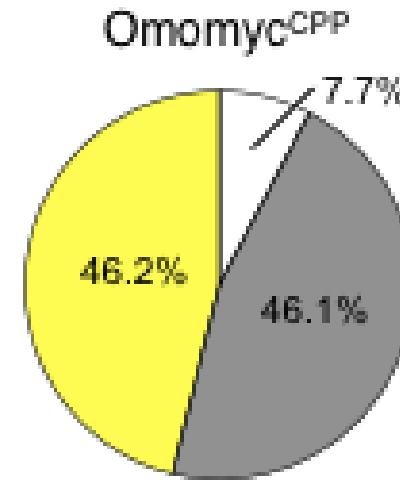
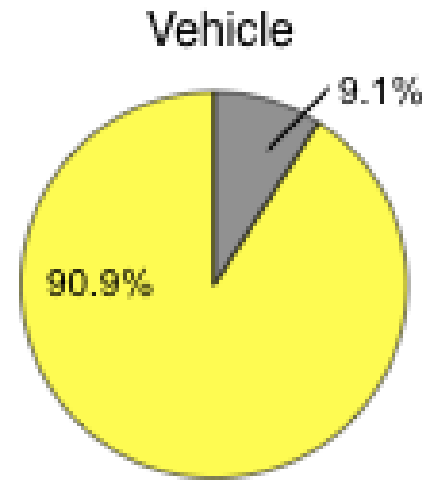
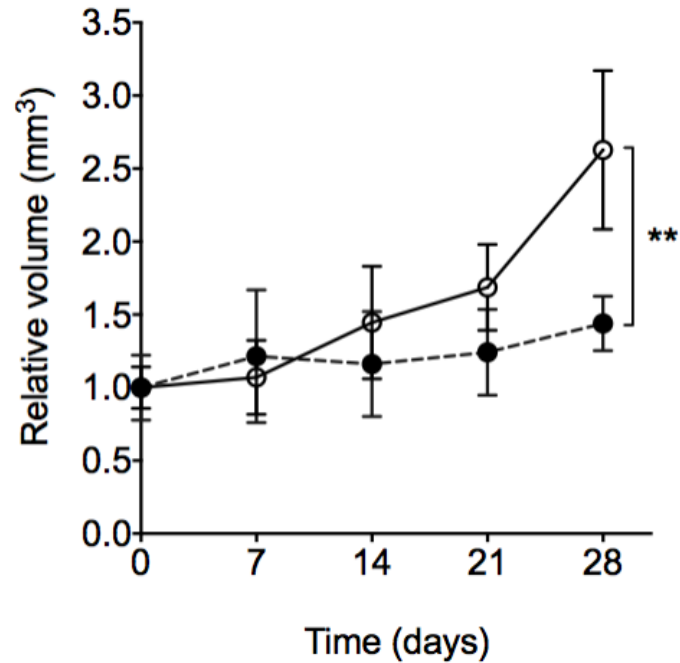
Intervention studies on tumor bearing mice



The Omomyc mini-protein displays tropism for tumors and prevents their growth

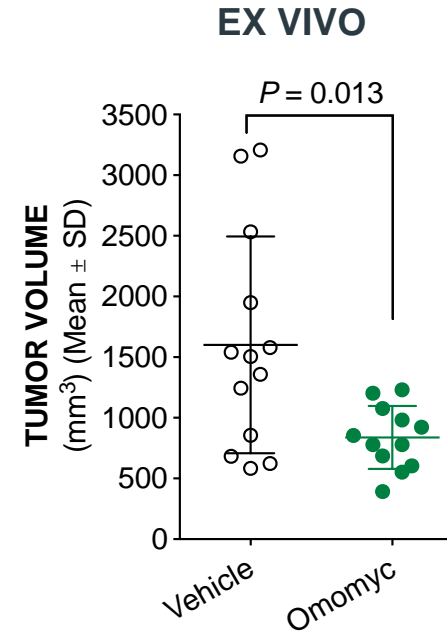
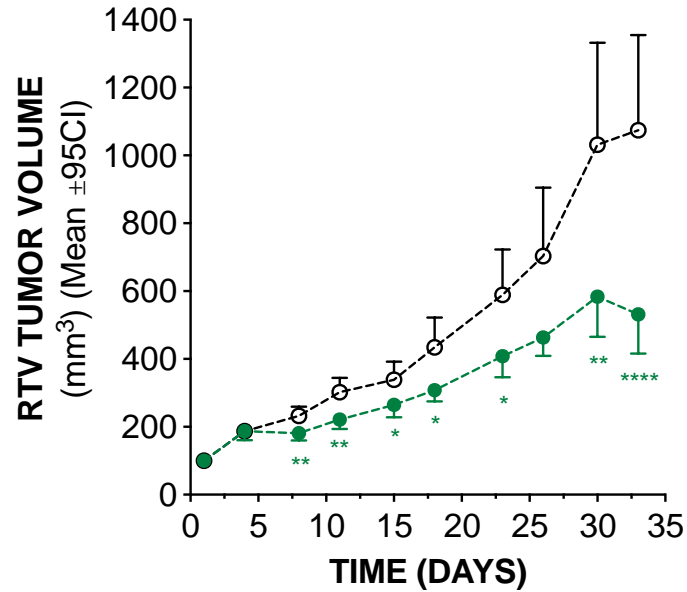
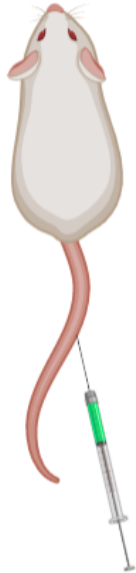


The Omomyc mini-protein reduces tumor growth and tumor grade (2.37 mg/Kg)



- Hyperplasia
- Adenoma
- Adenocarcinoma

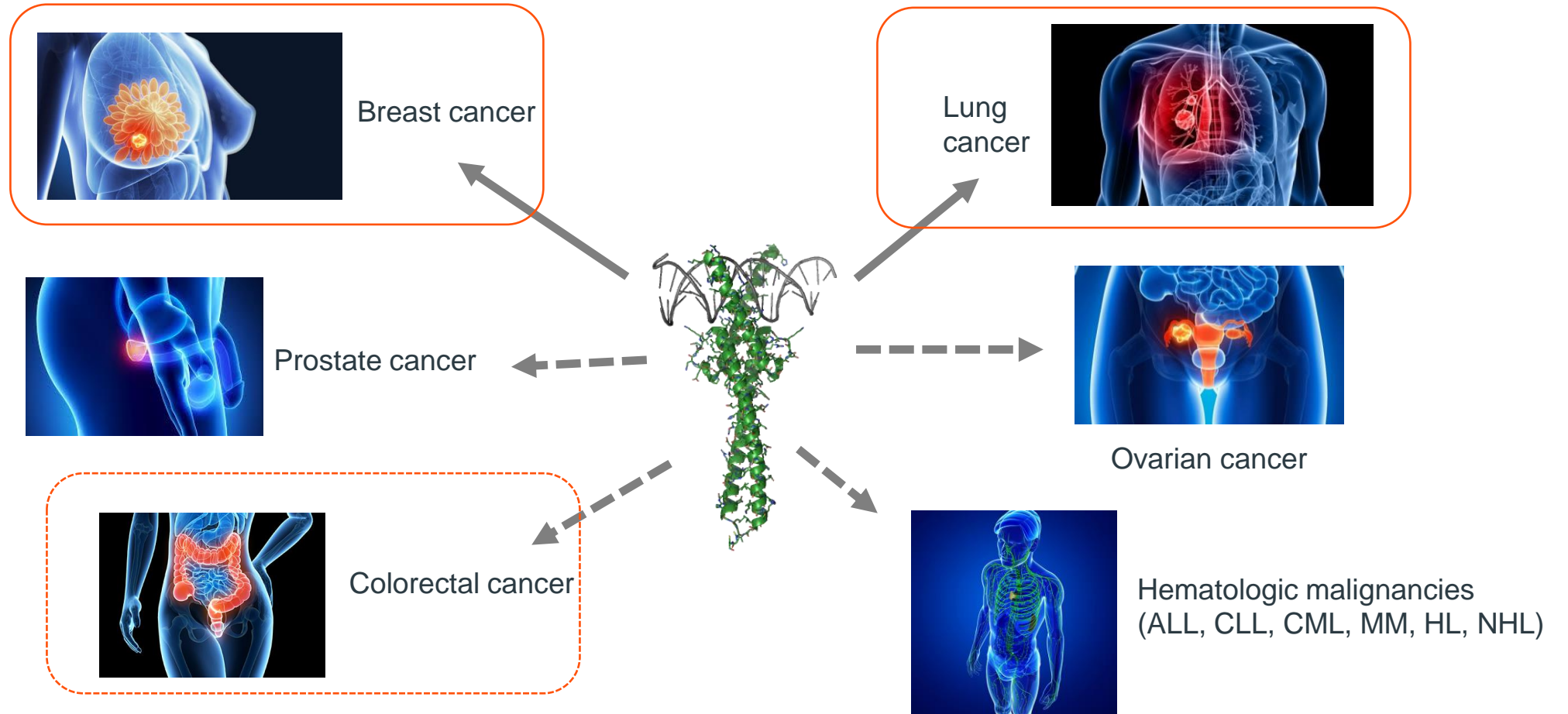
Efficacy of intravenous Omomyc in EGFR- P53- PI3K-mutated NSCLC subQ xenograft mouse model (H1975 human cell line, resistant to erlotinib)



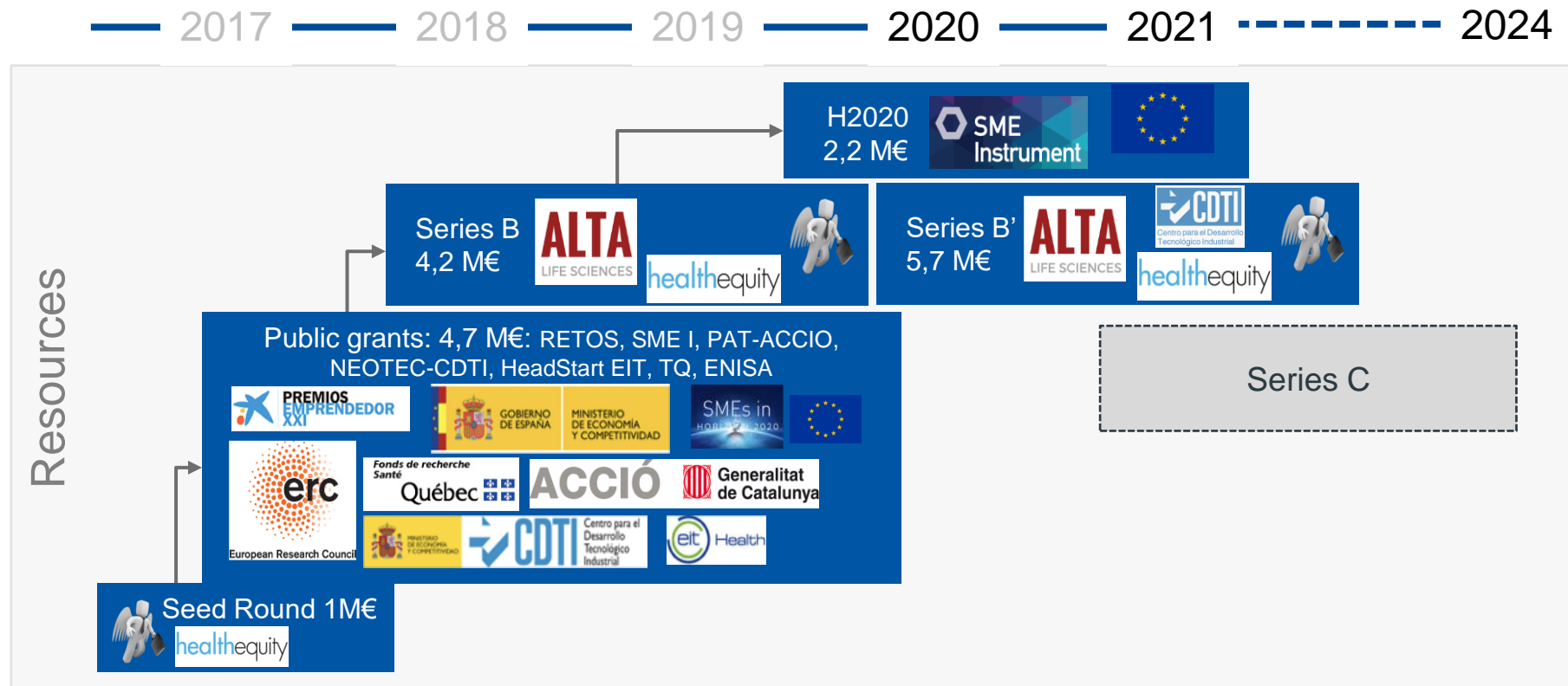
H1975 cells were implanted subcutaneously into immunocompromised mice (growth was monitored with caliper measurements). Treatment started when tumors had reached 150 mm³. Mice were treated intravenously with 30mg/kg of Omomyc or vehicle injected intravenously once per week. In vivo (left) and ex vivo (right, at endpoint) measurements of tumor volume are shown (RTV = Relative).

Note: Omomyc displays a half-life of ~49 hours after i.v. administration

Unleashing the full potential of Omomyc: potential indications



Fundraising highlights



The company has funding to complete Phase Ia clinical trials
 Next round of investment foreseen in 2020: 20 M euros to fund Phase IIa clinical trials

Fundraising highlights

PUBLIC FUNDING:



- SME instrument Phase I (European Commission): 50 K €
- PAT ACCIÓ (Generalitat): 50 K €
- RETOS Colaboración: 1.4 M € (between Peptomyc and lab)
- NEOTEC (CDTI): 210 K €
- APC (CDTI): 15K €
- ENISA: 300 K € (Loan)
- SME Phase 2 (H2020 Program): 2.2 M
- RETOS Colaboración: 2.1 M € (between Peptomyc and lab)



PRIVATE FUNDING:

- Seed Round in 2016 with VCs and BAs for 1 M euros
- Closed a series B of 4.2 M euros in 2017
- One more round series B' of 5.7 M euros in 2020 (con el programa Invierte)

Peptomyc's team: Strong science, Business acumen & Pharma out-licensing experience

Board of Directors



Laura Soucek
Co-founder & CEO
Chair of the BoD



M-Eve Beaulieu
Co-founder & CSO



Alexandra Maratchi
Business angel,
CEO of Homuork



Albert Ferrer
Director
at Healthequity



Montse Vendrell
Partner
of Alta LS

SAB of KOLs



Dr. Josep Tabernero
Director of VHIO
President of ESMO



Dr. Enriqueta Felip
Head of Thoracic cancer
unit at HUVH



Dr. Aleix Prat
Head of Med Onco at
Hospital Clinic

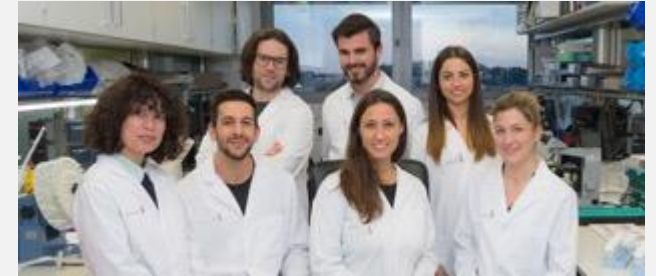


Dr. Roger Stupp
Chief Neuro-onco.
Northwestern Univ. (US)
President EORTC

Clinical and scientific team



Dr. Manuela Niewel
CMO



Partners
& consultants

IP | abc patentes | Dechert LLP
 Legal | RCD ROUSAUD COSTAS DURAN SLP
 CMC partners | Eurogentec | VETTER

Non-clinical safety

Regulatory

THE NON-CLINICAL ENGINE
 RTC Research Toxicology Centre
 GRANZER REGULATORY CONSULTING & SERVICES



Jörg Klumbis
CFO

Vantum CORPORATE
 ROS PETIT
 ASESORES LEGALES Y TRIBUTARIOS

Peptomyc in the news

• Webs del Grup Language
Dimarts, 3 octubre 2017

L'ECONOMIC

PORTADA FOCUS EMPRESES GRAN ANGULAR EMPRENEDORS EDICIÓ IMPRESA OPI

FOCUS BARCELONA - 9 juliol 2017 2.00 h

Candidats a unicorn català

Nou tecnològiques amb un alt potencial han estat triades per experts de L'Econòmic. Barcelona és un pol d'emprenedoria però no ha aconseguit 'start-up' en el club de les dels mil milions de dòlars



ENLLAC RELACI
Canal: L1
setmanar
PUBLICA
L'ECONOMI

Meet Inspiring EIT Community Women Leaders and Entrepreneur



Laura Soucek

Co-founder of Peptomyc, the prize winning team at the EIT Health Summit 2017

Tell us a bit about yourself and your connection to the EIT Community. I am both an entrepreneur and a scientist working in cancer research. I obtained my PhD in Genetics and Molecular biology from the University La Sapienza in Rome, and did my postdoc at UCSF in the USA. The EIT Community, through EIT Health Spain, gave me the opportunity to benefit from useful coaching and a great network built to reach potential investors!

Have you had to overcome many extra obstacles as a female entrepreneur? I believe so. I was often told that I was young to lead a company, when no matter what age would be told the same. I was advised to include more men in our team to make it look stronger. (Our team is 50% women, so you can see I did not take that advice!) I think there is often a bias against women which is often a result of 'flirtatious' is not a term that women use. Women, believe me.

What specific advice would you give young women following your steps?

This field has been male-dominated for a long time, but that is changing in other fields which are becoming more equal. So this should be an encouraging sign. As Ghandi once said "Be the change you wish to see in the world."

What has been your most rewarding moment of your career?

As a scientist, the most rewarding moment in my time I received funding from the EIT Community allowed me to gain project funding to make a difference in the community.

Laura Soucek
FUNDADORA I CEO DE PEPTOMYC
VELLETR, 1979

Formació
1997-1999 LICENCIADA EN CIÈNCIES BIOLÒGICAJE, UNIVERSITAT DE VELLETR (ITALIA)
1999-2001 LICENCIADA EN CIÈNCIES BIOLÒGICAJE, UNIVERSITAT DE VELLETR (ITALIA)
2001-2003 DOCTORA EN CIÈNCIES BIOLÒGICAJE, UNIVERSITAT DE VELLETR (ITALIA)

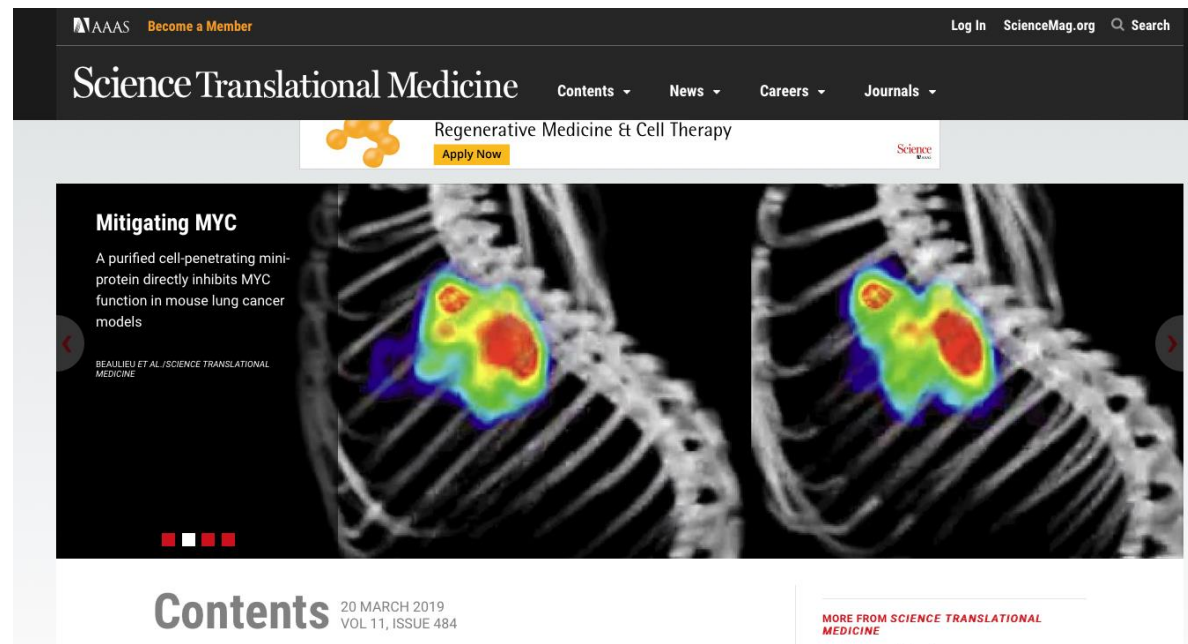
Experiència laboral
2004-2006 ILLUMINA, INC. (EUA)
2006-2008 ILLUMINA, INC. (EUA)
2008-2010 ILLUMINA, INC. (EUA)
2010-2012 ILLUMINA, INC. (EUA)
2012-2014 ILLUMINA, INC. (EUA)
2014-2016 ILLUMINA, INC. (EUA)
2016-2018 ILLUMINA, INC. (EUA)

20 candidatos a liderar la próxima década empresa
Entrepreneur Magazine ha seleccionat a 20 líders empresarials que podrien marcar la pauta de la pròxima dècada. Laura Soucek és una de les candidates.

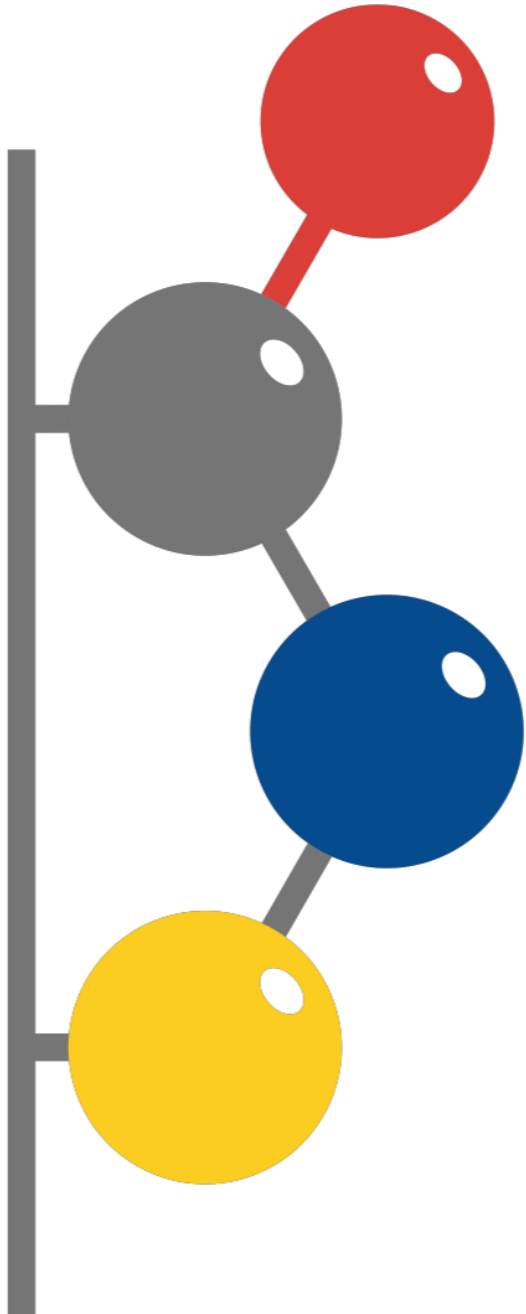


- TV:
 - http://www.rtve.es/alcarta/videos/telediario/td2_cancer_200319/5077739/
- Newspapers:
 - <https://www.biocentury.com/bc-extra/preclinical-news/2019-03-20/peptomyc-study-details-myc-targeted-cell-penetrating-biologic>
 - <http://www.bioworld.com/content/engineered-protein-can-block-undruggable-oncogene>
 - <https://www.lavanguardia.com/ciencia/20190320/461144877279/nuevo-farmaco-cancer-myc-omomyc.html>
 - <https://www.elmundo.es/ciencia-y-salud/salud/2019/03/20/5c923f25fdddf904b8b45b3.html>
 - https://eurekaalert.org/pub_releases/2019-03/vdio-pmi031919.php
 - <https://agenparl.eu/research-articles-intrinsic-cell-penetrating-activity-propels-omomyc-from-proof-of-concept-to-viable-anti-myc-therapy/>
 - <https://newsbeezer.com/mexicoeng/developed-a-drug-that-could-be-effective-against-most-tumors-news-from-gipuzkoa/>
- Radio:
 - https://www.cope.es/emisoras/cataluna/barcelona-provincia/barcelona/la-linterna-cope-catalunya-i-andorra/audios/farmac-experimental-podra-curar-cancer-supera-els-test-humans-20190321_700255
- Other:
 - https://www.eithealth.eu/-/peptomyc-publication-details-preclinical-validation-of-new-inhibitor-to-treat-cancer?utm_source=twitter&utm_medium=post&utm_campaign=peptomyc_news&utm_content=22032019
 - <http://www.nationalgeographic.com.es>

Relevant publications



- Beaulieu ME, Soucek L. Finding MYCure. *Mol Cell Oncol*. 2019 Jun 20;6(5):e1618178. doi: 10.1080/23723556.2019.1618178.
- Beaulieu ME, et al. Intrinsic cell-penetrating activity propels Omomyc from proof of concept to viable anti-MYC therapy. *Sci Transl Med*. 2019 doi:10.1126/scitranslmed.aar5012.
- Jauset T, Beaulieu ME. Bioactive cell penetrating peptides and proteins in cancer: a bright future ahead. *Curr Opin Pharmacol*. 2019. doi: 10.1016/j.coph.2019.03.014.
- Dang CV, Reddy EP, Shokat KM, Soucek L. Drugging the 'undruggable' cancer targets. *Nat Rev Cancer*. 2017. doi: 10.1038/nrc.2017.36.
- Whitfield JR, Beaulieu ME, Soucek L. Strategies to Inhibit Myc and Their Clinical Applicability. *Front Cell Dev Biol*. 2017. doi:10.3389/fcell.2017.00010.



Summary: The Omomyc mini-protein penetrates cells and attacks MYC, resulting in safe and durable response in lung and breast tumors

- ✓ Cell penetrating properties
- ✓ Preclinical efficacy in vivo (i.v. and local)
- ✓ Regulatory safety almost completed
- ✓ Industrial CMC
- ✓ To be licensed out @ CT Phase I (2022) or IIa (2024)
- ✓ Could treat several cancer types
- ✓ Patent portfolio (4 patents)



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A spin-off from  **VHIO**[®]
VALL D'HEBRON
Institute of Oncology

CELLEX Center
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www.peptomyc.com



The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 872212.

Disclosures Regarding Forward-Looking Statements

Peptomyc is including the following cautionary statement in this document to make applicable and take advantage of the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 (or equivalent law) for any forward-looking statements made by, or on behalf of, the Company. Forward-looking statements include statements concerning plans, objectives, goals, projections, strategies, future events or performance, and underlying assumptions and other statements which are other than statements of historical facts. Certain statements contained herein, including, without limitation, those that are identified by the use of the words "anticipates," "estimates," "expects," "forecasts," "intends," "plans," "predicts," "projects," "believes," "seeks," "will," "may" and similar expressions, are "forward-looking statements". Forward-looking statements involve risks and uncertainties, which could cause actual results or outcomes to differ materially from those expressed in the forward-looking statements.

The Company's expectations, beliefs and projections are expressed in good faith and are believed by the Company to have a reasonable basis, but there can be no assurance that management's expectations, beliefs or projections will result or be achieved or accomplished.