

# Translation

## aus Sicht der Helmholtz Gemeinschaft

Matthias H. Tschöp, CEO Helmholtz Munich  
Alexander-von-Humboldt Professor, TU München



AGROBIL  
MEDICINAE  
ET  
SOLAMINI  
BENEDICTI  
MAXIMILIANI  
JOSEPHI REGIS  
MDCCCXXIII

MEDIZINISCHE KLINIK DER UNIVERSITÄT MÜNCHEN MED. KLINIK

1992

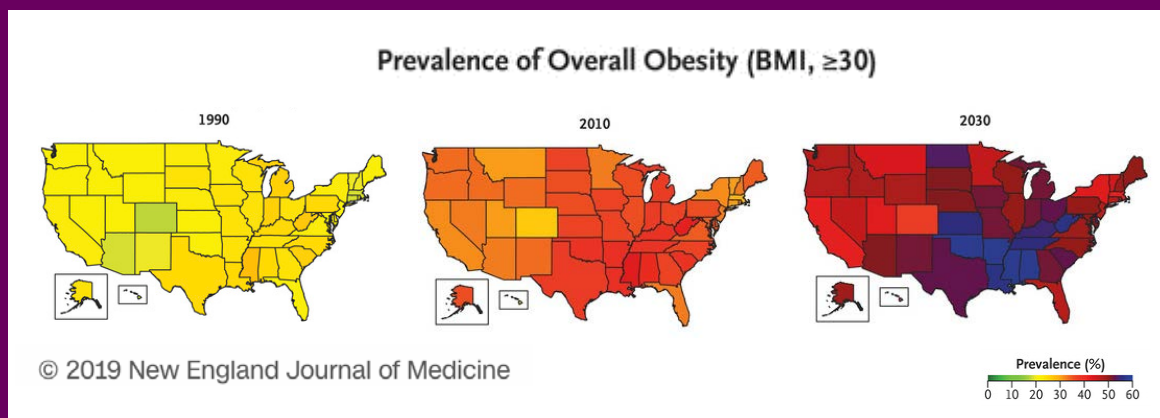
Munich University Hospital

# Obesity & Diabetes: A massive global threat

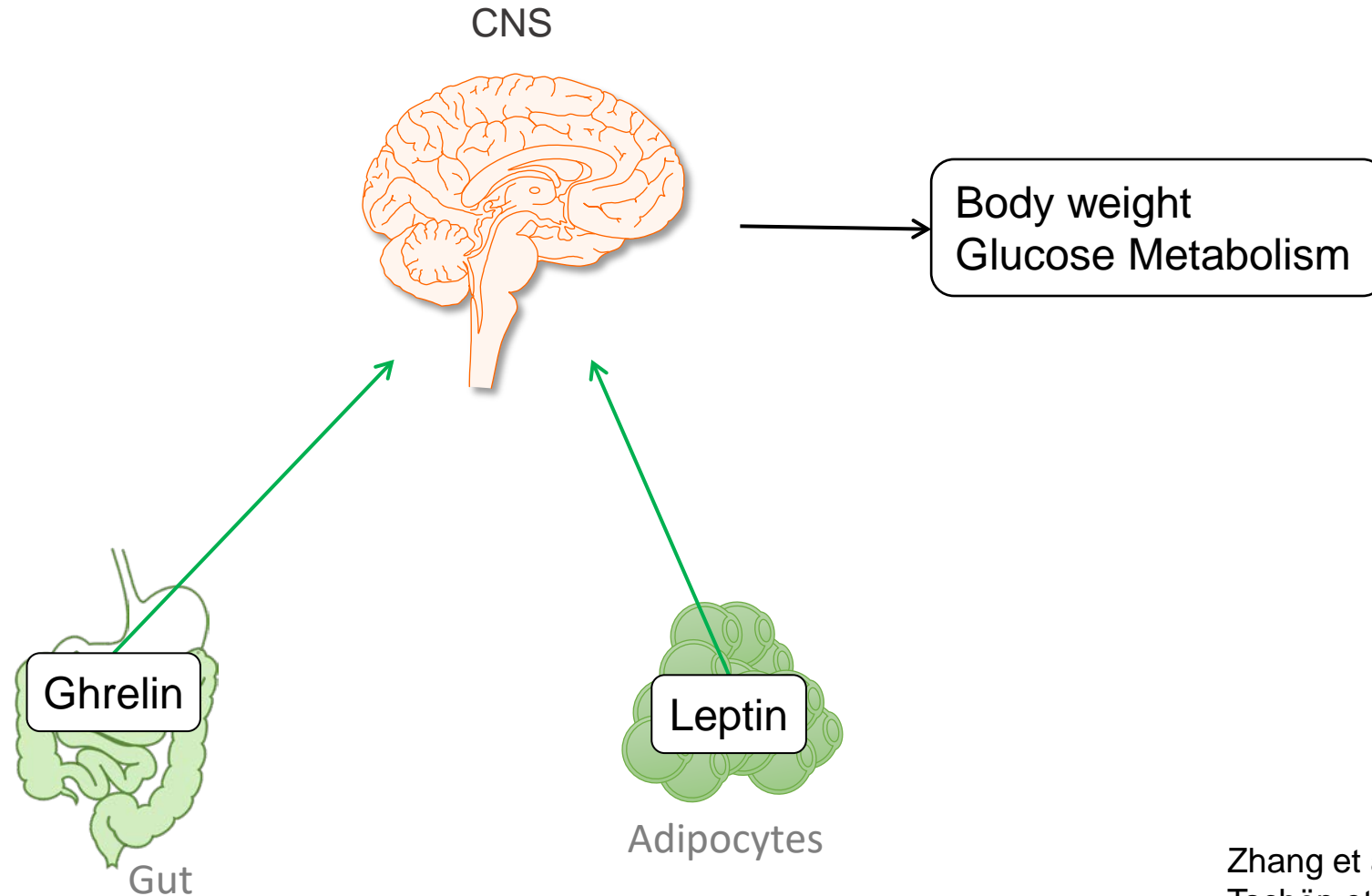
- > 2 billion adults overweight
- > 650 million adults obese
- > 0.5 billion with diabetes



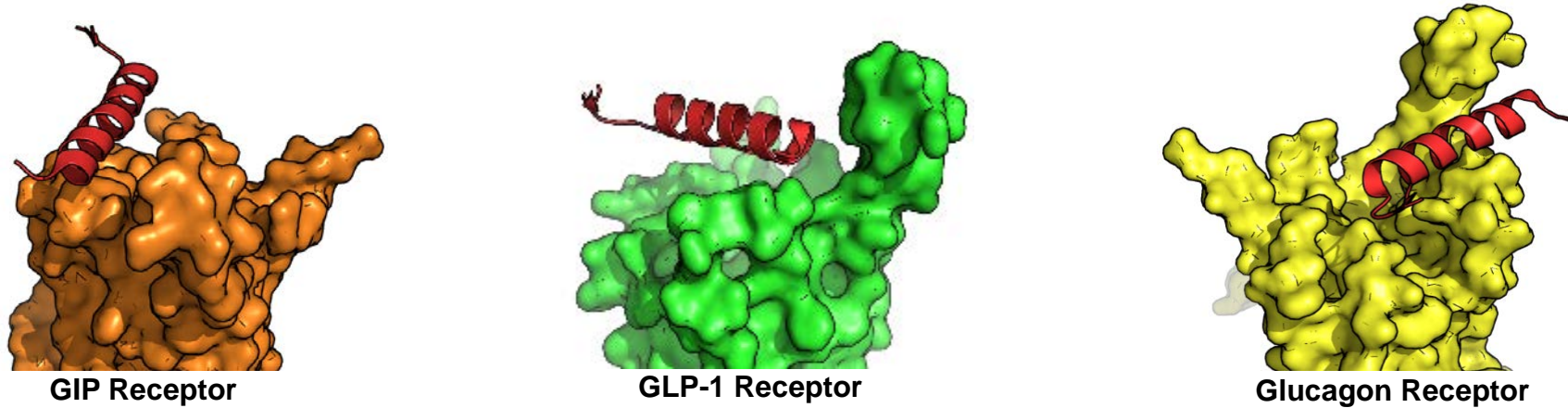
**Annual Costs of Diabetes alone: ca. 800 Billion**



# Discovery of Molecular Control of Food intake & Body Weight



# Discovery of 3 classes of novel anti-obesity/diabetes drugs



**Dual  
GIP-GLP-1 Agonists**

**Triple  
Glucagon-GIP-GLP Agonists**

**Dual Glucagon-  
GLP-1 Agonists**

Finan...DiMarchi, Tschöp  
Science Translational Medicine  
2013

Finan...DiMarchi, Tschöp  
Nature Medicine  
2015

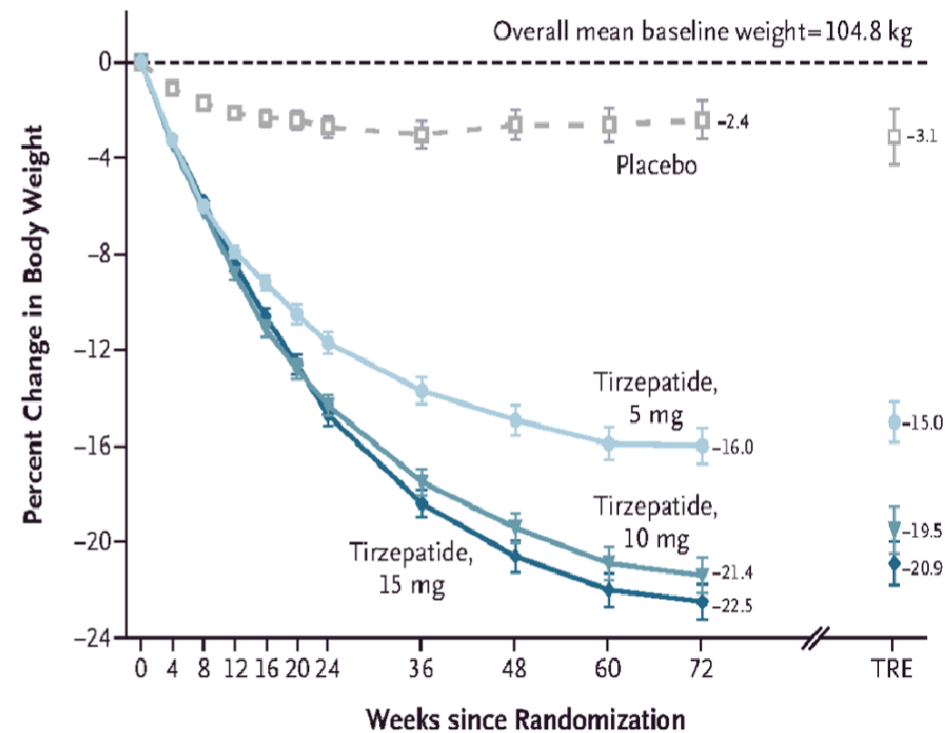
Day ...DiMarchi, Tschöp  
Nature Chemical Biology  
2009

# 12 Dual & Triple Combination Therapeutics in Clinical Trials

Triple and double combinations in development for obesity and other metabolic disorders			
Project	Company	Mechanism	Status
Phase 3			
Tirzepatide	Lilly	GIP/GLP-1 agonist	To be filed in diabetes in 2021; in the Surmount ph3 programme in obesity
Phase 2			
IBI362/OXM3	Lilly/Innovent	GLP-1/glucagon agonist	In ph2 in obesity
OPK88003	Opko Health/Lilly	GLP-1/glucagon agonist	In ph2 in diabetes and obesity
BI 456906	Boehringer Ingelheim/ Zealand Pharma	GLP-1/glucagon agonist	In ph2 in obesity and Nash
Cotadutide	Astrazeneca	GLP-1/glucagon agonist	In ph2 in diabetes, diabetic kidney disease and obesity with Nash
HM12525A/efinopegdutide	Hanmi	GLP-1/glucagon agonist	In ph2 in Nash
Phase 1			
ALT-801	Altimune	GLP-1/glucagon agonist	Ph1 in obesity; ph1 in NAFLD and Nash planned
DD01	D&D Pharmatech	GLP-1/glucagon agonist	Ph1 in obese subjects with diabetes and NAFLD
AMG 133	Amgen	GIP receptor antagonist/ GLP-1 agonist	In ph1 in obesity
LAPS Triple Agonist/ HM15211	Hanmi	GIP/GLP-1/ glucagon agonist	Ph1 in obese subjects with NAFLD
GGG Tri Agonist Research Program	Lilly	GIP/GLP-1/ glucagon agonist	Ph1 in diabetes; ph2 in diabetes, Nash and obesity planned

Source: Evaluate Pharma, clinicaltrials.gov & company websites.

## The GIP-GLP1 Dual Agonist Tirzepatide: Unprecedented Weight Loss in Obesity



Jastreboff et al, *NEJM*, 2022



## **FDA approves Lilly's Mounjaro™ (tirzepatide) injection, the first and only GIP and GLP-1 receptor agonist for the treatment of adults with type 2 diabetes**

May 13, 2022

*Mounjaro delivered superior A1C reductions versus all comparators in phase 3 SURPASS clinical trials*

*While not indicated for weight loss, Mounjaro led to significantly greater weight reductions versus comparators in a key secondary endpoint*

*Mounjaro represents the first new class of diabetes medicines introduced in nearly a decade and is expected to be available in the U.S. in the coming weeks*

INDIANAPOLIS, May 13, 2022 /PRNewswire/ -- The U.S. Food and Drug Administration (FDA) approved Mounjaro™ (tirzepatide) injection Eli Lilly and Company's (NYSE: LLY) new once-weekly GIP (glucose-dependent insulintropic polypeptide) and GLP-1 (glucagon-like peptide-1) receptor agonist indicated as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes. Mounjaro has not been studied in patients with a history of pancreatitis and is not indicated for use in patients with type 1 diabetes mellitus.

As the first and only FDA-approved GIP and GLP-1 receptor agonist, Mounjaro is a single molecule that activates the body's receptors for GIP and GLP-1, which are natural incretin hormones.<sup>1</sup>

# Discovery of 3 classes of novel anti-obesity/diabetes drugs

**1992: start of search for novel drugs**

**2003: start of work on gut hormone polyagonists**

**2009/2013/2015: key publications on gut hormone polyagonist discovery**

**2022: First FDA approved polyagonist (Eli Lilly & Co)**

**30 years**



# HELMHOLTZ MUNICH



**Ca. 2 500**  
Scientists and staff



**Ca. 370 Million Euro**  
Annual funding (2021)



**48**  
Cumulative ERC Grants



**138**  
Active patent families



**1 600** Publications in 2021



## Headquartered at Helmholtz Munich

- German Center for Diabetes Research
- Ellis Munich
- Headquarter Helmholtz AI
- National Cohort Repository
- German Mouse Clinic

# Enhancing Translation: Strategic Transformation

# Enhancing Translation: Strategic Transformation

Excellence in Research

# Research Quality

**Novel**

**Relevant**

**Problem Solving**

**Reproducible**

# Research Excellence: Publications 2018-2022 IF > 20

Nat. Rev. Mol. Cell Biol. Conrad, M.  
 Nat. Rev. Drug Discov. Lickert, H.  
 Nat. Rev. Drug Discov. Müller, T.D.  
 N. Engl. J. Med. Birkenfeld, A.L.  
 N. Engl. J. Med. Birkenfeld, A.L.  
 N. Engl. J. Med. Birkenfeld, A.L.  
 N. Engl. J. Med. Peters, A.  
 Lancet Peters, A.  
 Lancet Breitner, S.  
 Lancet Breitner, S.  
 Lancet Peters, A.  
 Lancet Stumvoll, M.  
 Lancet Thorand, B.  
 Lancet von Mutius, E.  
 Lancet Meisinger, C.  
 Nat. Rev. Cancer Kobold, S.  
 Chem. Rev. Hagn, F.  
 Chem. Rev. Reif, B.  
 Nat. Rev. Genet. Schneider, R.  
 Nat. Rev. Dis. Primers Schormair, B.  
 Nat. Rev. Cancer Conrad, M.  
 JAMA Birkenfeld, A.L.  
 JAMA Standl, M.  
 JAMA Ziegler, A.-G.  
 JAMA Ziegler, A.-G.  
 JAMA Emmert-Fees, K.  
 Nat. Biotechnol. Stiel, A.-C.  
 Nat. Biotechnol. Theis, F.J.  
 Nat. Biotechnol. Mayer, K.F.X.  
 Nat. Biotechnol. Witting, M.  
 Nat. Biotechnol. Theis, F.J.  
 Nat. Biotechnol. Gagneur, J.  
 Nat. Biotechnol. Lickert, H.  
 Nat. Biotechnol. Theis, F.J.  
 Nat. Biotechnol. Haghverdi, L.  
 Nat. Biotechnol. Ntziachristos, V.  
 Nat. Biotechnol. Theis, F.J.  
 Nature Lickert, H.  
 Nature Scialdone, A.  
 Nature Stiel, A.-C.  
 Nature Stumvoll, M.  
 Nature García-Cáceres, C.  
 Nature Peters, A.  
 Nature Unger, K.  
 Nature Ziegler, A.-G.  
 Nature Meitinger, T.  
 Nature Schulte, E.C.  
 Nature Theis, F.J.  
 Nature Wurst, W.  
 Nature Jeremias, I.  
 Nature Spannagl, M.  
 Nature Hu, D.  
 Nature Conrad, M.  
 Nature Götz, M.  
 Nature Rinkevich, Y.  
 Nature Schroeder, T.

Nature Torres-Padilla, M.E.  
 Nature Meier, M.  
 Nature Müller-Nurasyid, M.  
 Nature Gieger, C.  
 Nature Theis, F.J.  
 Nature Sattler, M.  
 Nature Buettner, F.  
 Nature Götz, M.  
 Nature Falter-Braun, P.  
 Nature Ntziachristos, V.  
 Nature Yildirim, A.Ö.  
 Nature Spannagl, M.  
 Nature Mayer, K.F.X.  
 Nature Zischka, H.  
 Nature Stumvoll, M.  
 Nature Theis, F.J.  
 Nature Peters, A.  
 Nature Theis, F.J.  
 Nature Adamski, J.  
 Nature Mayer, K.F.X.  
 Nature Heinig, M.  
 Nature Semb, H.  
 Nature Götz, M.  
 Nature Unger, C.  
 Nature Götz, M.  
 Nature Ziegler, A.-G.  
 Nature Ziegler, A.-G.  
 Nat. Mater. Westmeyer, G.G.  
 Nat. Mater. Protzer, U.  
 Nat. Rev. Genet. Theis, F.J.  
 Nat. Rev. Genet. Zeggini, E.  
 Chem. Soc. Rev. Tetko, I.V.  
 Science Raffler, J.  
 Science Scialdone, A.  
 Science Götz, M.  
 Science Götz, M.  
 Science Griesmann, M.  
 Science Theis, F.J.  
 Science Spannagl, M.  
 Science Mayer, K.F.X.  
 Science Zeggini, E.  
 Science Vlot, A.C.  
 Nat. Med. Cai, N.  
 Nat. Med. Luecken, M.  
 Nat. Med. Wagner, R.  
 Nat. Med. Kastenmüller, G.  
 Nat. Med. Protzer, U.  
 Nat. Med. Depner, M.  
 Nat. Med. Solimena, M.  
 Nat. Med. Ziegler, A.-G.  
 Nat. Med. Heinitz, S.  
 Nat. Med. Schiller, H.B.  
 Nat. Med. Heikenwalder, M.  
 Nat. Med. von Mutius, E.  
 Nat. Med. Götz, M.  
 Nat. Med. Schiller, H.B.

Nat. Med. Ziegler, A.-G.  
 J. Clin. Oncol. Walch, A.K.  
 J. Clin. Oncol. Brugger, M.  
 BMJ Schneider, A.E.  
 BMJ Peters, A.  
 BMJ Schneider, A.E.  
 Cell Engel, B.D.  
 Cell Peters, A.  
 Cell Zeggini, E.  
 Cell Götz, M.  
 Cell Theis, F.J.  
 Cell Yildirim, A.Ö.  
 Cell Ertürk, A.  
 Cell Hadian, K.  
 Cell Tschöp, M.  
 Cell Schiller, H.B.  
 Cell Ertürk, A.  
 Cell Peters, A.  
 Cell Zeggini, E.  
 Cell Zeggini, E.  
 Cell Mayer, K.F.X.  
 Cell Tschöp, M.H.  
 Cell Coskun, Ü.  
 Cell Madl, T.  
 Cell Drukker, M.  
 Cell Ntziachristos, V.  
 Cell Lang, D.  
 Cell Combs, S.E.  
 Lancet Oncol. Stathopoulos, G.T.  
 Lancet Oncol. Ntziachristos, V.  
 Nat. Photonics Ntziachristos, V.  
 Lancet Neurol. Oertel, W.H.  
 Lancet Neurol. Feederle, R.  
 Lancet Neurol. Winkelmann, J.  
 Lancet Neurol. Winkelmann, J.  
 Lancet Neurol. Winkelmann, J.  
 Nat. Rev. Endocrinol. Heni, M.  
 Nat. Rev. Endocrinol. Lickert, H.  
 Nat. Rev. Endocrinol. Morigny, P.  
 Nat. Rev. Endocrinol. Ntziachristos, V.  
 Nat. Rev. Endocrinol. Stefan, N.  
 Nat. Rev. Endocrinol. Ziegler, A.-G.  
 Nat. Rev. Endocrinol. Lickert, H.  
 Nat. Rev. Endocrinol. Clemmensen, C.  
 Nat. Rev. Endocrinol. Tschöp, M.H.  
 Nat. Rev. Neurosci. Ertürk, A.  
 Immunity Colomé-Tatché, M.  
 Nat. Genet. Cai, N.  
 Nat. Genet. Zeggini, E.  
 Nat. Genet. Winkelmann, J.  
 Nat. Genet. Kastenmüller, G.  
 Nat. Genet. Spannagl, M.  
 Nat. Genet. Peters, A.  
 Nat. Genet. Schiller, H.B.  
 Nat. Genet. Proksich, H.  
 Nat. Genet. Heinig, M.  
 Nat. Genet. Götz, M.  
 Nat. Genet. Strauch, K.  
 Nat. Genet. Torres-Padilla, M.E.

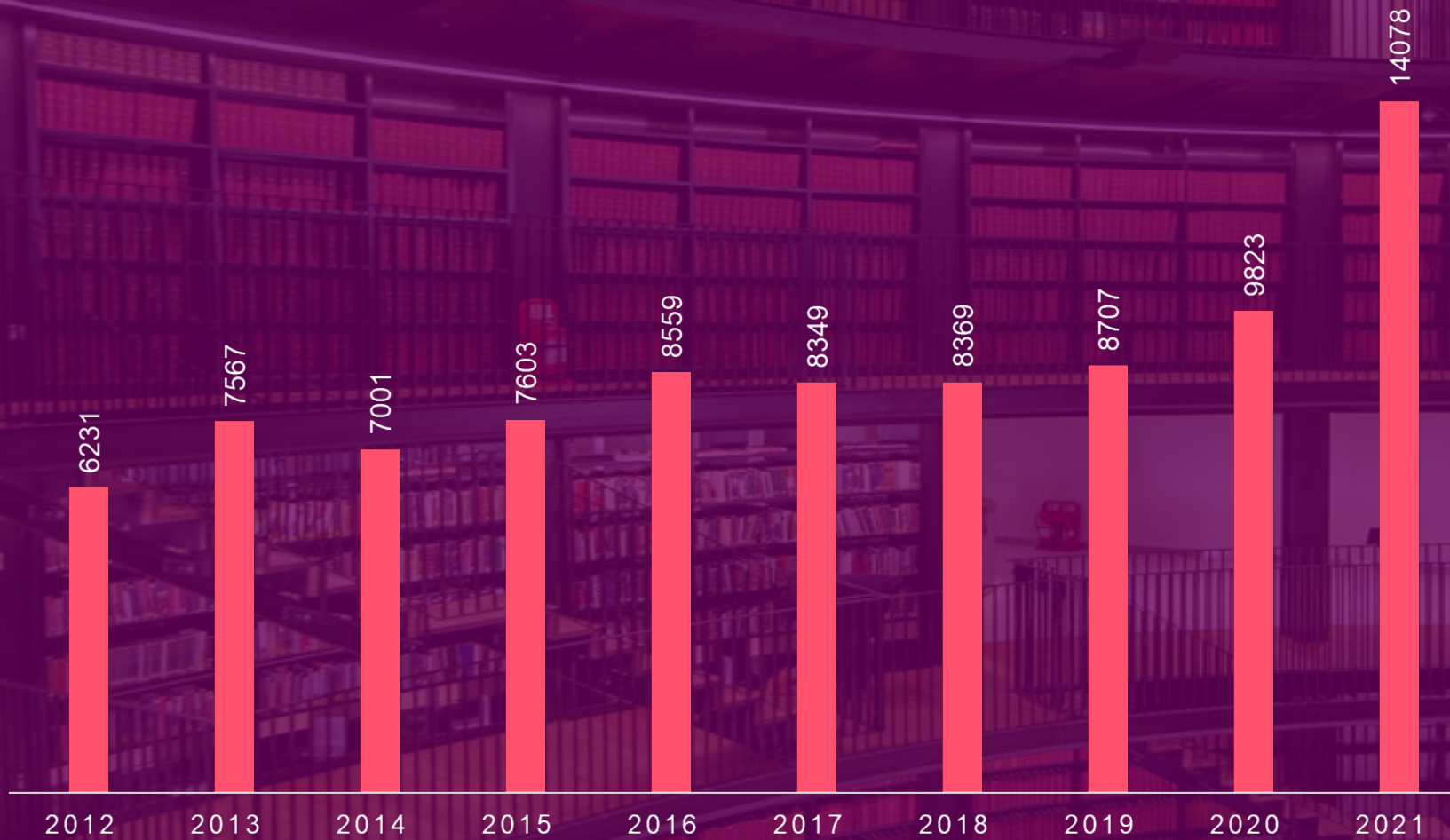
Nat. Genet. Wagner, M.  
 Nat. Genet. Strauch, K.  
 Nat. Genet. Cai, N.  
 Nat. Genet. Mayer, K.F.X.  
 Nat. Genet. Bonev, B.  
 Nat. Genet. Müller-Nurasyid, M.  
 Nat. Genet. Kastenmüller, G.  
 Nat. Genet. Zeggini, E.  
 Nat. Genet. Torres-Padilla, M.E.  
 Nat. Genet. Standl, M.  
 Nat. Genet. Zierer, J.  
 Nat. Genet. Strauch, K.  
 Nat. Genet. Müller-Nurasyid, M.  
 Nat. Genet. Strom, T.M.  
 Nat. Genet. Gieger, C.  
 Nat. Genet. Müller-Nurasyid, M.  
 Nat. Genet. Stricker, K.  
 Nat. Genet. Gieger, C.  
 Nat. Genet. Gieger, C.  
 Nat. Genet. Waldenberger, M.  
 Nat. Genet. Standl, M.  
 Nat. Genet. Mayer, K.F.X.  
 Nat. Genet. Seidel, M.  
 Nat. Genet. Zeggini, E.  
 Nat. Genet. Grallert, H.  
 Nat. Genet. Schramm, K.  
 Nat. Genet. Zeggini, E.  
 Nat. Genet. Karrasch, S.  
 Nat. Genet. Winkelmann, J.  
 Nat. Genet. Wichmann, H.-E.  
 Nat. Genet. Peters, A.  
 Nat. Genet. Standl, M.  
 Nat. Genet. Strauch, K.  
 Nat. Genet. Zeggini, E.  
 Nat. Genet. Waldenberger, M.  
 Nat. Genet. Mirza-Schreiber, N.  
 Nat. Genet. Ertürk, A.  
 Nat. Methods Witting, M.  
 Nat. Methods Engel, B.D.  
 Nat. Methods Theis, F.J.  
 Nat. Methods Theis, F.J.  
 Nat. Methods Bruns, O.T.  
 Nat. Methods Mc Larney, B.  
 Nat. Methods Theis, F.J.  
 Nat. Methods Theis, F.J.  
 Nat. Methods Müller, A.  
 Nat. Methods Stöger, T.  
 Adv. Mater. Wagner, D.E.  
 Lancet Resp. Med. Frankenberg, M.  
 Lancet Resp. Med. Hilgendorff, A.  
 Lancet Resp. Med. Behr, J.  
 Lancet Resp. Med. Gieger, C.  
 Lancet Glob. Health Hasenauer, J.  
 Circulation Mastantuono, E.  
 Circulation Meitinger, T.

Circulation Zeggini, E.  
 Circulation Müller-Nurasyid, M.  
 Circulation Peters, A.  
 Lancet Diabet. Endocrinol. Bornstein, S.R.  
 Lancet Diabet. Endocrinol. Stefan, N.  
 Lancet Diabet. Endocrinol. Herzig, S.  
 Lancet Diabet. Endocrinol. Kurz, C.F.  
 Lancet Diabet. Endocrinol. Stumvoll, M.  
 Lancet Diabet. Endocrinol. Kullmann, S.  
 Lancet Diabet. Endocrinol. Bornstein, S.R.  
 Lancet Diabet. Endocrinol. Stefan, N.  
 Lancet Diabet. Endocrinol. Birkenfeld, A.L.  
 Lancet Diabet. Endocrinol. Bornstein, S.R.  
 Nat. Bio. Eng. Kobold, S.  
 Nat. Bio. Eng. Meier, M.  
 Nat. Bio. Eng. Ntziachristos, V.  
 Physiol. Rev. Cunion, F.  
 Nat. Cell Biol. Lickert, H.  
 Nat. Cell Biol. Lickert, H.  
 Nat. Cell Biol. Westmeyer, G.G.  
 Nat. Cell Biol. Torres-Padilla, M.E.  
 Nat. Cell Biol. Drukker, M.  
 Nat. Cell Biol. Schneider, A.E.  
 Eur. Heart J. Strauch, K.  
 Eur. Heart J. Ladwig, K.-H.  
 Eur. Heart J. Peters, A.  
 Eur. Heart J. Ladwig, K.-H.  
 Eur. Heart J. Adamski, J.  
 Eur. Heart J. Müller-Nurasyid, M.  
 Eur. Heart J. Müller-Nurasyid, M.  
 Eur. Heart J. Meisinger, C.  
 Eur. Heart J. Chen, K.  
 Eur. Heart J. Gieger, C.  
 Eur. Heart J. Meitinger, T.  
 Eur. Heart J. Peters, A.  
 JAMA Oncol. Eitz, K.A.  
 Cancer Cell Heikenwälder, M.  
 Cancer Cell Müller, T.  
 Cancer Cell Jeremias, I.  
 Nat. Neurosci. Lao, C.L.  
 Nat. Neurosci. Götz, M.  
 Nat. Neurosci. Perocchi, F.  
 Cell Metab. García-Cáceres, C.  
 Cell Metab. Herzig, S.  
 Cell Metab. Müller, T.D.  
 Cell Metab. Schmitt-Kopplin, P.  
 Cell Metab. Hauner, H.  
 Cell Metab. Jais, A.  
 Cell Metab. Lutter, D.  
 Cell Metab. Herzig, S.  
 Cell Metab. Ntziachristos, V.  
 Cell Metab. Ntziachristos, V.  
 Cell Metab. Nawroth, P.P.  
 Cell Metab. Teperino, R.  
 Cell Metab. Jastroch, M.

Cell Metab. Walch, A.K.  
 Cell Metab. Gerdes, J.M.  
 Cell Metab. Small, D.M.  
 Cell Metab. Berland, C.  
 Cell Metab. Conrad, M.  
 Cell Metab. Zeggini, E.  
 Cell Metab. Bruns, O.T.  
 Gut Blüher, M.  
 Gut Stumvoll, M.  
 Cell Stem Cell Meier, M.  
 Cell Stem Cell Vincendeau, M.  
 Cell Stem Cell Götz, M.  
 Cell Stem Cell Götz, M.  
 Cell Stem Cell Torres-Padilla, M.E.  
 Cell Stem Cell Götz, M.  
 Cell Stem Cell Götz, M.  
 Nat. Immunol. Heissmeyer, V.  
 Nat. Immunol. Cunion, F.  
 Nat. Immunol. Rinkevich, Y.  
 Nat. Immunol. Feederle, R.  
 Nat. Immunol. Ringelhan, M.  
 Nat. Immunol. Solimena, M.  
 Nat. Immunol. Coskun, Ü.  
 Nat. Immunol. Lorenz-Depiereux, B.  
 J. Hepatol. Protzer, U.  
 J. Hepatol. Protzer, U.  
 J. Hepatol. Peters, A.  
 J. Hepatol. Ladwig, K.-H.  
 J. Hepatol. Adamski, J.  
 J. Hepatol. Müller-Nurasyid, M.  
 J. Hepatol. Müller-Nurasyid, M.  
 J. Hepatol. Meisinger, C.  
 J. Hepatol. Chen, K.  
 J. Hepatol. Gieger, C.  
 J. Hepatol. Meitinger, T.  
 J. Hepatol. Peters, A.  
 J. Hepatol. Eitz, K.A.  
 J. Hepatol. Heikenwälder, M.  
 J. Hepatol. Müller, T.  
 J. Hepatol. Jeremias, I.  
 J. Hepatol. Jeremias, I.  
 J. Hepatol. Jakwerth, C.A.  
 J. Hepatol. Hammerschmidt, W.  
 J. Hepatol. Marr, C.  
 J. Hepatol. Coskun, Ü.  
 J. Hepatol. Bruns, O.T.  
 J. Hepatol. Kastenmüller, G.  
 J. Hepatol. Arnold, M.  
 Am. J. Respir. Crit. Care Med. Illi, S.  
 Am. J. Respir. Crit. Care Med. Peters, A.  
 Ann. Intern. Med. Stefan, N.  
 Gastroenterology Machmüller, A.C.  
 Gastroenterology Tengen, F.  
 Gastroenterology Protzer, U.  
 Gastroenterology Zischka, H.  
 Gastroenterology Ntziachristos, V.  
 Gastroenterology Adamski, J.  
 Gastroenterology Glasmacher, E.  
 Gastroenterology Krahmer, N.  
 Fungal Divers. Buegger, F.  
 Nat. Phys. Scheel, C.

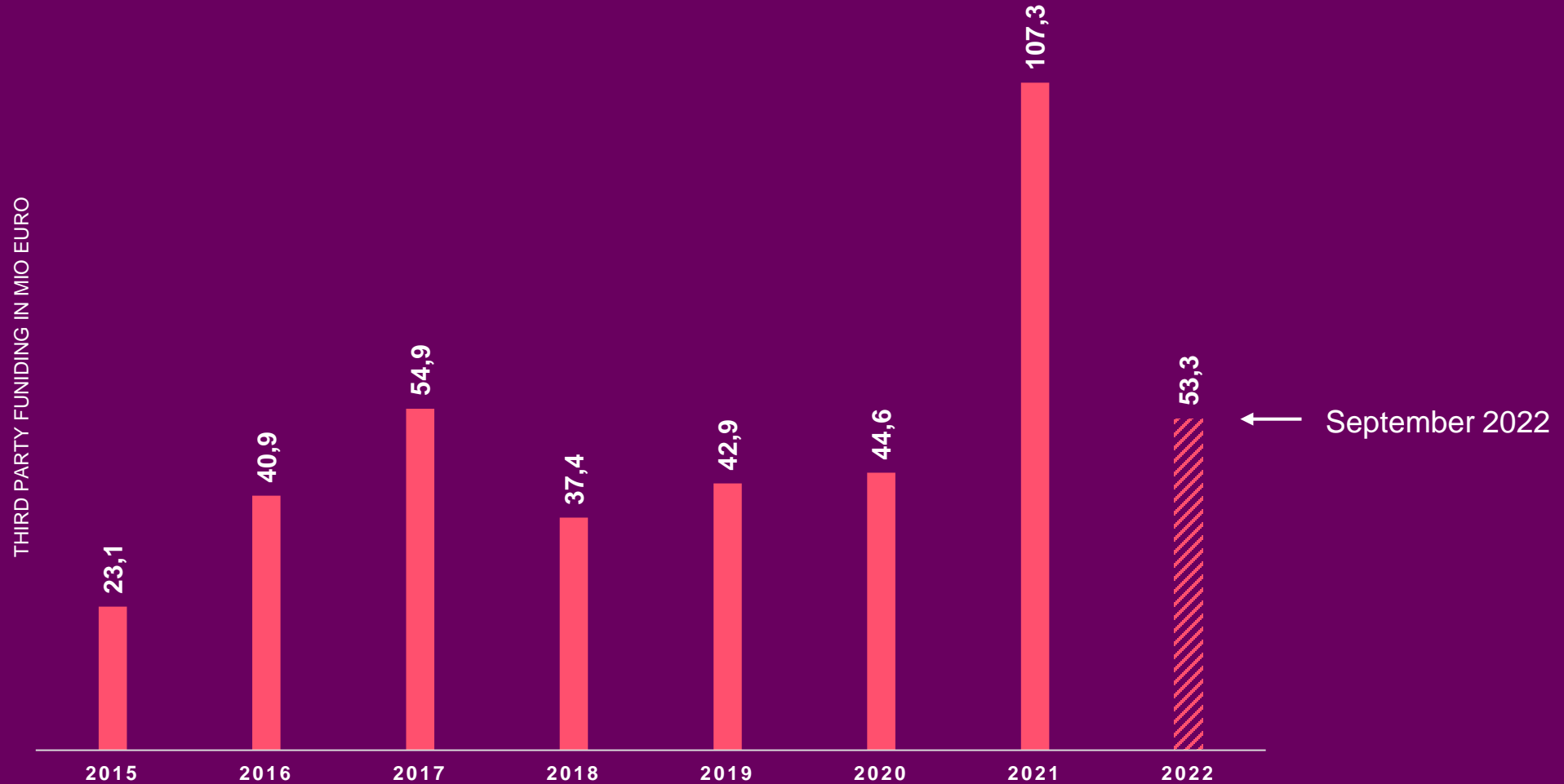


# Helmholtz Munich Cumulative Impact Factor 2012-2021



*Cumulative Impact Factor  
(Clarivate Analytics)*

# Third Party Funding 2015 - 2022



Totals from all projects approved to date and opened by FI-GGM.



# ERC Grants Helmholtz Munich

48 ERC Grants

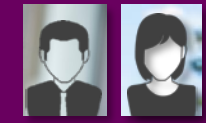


2022

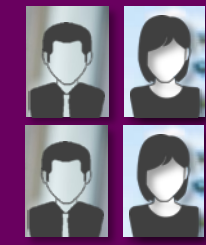
**3 Starting Grants**  
**3 Consolidator Grants**  
and  
**3 Advanced Grants**

Submitted for the next selection round:

**Starting Grants (2. Round)**



**Consolidator Grants (2. Round)**



**Advanced Grants**



# Prizes and Awards (Selection 2018 - 2022)



Anette Ziegler

- George Eisenbarth Award 2018
- Aufnahme in die Bayerische Akademie der Wissenschaften
- EASD-Novo Nordisk Foundation Diabetes Prize for Excellence



Magdalena Götz  
Mendel-Medaille der Leopoldina 2019  
David Koetser Foundation Brain Research Award 2021



Fabian Theis  
Hamburger Wissenschaftspreis 2021



Martin Heni  
Ferdinand-Bertram-Preis 2019



Hans Zischka  
Lydia-Kaulfuß-Preis 2019



Teresa Rodriguez-Calvo

Dr. Robert Goldstein Award 2020



Vasilis Ntziachristos  
Karl Heinz Beckurts-Preis 2021  
IEEE Fellow



Hans-Ulrich Häring  
Ehrennadel der DDG in Gold 2019



Annette Peters  
John Goldsmith Award 2019



Ulrike Protzer  
Bayerischer Verdienstorden



Michael Schloter

Aufnahme in die Bayerische Akademie der Wissenschaften

Matthias Tschöp

- Paul-Langerhans-Medaille 2019
- Berthold-Medaille 2021
- Ernst Jung-Preis für Medizin 2021
- EASD-Lilly Centennial Anniversary Prize 2022



Ali Ertürk  
Rolf Becker-Preis 2020



Claudia Traidl-Hoffmann  
EAACI Fellow



Monika Witzenberger  
Merck Innovation Cup 2021



Carolin Daniel  
Ferdinand-Bertram-Preis 2021

Aufnahme:  
Association of American Physicians  
Bayerische Akademie der Wissenschaften  
EMBO



Julia Schnabel  
IEEE Fellow



Erika von Mutius  
Lucie Adelsberger Medaille 2018  
Balzan Preis 2019



Ben Engel  
EMBO Young Investigator



Michael Sattler

Erwin Schrödinger Preis 2020



Grzegorz Popowicz



Heiko Lickert  
Finalist Falling Walls Wettbewerb 2021



Julia Esser von Bieren  
Henning Løwenstein Research Award 2021



Martin Hrabě de Angelis  
Paul-Langerhans-Medaille 2021  
Mitglied Leopoldina



Stephan Herzig  
Werner-Creutzfeldt-Preis 2022



Henriette Uhlenhaut  
Heinz-Meier-Leibniz-Preis 2019



Eleftheria Zeggini  
Fellow Academy of Medical Sciences, UK  
Aufnahme EMBO

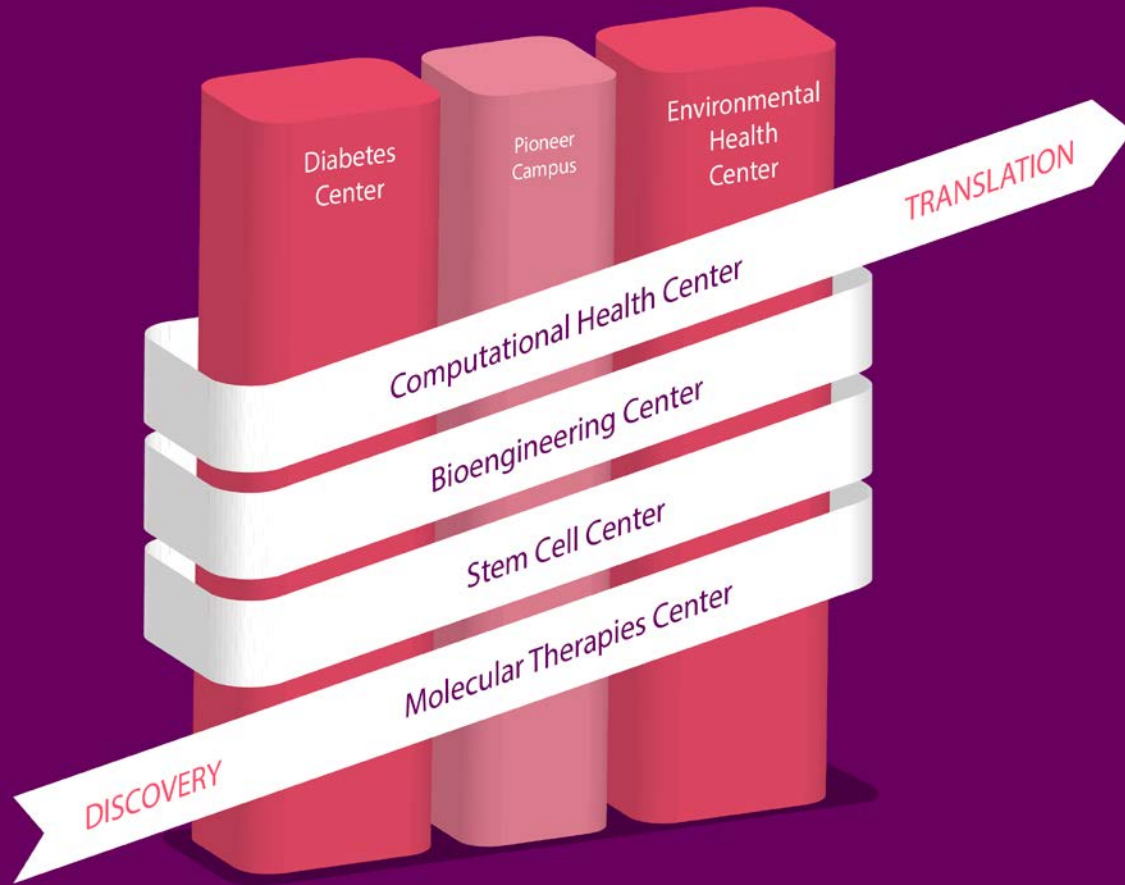


Sarah Kim-Hellmuth  
Adalbert-Czerny-Preis 2021  
Wissenschaftspreis des GlaxoSmithKline Stiftung 2022  
Friedmund Neumann Prize

# Enhancing Translation: Strategic Transformation

Excellence in Research

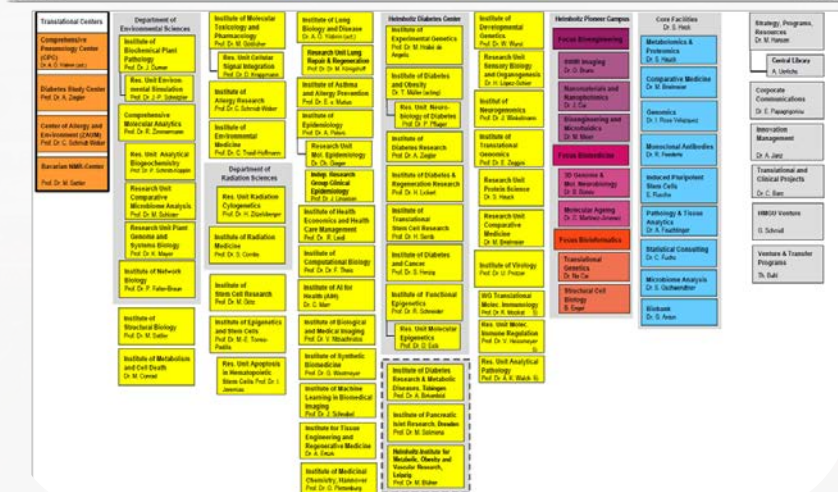
Establish more translational & entrepreneurial culture

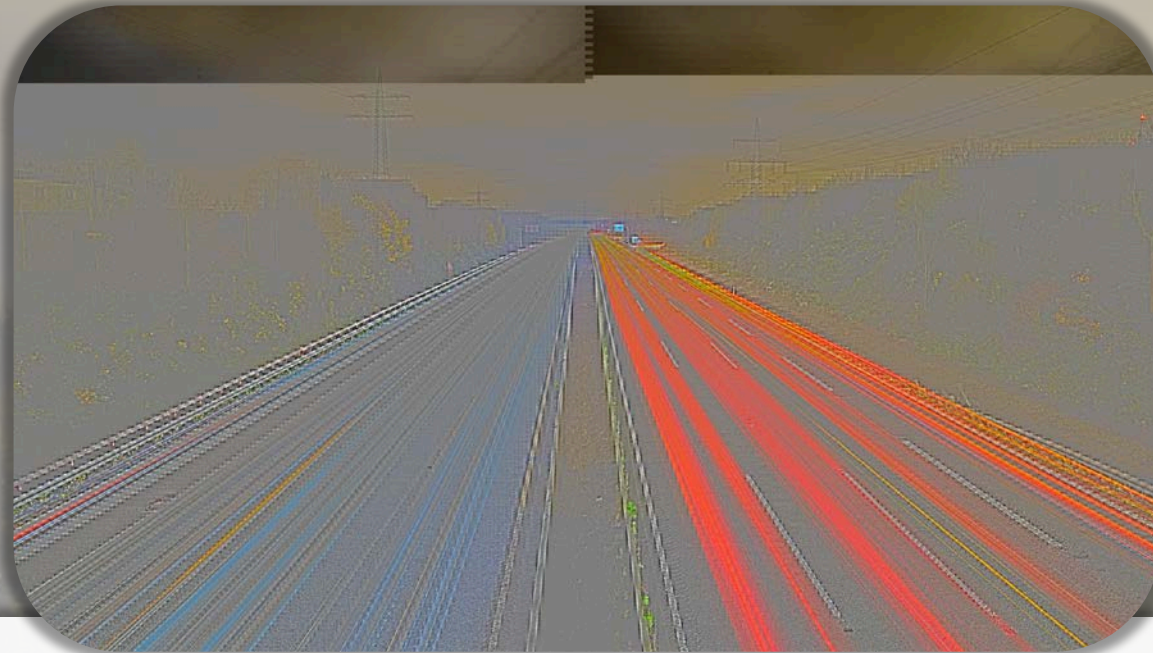


We discover breakthrough solutions for better health in a rapidly changing world



Scientific Director





## Scientific Director

Matthias Tschöp

**Research Directors**  
Stephan Herzig  
Martin Hrabé de Angelis

**POF IV Program Speaker**  
Eleftheria Zeggini

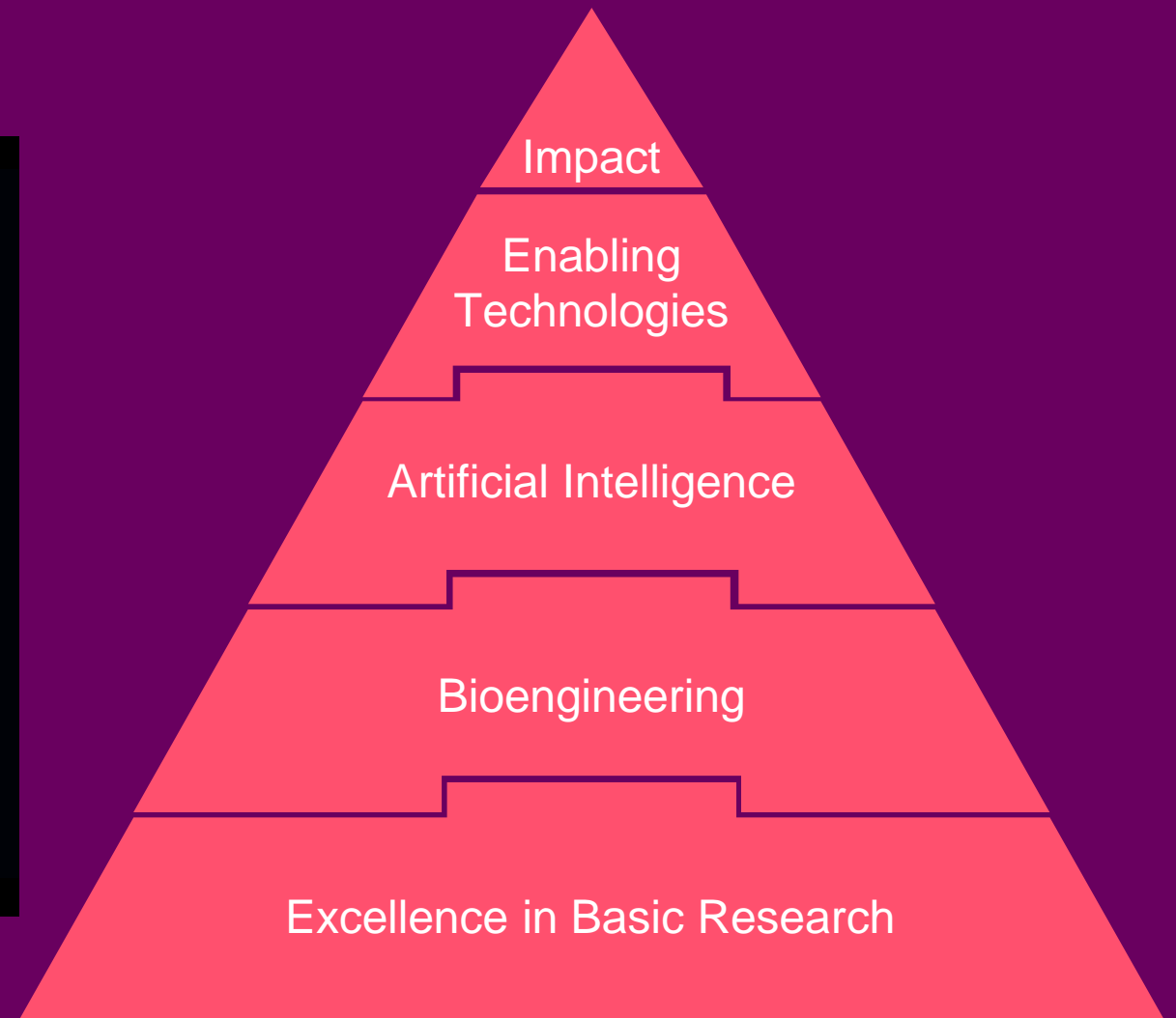
*Topics POF IV Programm ENABLE*



EC= Executive Committee

# Transfer at Helmholtz Munich

## Delivering Impact



# Key Performance Indicators

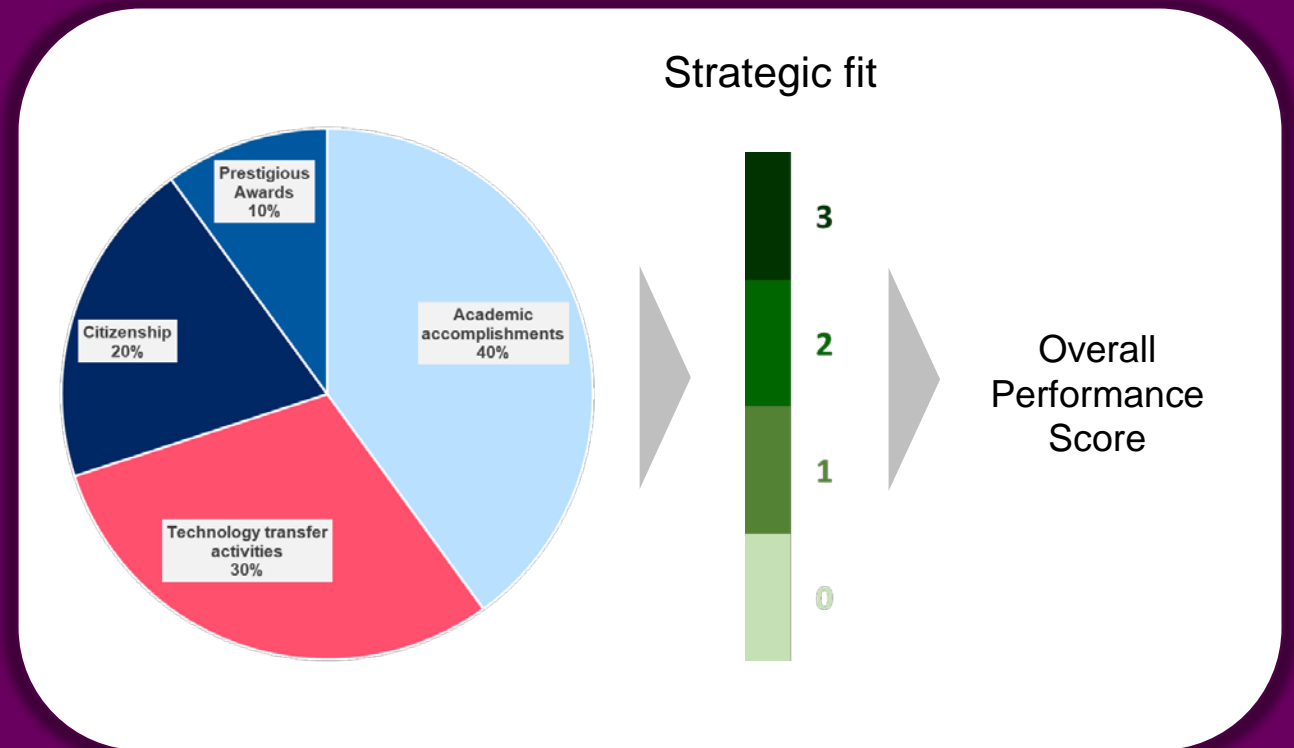
Monitoring performance of scientific units (n>60) and guiding resource allocation

## KPI framework:

- **Academic accomplishments** (Original papers only, Lead authorship @ Helmholtz Munich, Journal IF as proxy for weighing, Grant Income)
- **Technology transfer activities** (Licensing fees, Patent applications, clinical studies, Spin-Offs)
- **Citizenship** (Reviews and non-lead original papers, Invited talks and awards, Advisory board memberships, Helmholtz Munich committee work, Helmholtz Munich training and outreach activities)
- **Prestigious awards**

**Normalised** by core funding income

**Overall weight calibration** given by alignment with scientific strategy





# Drug Discovery und Development Pipeline

Selection of advanced projects (small molecules, biologics, vaccines, cell and gene therapies)

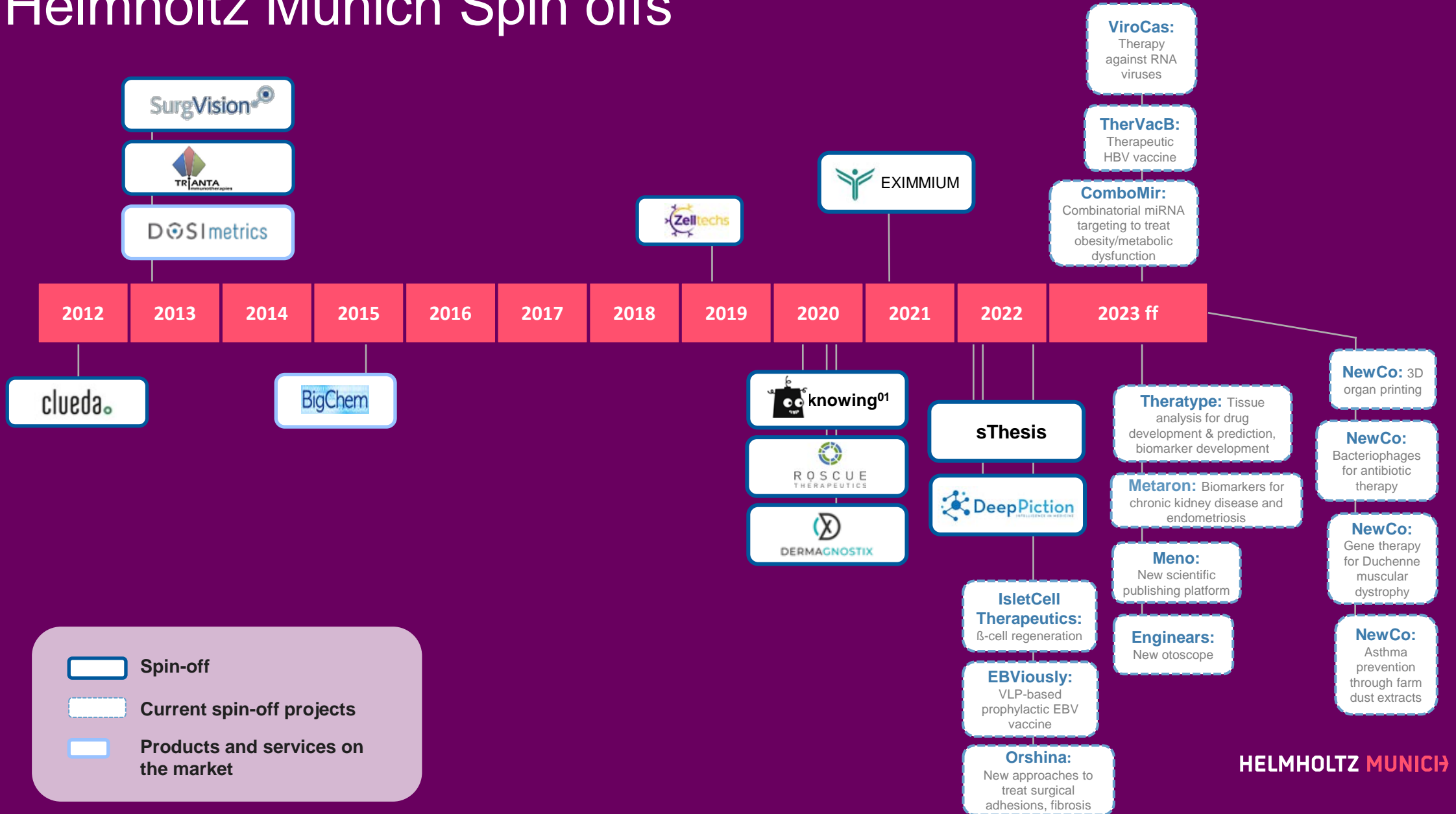
Drug	Lead indication	Hit-to-Lead	Lead optimization	Pre-clinical development	Clinical PoC	Partner	
<b>LENTIBOOST™ Gene therapy</b>	β-thalassemia	[Progress bar]				<b>SIRION BIOTECH</b>   Out-licensed	
<b>Insulin (oral)</b>	Type 1 diabetes prevention	[Progress bar]				<b>HELMMSLEY</b>   <b>GPPAD</b>	
<b>Dual and triple peptide agonists</b>	Type 2 diabetes and obesity	[Progress bar]				Pharmaceutical industry	
<b>DC-vaccine</b>	Cancer (leukemia)	[Progress bar]				<b>medigene</b>   <b>TRIANTA</b>   Out-licensed	
<b>Adoptive T-cell therapy</b>	HBV, HBV-induced HCC	[Progress bar]				<b>SCG</b>   Out-licensed	
<b>MALT-1 inhibitor</b>	Cancer (solid tumors)	[Progress bar]				<b>Monoperos</b>   Out-licensed	
<b>CAXII-mAb</b>	Glioblastoma multiforme	[Progress bar]				Collaboration & Option agreement   <b>itm</b>	
<b>Ferroptosis inhibitor</b>	Organ transplantation	[Progress bar]				Spin-off founded   <b>ROSCUE</b>	
<b>MVA-based vaccine</b>	HBV	[Progress bar]				Spin-off project TherVacB   <b>Fraunhofer</b>   <b>DZIF</b>   <b>UKF</b>	
<b>VLP vaccine</b>	EBV	[Progress bar]				Spin-off project   <b>DZIF</b>	
<b>Methanobactin</b>	Wilson disease	[Progress bar]				Out-licensed   <b>ARBORMED</b>	
<b>CAR-T cell therapy</b>	EBV	[Progress bar]				Spin-off founded   <b>Zelltechs</b>   <b>M-H</b>	
<b>TRAF6/Ubc13 inhibitor</b>	Autoimmune diseases (RA)	[Progress bar]				Under evaluation by Big Pharma & VCs	
<b>Ferroptosis inhibitor</b>	CNS disorders (ALS, HD, AD)	[Progress bar]				<b>ROSCUE</b>   Spin-off founded	
<b>Barn dust</b>	Asthma	[Progress bar]				<b>LMU</b>   <b>FA</b> Spin-off project	
<b>Anti-IGFR like 1 mAbs</b>	Diabetes	[Progress bar]				Spin-off in foundation	
<b>Bi/Tri-specific Abs</b>	HBV	[Progress bar]				<b>SCG</b>   Out-licensed	
<b>PEX14/PEX5 inhibitor</b>	Chagas disease	[Progress bar]				<b>RUB</b>   Collaboration   <b>Federal Ministry of Education and Research</b>	
<b>T-cell therapy</b>	EBV, CMV	[Progress bar]				<b>Bioflyngen</b>   Out-licensed	
<b>miRNA-based therapy</b>	Metabolic disorders	[Progress bar]				Spin-off project   <b>Federal Ministry of Education and Research</b>	
<b>Early-stage projects (HTS, FBDD, in silico screening)</b>		<b>&gt; 30</b>					Including external collaborations

# Diagnostics Pipeline

Selection of advanced projects (biomarkers, medical devices, imaging techniques)

Asset	Lead Indication	Discovery	Validation	Product development	Clinical development	Partner
<b>MSOT Acuity (Multispectral optoacoustic tomography)</b>	Various indications	[Progress bar]				Certified for clinical research 
<b>Risk score</b>	Type 1 diabetes prevention	[Progress bar]				Patient recruitment
<b>Fluorescence imaging-guided surgery</b>	Cancer	[Progress bar]				
<b>Raster-scanning optoacoustic mesoscopy</b>	Skin cancers, vascular diseases	[Progress bar]				
<b>PsorEx Lab disk</b>	Dermatology (psoriasis vs. eczema)	[Progress bar]				Spin-off founded
<b>Risk score</b>	Bronchopulmonary Dysplasia	[Progress bar]				Comprehensive Pneumology Center   Collaboration
<b>Otoscope</b>	Acute otitis	[Progress bar]				Spin-off project Engineers
<b>Gastropredict</b>	Gastric cancer	[Progress bar]				Spin-off in foundation
<b>Transparency imaging</b>	Cancer	[Progress bar]				Spin-off founded
<b>Metabolic biomarker</b>	Endometriosis	[Progress bar]				Spin-off project
<b>Optoacoustic sensing</b>	Diabetic neuropathy	[Progress bar]				Spin-off founded
<b>Early-stage projects</b>		>10				Including external collaborations

# Helmholtz Munich Spin offs



# Agile Translation - Public Private Partnership Cluster

## Existing



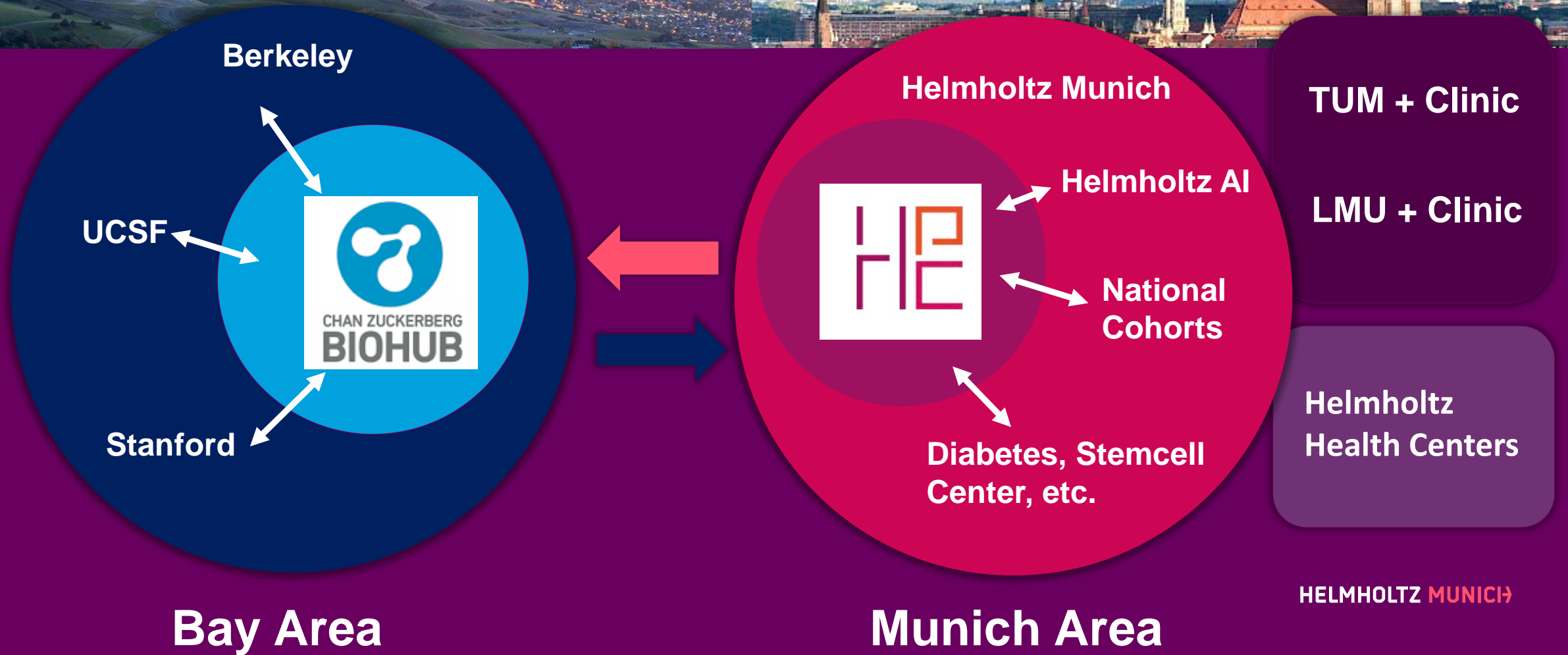
## In negotiation



HELMHOLTZ MUNICH

# Bridging with New Chan Zuckerberg HUB

## Connecting San Francisco Bay & Munich Science Communities



# Success Story: LentiBOOST™

## Joint Development of Helmholtz Munich and Sirion Biotech (Martinsried, Munich)

(Dr. Natasa Anastasov, ISB; technology has been developed with and licensed to Sirion Biotech in 2013)

### LentiBOOST™

- Transduction enhancer for preclinical and clinical application of lentiviral vectors
- Sirion in charge of the commercial exploitation of the patented technology



license to bluebird bio Inc. for development of Zynteglo



- First gene therapy for transfusion-dependent beta thalassemia
- EU conditional approval in June 2019: Zynteglo™ (withdrawn by bluebird bio in March 2022 due to commercial reasons)
- **FDA approval on August 17, 2022\*** (granted to bluebird bio, Inc.)



\* FDA approves first cell-based gene therapy to treat adult and pediatric patients with beta-thalassemia who require regular blood transfusions

# Diabetes Study Center: A World without 1

Several  
clinical  
studies



## Vaccination for Diabetes Type 1 Prevention

Oral Insulin Therapy (POInT)  
+ Probiotic for strengthening the  
intestinal immune system (SINT1a)



Anette Ziegler

	POInT (2018 -2026)	~ 52 Mio € Helmsley Trust 6 Mio € Freistaat Bayern und BMBF
	GPPAD Coordination Center Continuation	~ 5,4 Mio € Helmsley Trust
2021: (1) GPPAD-SINT1A-Studie (2) Neugeborenen-Screening auf Typ-1-Diabetes-Risiko		~ 25 Mio € Helmsley Trust
<b>&gt; 80 Mio €</b>		



**DZD**

Deutsches Zentrum  
für Diabetesforschung

HELMHOLTZ MUNICH

# Therapeutic Hepatitis B Vaccination

Welches Bild?



Ulrike Protzer

## Therapeutic hepatitis B vaccination

- GMP production completed
- Phase 1a clinical trial starts in Q3/2022
- Phase 1b/2a is planned for mid-2023



Funding by Helmholtz PoC Initiative, DZIF, BMBF and EU (Horizon 2020)

Cooperation with TUM and DZIF

## Pandemic research: Construction of BSL3/BSL2 laboratories

**PerForM** – Enabling pandemic response and prevention through research infrastructure in the greater Munich area





# Pneumology Center: New Asthma Therapy

Clinical Study and company foundation on the way



Early childhood contact with **cow** stalls and the consumption of untreated cow's milk

Reduction of asthma disease risk by more than **70 percent**

**Protection against asthma by means of barn dust extract:**



Erika von Mutius

Isolation of protective active ingredients from the extract

**8 candidates identified**



Farm dust protects against asthma

Lasting effects in childhood

Erika von Mutius,  
Institut für Asthma-  
und Allergieprävention

HELMHOLTZ  
MUNICH

**Comprehensive Pneumology Center (CPC)**  
*Translational research on chronic lung disease*

HELMHOLTZ  
MUNICH

LMU  
KLINIKUM  
DER UNIVERSITÄT MÜNCHEN

LMU  
LUDWIG-  
MAXIMILIANS-  
UNIVERSITÄT  
MÜNCHEN

ASKLEPIOS  
Gemeinsam für Gesundheit

DZL  
Deutsches Zentrum für  
Lungenforschung

Link to:

Haunersche Kinderspital (LMU)

HELMHOLTZ MUNICH

# Dermagnostix: Diagnosis of inflammatory skin diseases



Stefanie Eyerich



Fabian Theis

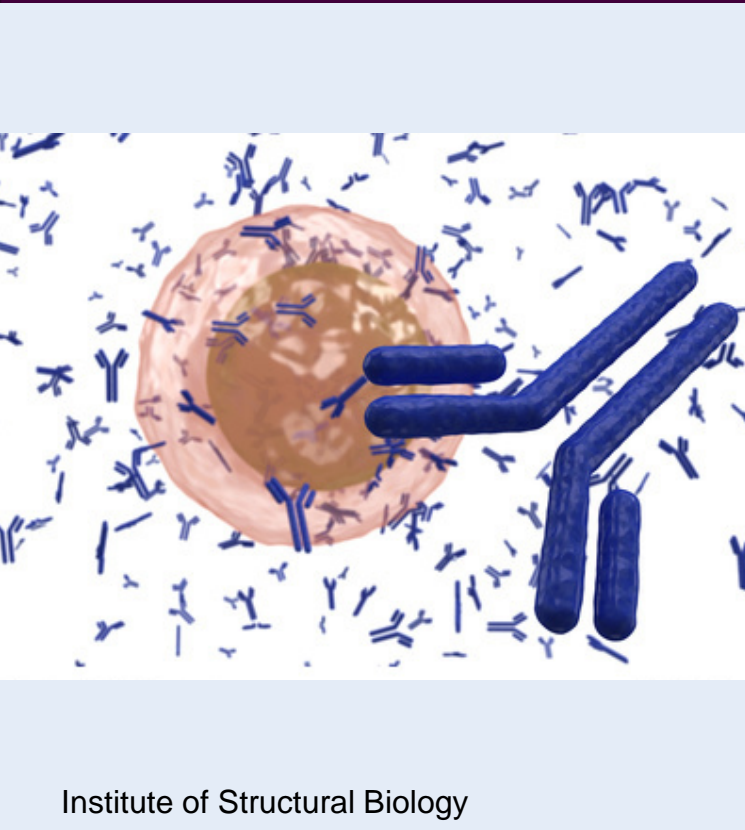
**Groundbreaking translational research meets cutting-edge technology**

Point of care products for differential diagnosis of skin diseases



# Radioimmunotherapy against glioblastoma

Clinical Study  
2022



Institute of Structural Biology

**Vesicle-based platform technology for the development of highly functional antibodies against new targets**

## Glioblastoma therapy: 6A10 antibody

→ coupled with Lutetium-177, the Fab-fragment of the antibody specifically binds to tumor cells and damages them



Reinhard Zeidler



**January 2022:** Strategic Cooperation between Isotope Technologies Munich SE (ITM) and Helmholtz Munich

**August 2022:** ITM has exercised option for exclusive license to the patent portfolio for the 6A10 antibody

→ The planned multicenter investigator-initiated trial will be led by the Westfälische Wilhelms-Universität Münster (Prof. Stummer); recruiting of patients has started, first patient-in expected until end of 2022

HELMHOLTZ MUNICH

# Enhancing Translation: Strategic Transformation

Excellence in Research

Establish more translational & entrepreneurial culture

Implement AI & engineering technologies as accelerators across disciplines

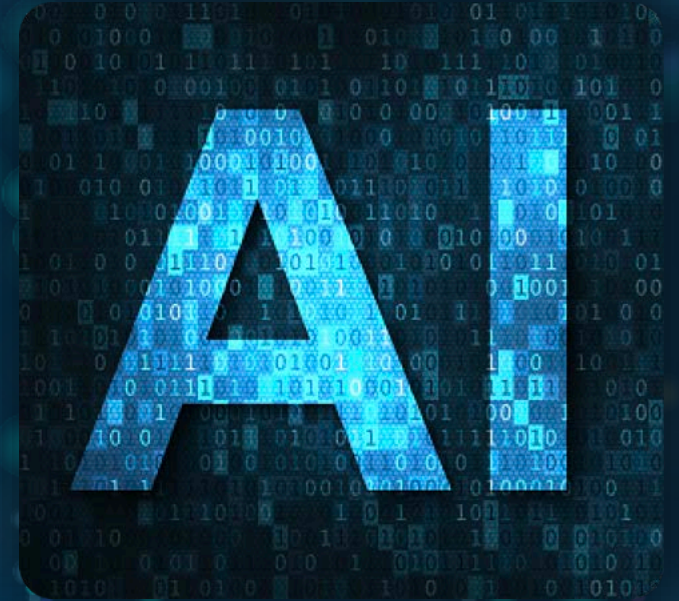
# Impact of AI in biomedicine

scaling of manual tasks

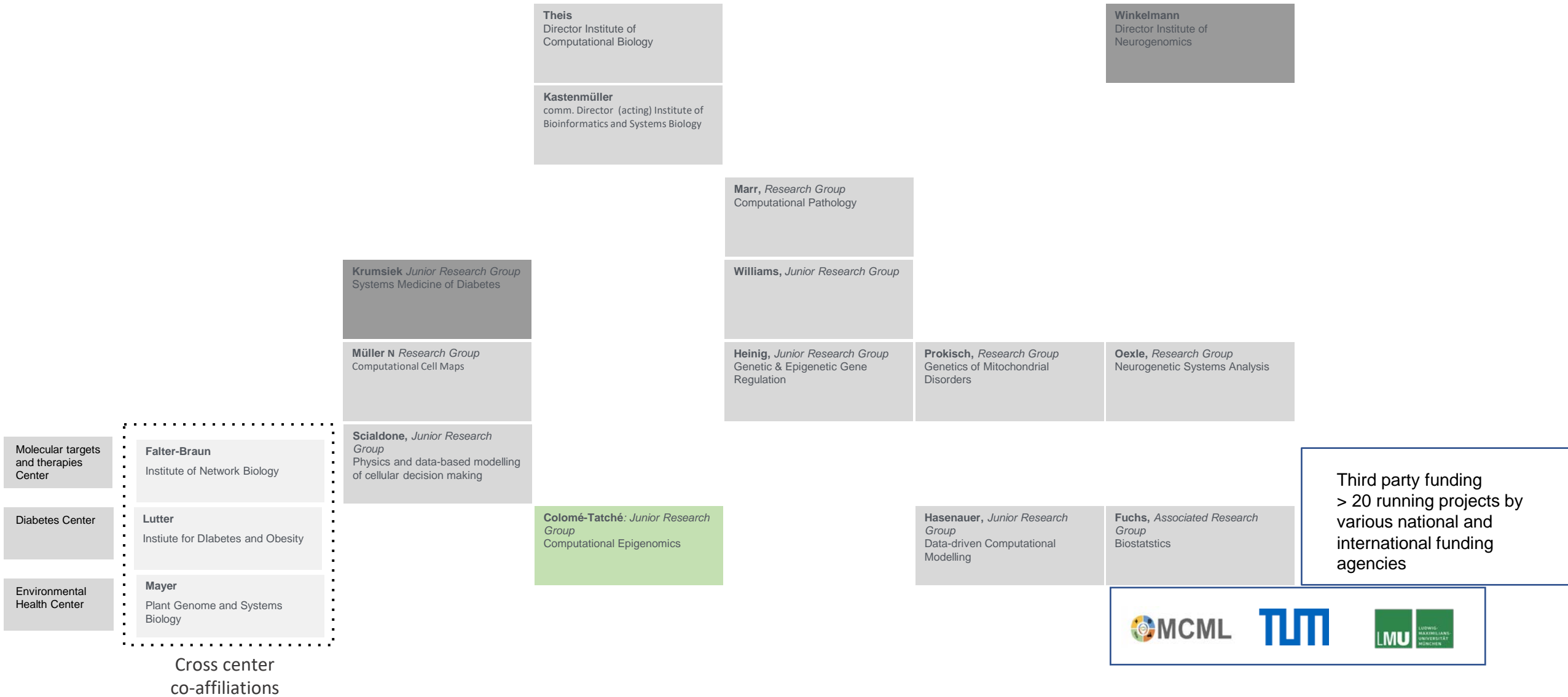
*eg. from pathology, radiomics etc.*

finding unexpected patterns

*data integration eg. omics + clinical phenotypes*



# Computation @ Helmholtz Munich 2017



High Tech Agenda Bavaria Funding

Helmholtz Association Funding

# Computational Health Center 2022

## AIH Satellites

Stem Cell Center	<b>Cell Programming &amp; Repair</b> Torres-Padilla
Environmental Health Center	<b>Environmental Health</b> Hölscher (2022)
Bioengineering Center	<b>Bioengineering &amp; Digital Health</b> Ntziachristos
Diabetes Center	<b>Metabolic Health</b> Lickert
Molecular targets and therapies Center	<b>Molecular Targets &amp; Therapies</b> Falter-Braun
Pioneer Campus	<b>Na Cai</b> Translational Genetics Group, Pioneer Campus
Molecular targets and therapies Center	<b>Falter-Braun</b> Institute of Network Biology
Diabetes Center	<b>Lutter</b> Institute for Diabetes and Obesity
Environmental Health Center	<b>Mayer</b> Plant Genome and Systems Biology

<b>Marr</b> Director Institute of AI for Health	<b>Theis, Department Head</b> Director Institute of Computational Biology	<b>Zeggini, Deputy Head</b> Director Institute of Translational Genomics	<b>Schnabel</b> Director Institute of Machine Learning in Biomedical Imaging	<b>Winkelmann</b> Director Institute of Neurogenomics
<b>NN</b> Director Institute of AI for Health	<b>NN</b> Director Institute of AI for Health	<b>NN</b> Director Institute of AI for Drug Discovery	<b>NN</b> Institute of Algorithmic Machine Learning & Explainable AI	<b>NN</b> Institute of Data Integration and Analysis
<b>Rieck, Junior Research &amp; Pioneer Group</b>	<b>Marsico, Research Group</b> Computational RNA Biology	<b>Kim-Hellmuth, Junior Research Group</b>	<b>Kilbertus, Junior Research Group</b> Reliable machine learning	<b>Peng, Junior Research Group</b> AI for microscopy and computational pathology
<b>Casale, Junior Research &amp; Pioneer Group</b>	<b>Kastenmüller, Research Group</b> System Metabolomics	<b>Williams, Junior Research Group</b>	<b>Albarqouni, Junior Research Group</b> Deep federated learning in healthcare	<b>NN, Junior Research Group</b>
<b>NN, Junior Research &amp; Pioneer Group</b>	<b>Müller, Research Group</b> Computational Statistics and Data Science for Biological Systems	<b>Heinig, Junior Research Group</b> Genetic & Epigenetic Gene Regulation	<b>Prokisch, Research Group</b> Genetics of Mitochondrial Disorders	<b>Oexle, Research Group</b> Neurogenetic Systems Analysis
<b>Scialdone, Junior Research Group</b> Physics and data-based modelling of cellular decision making	<b>Schubert, Junior Research Group</b> Translational Immunoinformatics	<b>Menden, Junior Research Group</b> Computational Biomedicine	<b>NN, Junior Research Group</b>	<b>Kotlarz, Junior Research Group</b>
<b>Ahmidi, Associated Research Group</b> AI for Patient Diagnosis and Treatment	<b>Colomé-Tatché, Associated Research Group</b> Computational Epigenomics	<b>Gagneur, Associated Research Group</b> Computational Molecular Medicine	<b>Hasenauer, Associated Research Group</b> Data-driven Computational Modelling	<b>Fuchs, Associated Research Group</b> Biostatistics
<b>Knauer-Arloth, Associated Junior Research Group</b> Translational Research in Psychiatry	<b>MUDS</b>   MUNICH SCHOOL FOR DATA SCIENCE HELMHOLTZ   TUM   LMU		<b>e l l i s</b> European Laboratory for Learning and Intelligent Systems	<b>MCML</b>   <b>TUM</b>   <b>LMU</b> LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

## Helmholtz Association

**HELMHOLTZ AI**

Central unit for platform coordination & local unit for research area HEALTH

Health	Energy
Aeronautics, Space Transport	Matter
Environment	Information

**Piraud**  
AI consultant team for Research Area Health

**HAICORE** | HELMHOLTZ AI COMPUTING RESOURCES  
**HIDA** | HELMHOLTZ Information & Data Science Academy  
**HIFIS** | HELMHOLTZ FEDERATED SERVICES  
**HELMHOLTZ INTERNATIONAL LAB**

Industry collaborations  
> 15 projects funded by industry partners

Third party funding  
> 40 running projects by various national and international funding agencies

Cross center co-affiliations



High Tech Agenda Bavaria Funding

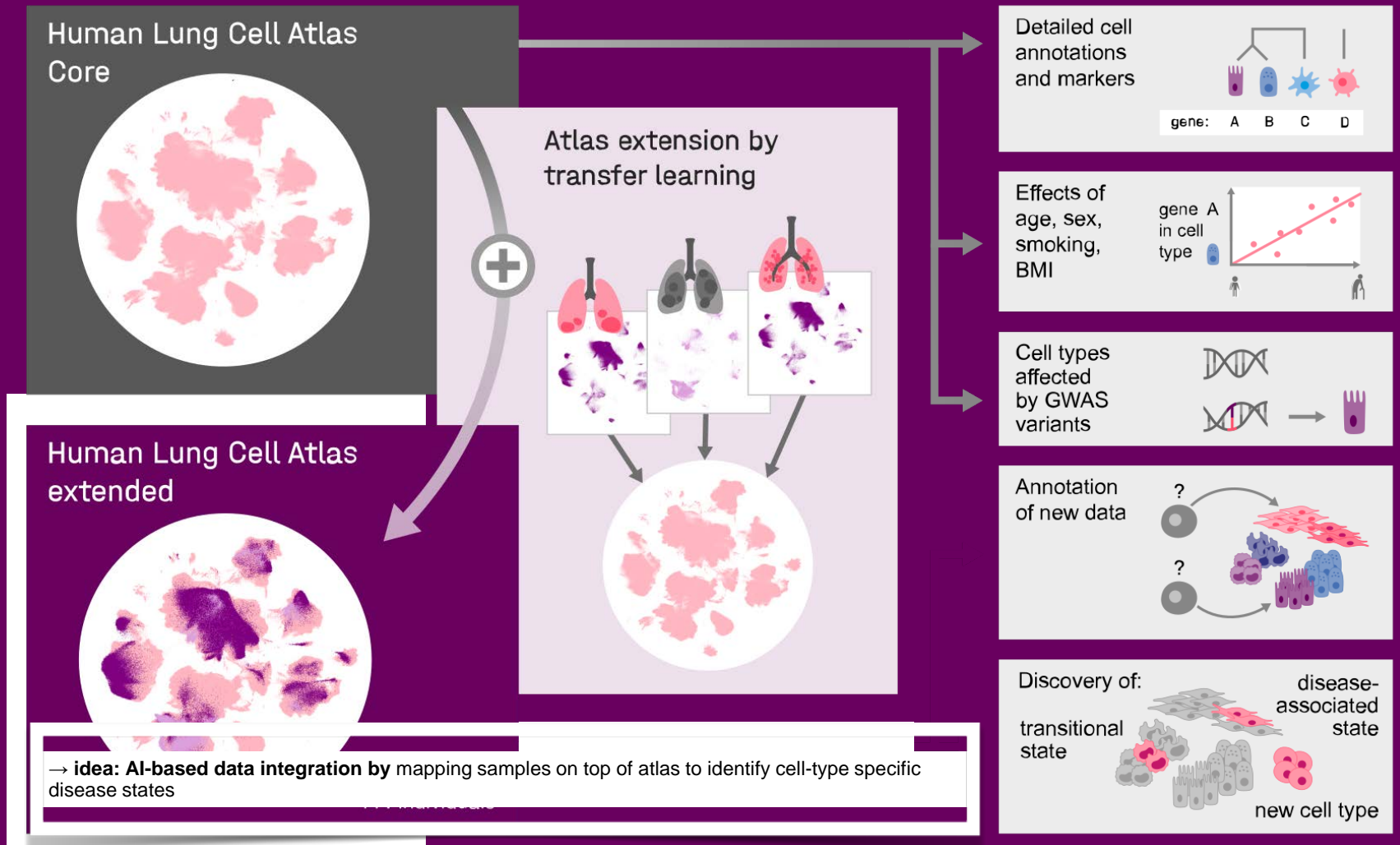
Helmholtz Association Funding

AIH = AI for Health

# An integrated human lung cell atlas



Lisa Sikkema Malte Lücken

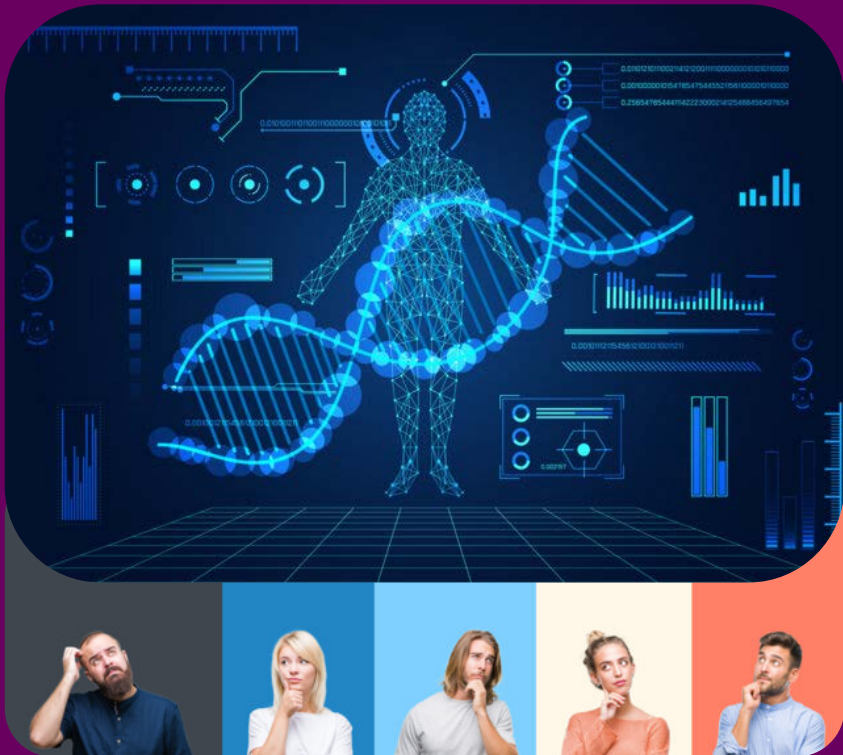


HELMHOLTZ MUNICH



# Artificial Intelligence in Medicine

## – Need for active communication to society



Source: Adobe Stock

**New BADW focus group „AI in Medicine“** funded by Bavarian Academy of Sciences and Humanities (BADW)

Education about AI

Raise society's awareness of the need to handle health data sensibly and responsibly

Raise society's awareness of the use and integration of AI in medicine

### Planned Activities

- Development of an **AI content hub** on the Helmholtz Munich website
- High-profile **events**
- Link to the **health forum of the Süddeutsche Newspaper**.
- **Discussion events** between humanities and life sciences
- Active offering of **qualification measures for young scientists**

# Enhancing Translation: Strategic Transformation

Excellence in Research

Establish more translational & entrepreneurial culture

Implement AI & engineering technologies as accelerators across disciplines

## BIOLOGY

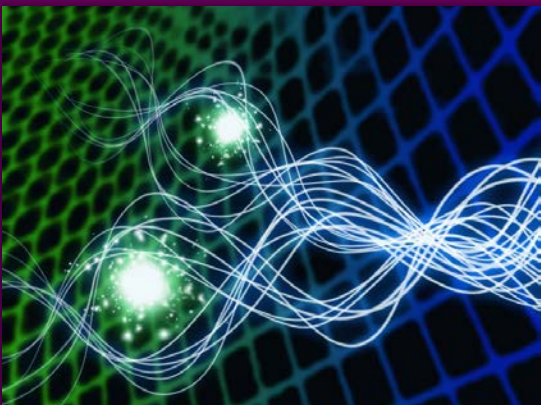
Discovery - Knowledge



## TRANSLATION

## PHYSICS

Discovery - Knowledge



## ENGINEERING

Problem Solving



+

=

Solutions in  
Medicine



Solutions in  
Mobility



HELMHOLTZ MUNICH

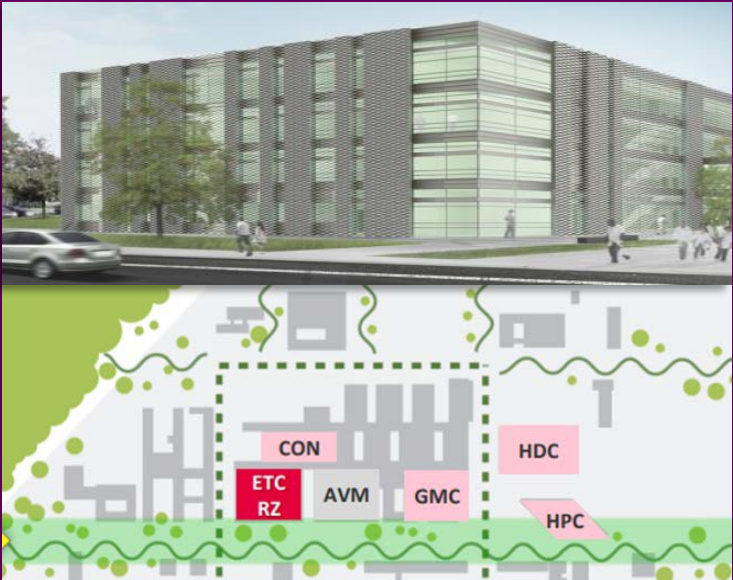
# Bioengineering & Data Center

## BIOLOGY

Discovery - Knowledge



+



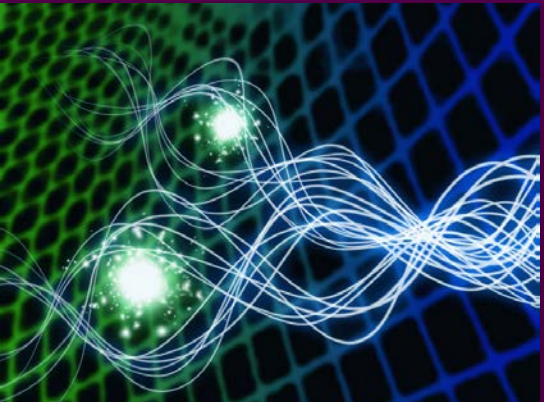
=

Solutions in  
Medicine



## PHYSICS

Discovery - Knowledge



+



=

Solutions in  
Mobility

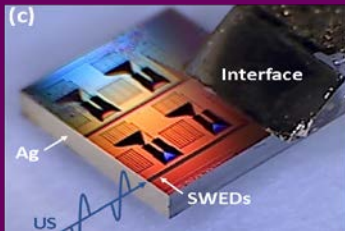
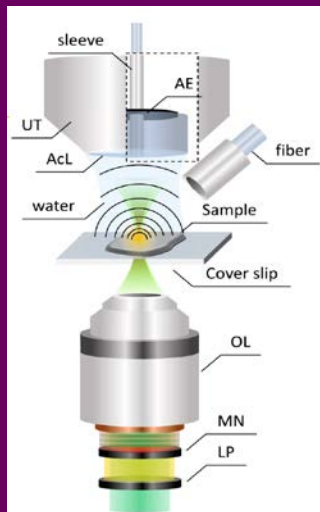


# Innovative Imaging Methods (Vasilis Ntziachristos, IBMI)

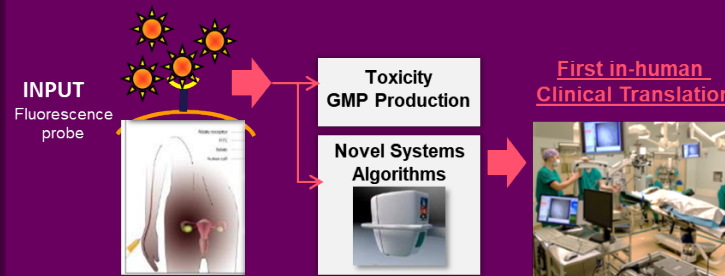
## New class of microscopy

### Optical and Optoacoustic hybrid microscopy

Label-free molecular imaging



## Fluorescence Molecular Imaging – Shaping intraoperative intervention



Spin-off



## Optoacoustic Imaging



Spin-off



# Enhancing Translation: Strategic Transformation

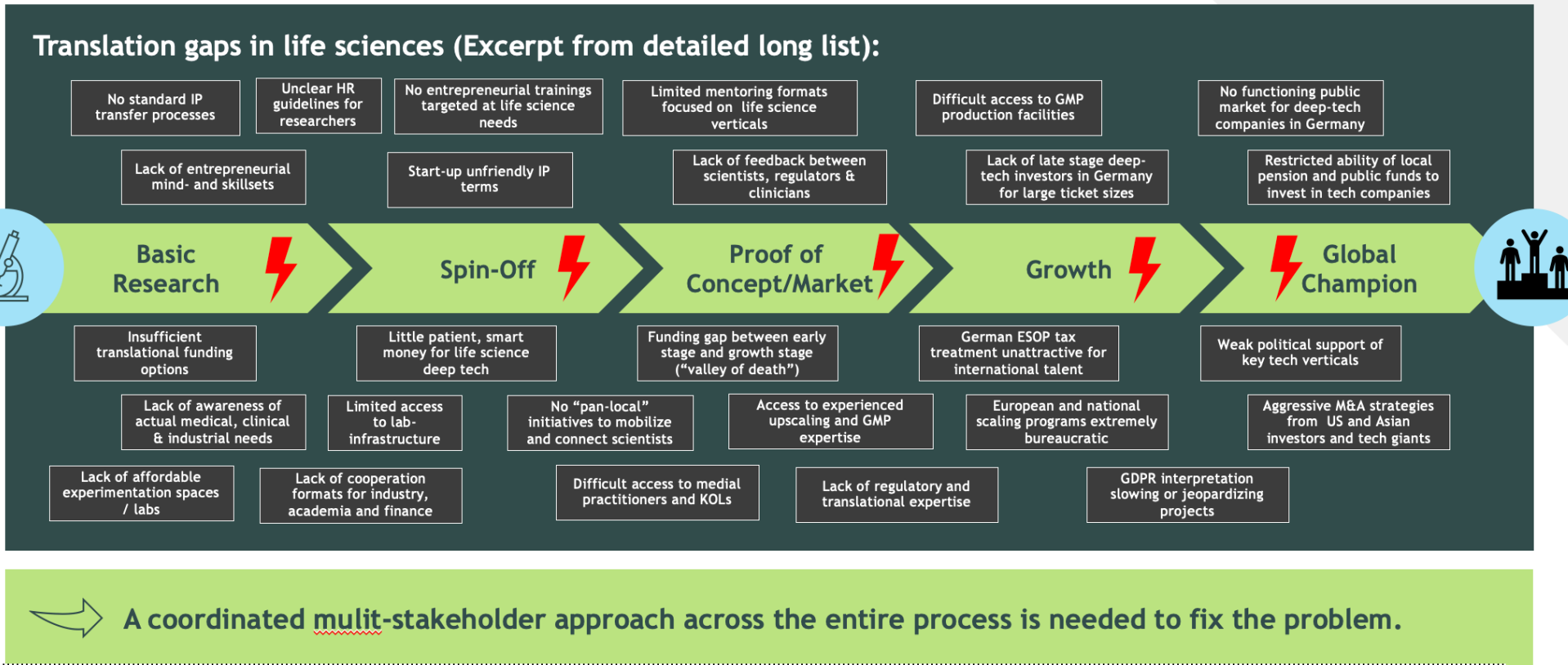
Excellence in Research

Establish more translational & entrepreneurial culture

Implement AI & engineering technologies as accelerators across disciplines

Identify and remove bottlenecks impeding entrepreneurship

# Analysis of the life sciences R2C process: Multiple specific impediments for company creation



Marco Janezic  
Blue Ribbon Partners  
Munich

# Center-wide entrepreneurial dynamics

## Start-Up Accelerator



## Start-Up Accelerator

### Structured Company-Building Program

(4 - 6 months)

- Scientists with spin-off project
- joint modules & individual coaching
- Synergies and efficiency through cooperation with:
  - Life Science Factory in Göttingen (sponsored by Sartorius).
  - AHEAD, the Company Building Program of Fraunhofer
- Start: September 2022



# Helmholtz Pioneer Campus

## Life Science Factory Incubator Sartorius



Joachim Kreuzburg



## Start-Up Incubator

### Start-up-Incubator

(in cooperation with **Sartorius & Life Science Factory, Göttingen**)

- Start-ups directly after foundation
- Powered by Sartorius AG
- Rights remain with Helmholtz Munich
- Start: 2023 at Helmholtz Pioneer Campus



# Training of Biotech - Start Up Leaders

## Life Science Executive Academy (LISEAD)

LISEAD



The Life Science Entrepreneurship Academy (LISEAD) is a highly selective academy which equips entrepreneurially-minded world-class scientists and business talents with the cross-functional skills and experiences needed to create, build, manage and scale high-impact life-science companies.

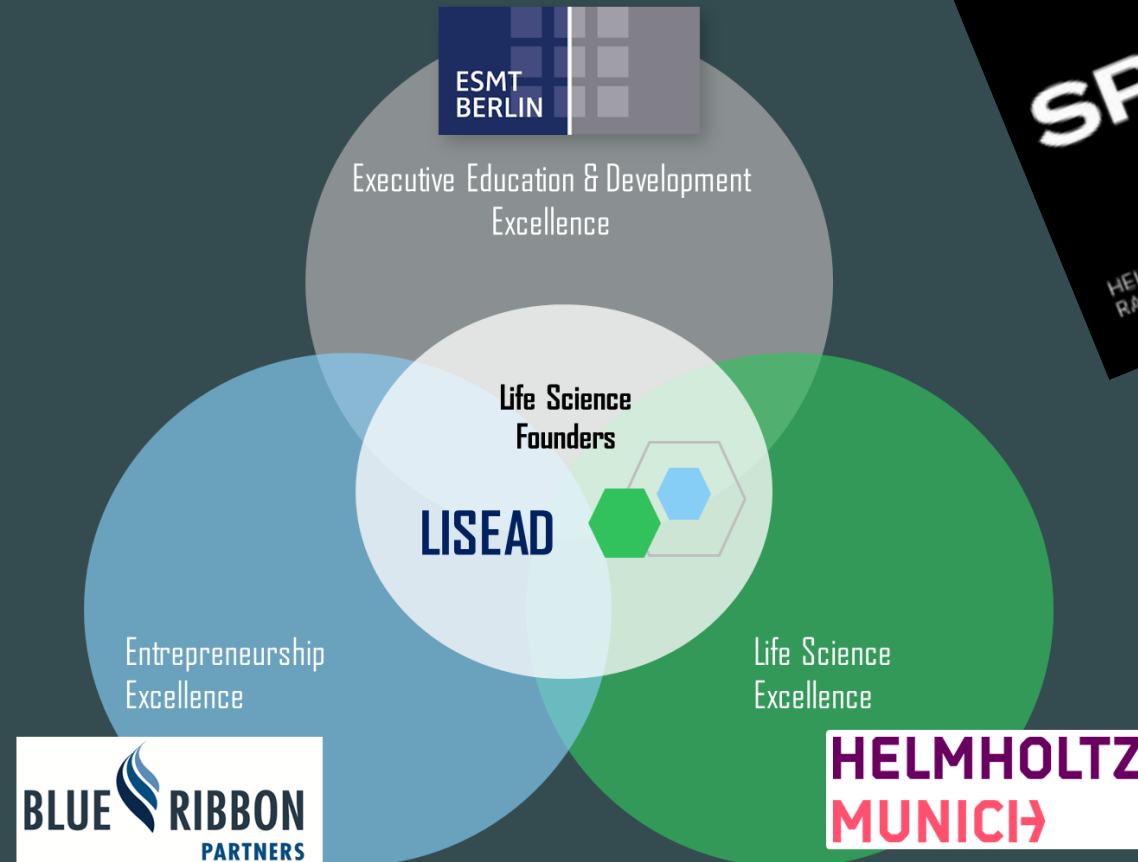
**Founded:** 2021

**Locations:** Munich, Berlin

**Founding Partners:**

Blue Ribbon Partners, ESMT Berlin, Helmholtz Munich (HMGU)

**Other:** Charité, Agentur für Spunginnovation



Funded by:  
**SPRIN-D**

HEIMAT FÜR  
RADIKALE NEUDENKER:INNEN

# Bits & Pretzels HealthTech Conference



Founders, investors, healthcare providers, MedTech executives, insurers, TechGiants, and policymakers discuss about future healthcare.



# Bioengineering Conference

Latest impactful innovations in bioengineering and artificial intelligence, with a focus on technologies that promise tangible solutions for urgent medical needs.



# Growing synergies with German University Medicine

Joint operations with 7 German University Hospitals

University Hospital Technical University  
**Munich** (Klinikum Rechts der Isar)

University Hospital Carl Gustav Carus  
**Dresden**

University of **Leipzig** Medical Center

**Augsburg** University Medicine

**HELMHOLTZ**  
**MUNICH** →

University Hospital of **Munich** Ludwig  
Maximilian University

Hospital of the University of  
**Tübingen**

University Hospital of **Gießen and**  
**Marburg**

HELMHOLTZ **MUNICH** →

# Link to German Centers for Health Research



Neurodegenerative Diseases



Lung Research



**DZD**  
Deutsches Zentrum  
für Diabetesforschung

Diabetes Research



**DZHK**  
DEUTSCHES ZENTRUM FÜR  
HERZ-KREISLAUF-FORSCHUNG E.V.

Cardiovascular Research



Infection Research

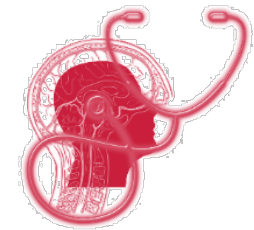


Cancer Research



Child and Adolescent Health

New in  
2022



Mental health

New in  
2022

Headquartered at  
Helmholtz Munich

Helmholtz Munich is the only research center actively  
involved in all 8 German Centers

HELMHOLTZ MUNICH

# Member of the Helmholtz Association

**HELMHOLTZ** RESEARCH FOR GRAND CHALLENGES



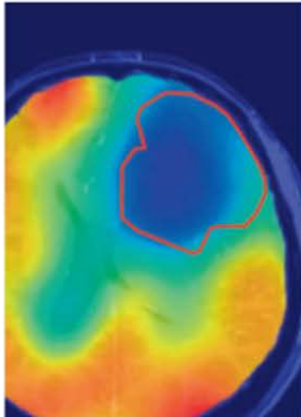
- + largest European research organisation
- + 18 scientific-technical and biological-medical research centers
- + 6 research areas
- + annual budget of > €5 billion
- ~ 43.000 employees



**HELMHOLTZ MUNICH**

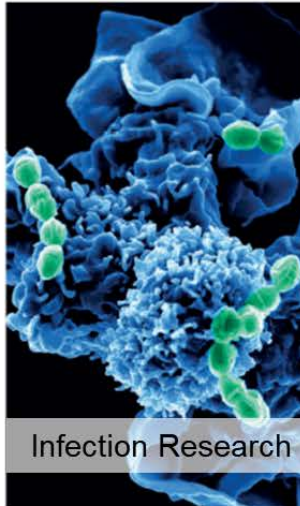
# Helmholtz Health

**dkfz.** GERMAN  
CANCER RESEARCH CENTER  
IN THE HELMHOLTZ ASSOCIATION  
**HZDR**  
HELMHOLTZ ZENTRUM  
DRESDEN ROSENDRIF



Cancer Research

**HZI HELMHOLTZ**  
Centre for Infection Research



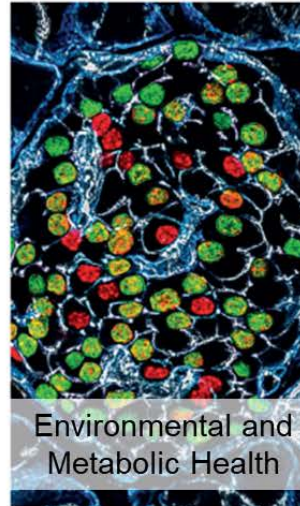
Infection Research

**DZNE**  
German Center for  
Neurodegenerative Diseases  
within the Helmholtz Association



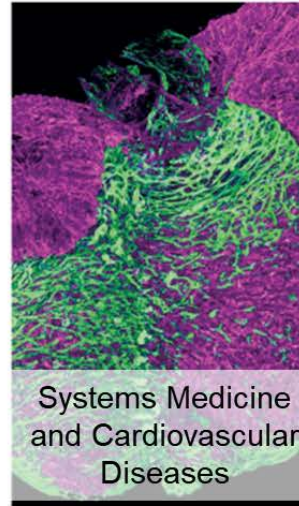
Neurodegenerative  
Diseases

**HELMHOLTZ  
MUNICH**



Environmental and  
Metabolic Health

**MDC** MAX DELBRÜCK CENTER  
FOR MOLECULAR MEDICINE  
IN THE HELMHOLTZ ASSOCIATION



Systems Medicine  
and Cardiovascular  
Diseases

> 9000 Scientists & Staff

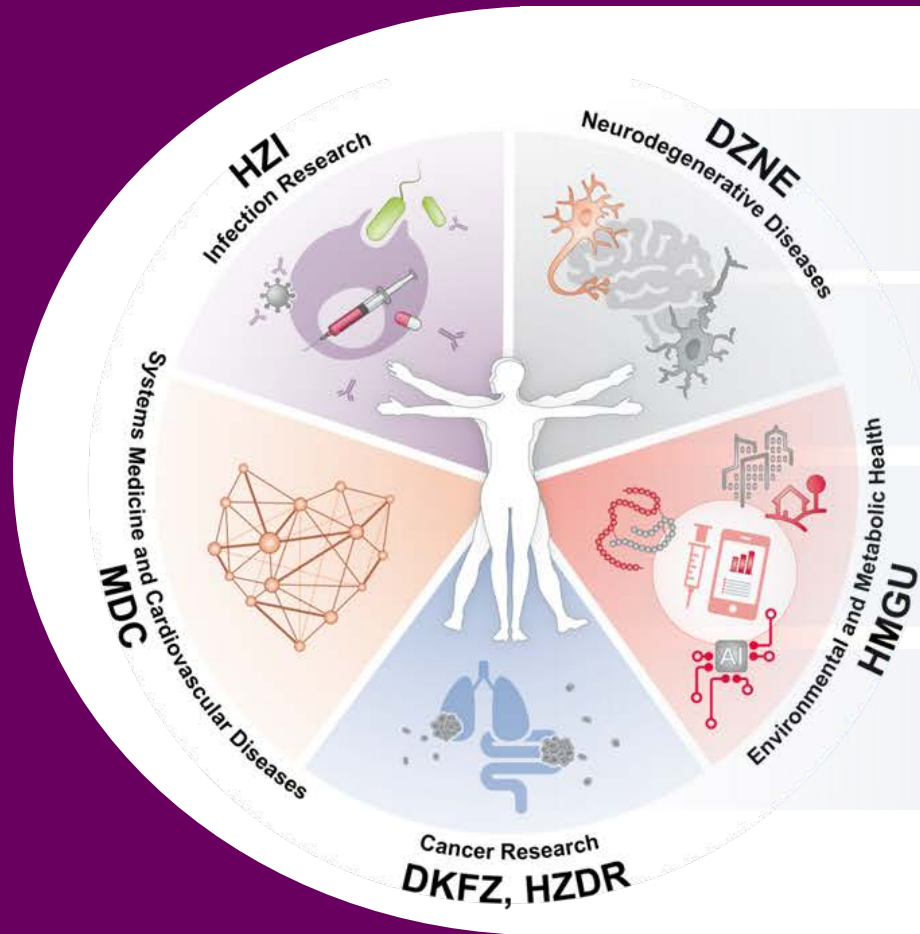
> 600 Research Units

~ 850 Mio €/year total budget

> 600 patent families

> 120 ERC Grants

# Mission Helmholtz Health



Cutting-edge basic and translational research in five programs

Critical mass and interdisciplinary cooperation

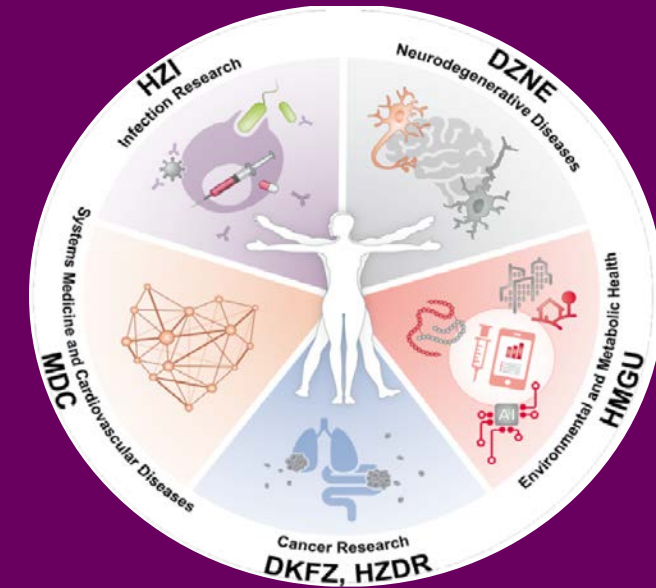
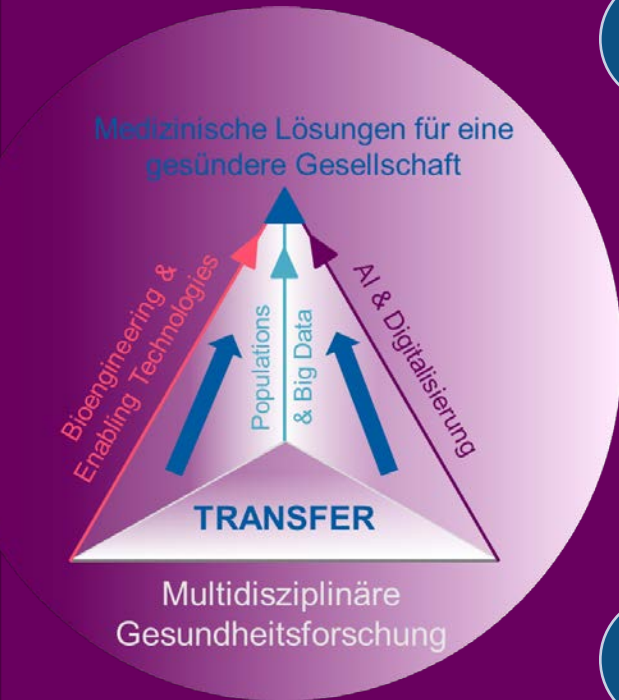
National and international partnerships and networks

Impact for health system, society and economy



# Integration with Helmholtz Health

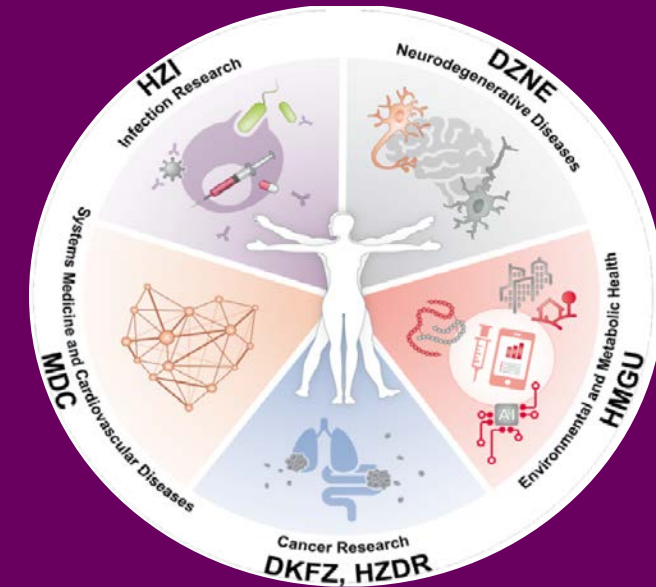
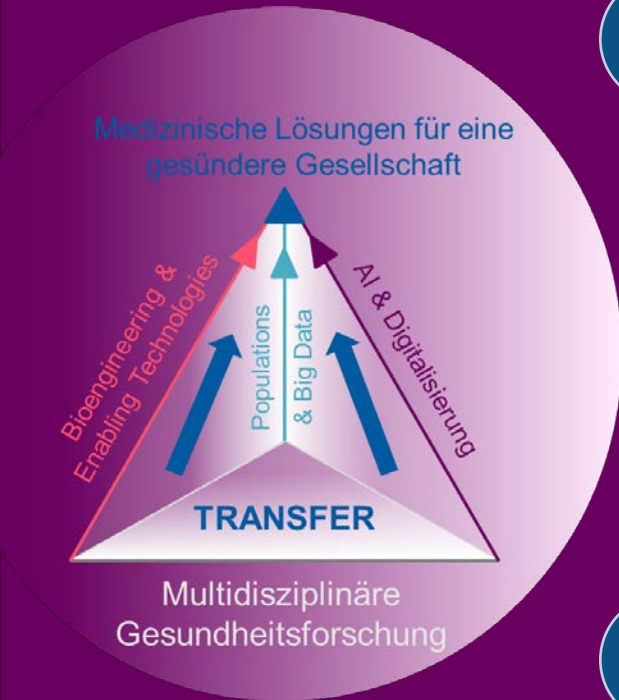
- 1 Integration of innovation areas
- 2 Educating next generation scientists
- 3 New financing options
- 4 \_Increased transfer of knowledge
- 5 Innovation eco-system with industry
- 6 Pushing digitization
- 7 Potenzial leveraging potential of disease prevention



# Integration with Helmholtz Health

- 1 Integration of innovation areas
- 2 Educating next generation scientists
- 3 New financing options
- 4 \_Increased transfer of knowledge
- 5 Innovation eco-system with industry
- 6 Pushing digitization
- 7 Potenzial leveraging potential of disease prevention

Online seit Februar 2022



# Helmholtz Health Hub H3 - A Helmholtz Transfer Academy

➔ Goal: Bundling & coordination of technology transfer initiatives of all 6 Helmholtz Health centers → focus on fostering spin offs



➔ In cooperation with external partners:



➔ Pre-approved funding by Helmholtz Association for 3 years, start in January 2023

# Affiliation of innovative minds and entrepreneurs

## Helmholtz Institute for Translational Oncology Mainz (HI-TRON Mainz)



**Özlem Türeci** appointed Professor of Personalized Immunotherapy at HI-TRON Mainz (December 2021).

→ promoting the development and preclinical study of innovative immunotherapy concepts.



**Uğur Şahin:** New Department for mRNA-based cancer immunotherapy at HI-TRON Mainz (February 2022)



Both are members of the HI-TRON Scientific Management Board



# Discovering Future Health



Thank you.