

BRAIN Biotech AG

Creating a #BiobasedFuture

Capital Markets Day 2023

Zwingenberg, February 27, 2023

WE SUPPORT



Since 2021 we have been committed to the UN Global Compact corporate responsibility initiative and its principles in the areas of human rights, labor, the environment and anti-corruption.



Beyond Industrial Biotech: Akribion Genomics

Lukas Linnig, Co-CEO & Dr. Dirk Sombroek, Head of Strategic Partnerships

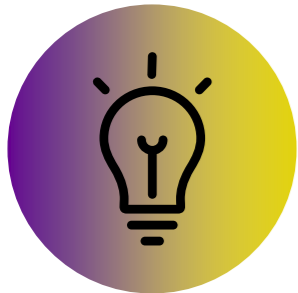
Akribion Genomics – Vision and mission

democratizing access to Genome Editing tools
enabling novel opportunities to edit the living for the better



We have a clear vision:

To become a **leading player in the genome editing landscape...**
... by **enabling others with the tools and technology** (“picks & shovels”)...
... to edit the living for the better



Our mission is twofold: Enable new opportunities and democratize access

- Make new **treatment approaches in oncology and other opportunities** possible by developing **novel technology with unique properties**
- **Democratize access** to advanced CRISPR genome editing technology **with freedom to operate**



We serve and win in a variety of markets:



Therapeutics



Industrial
Biotech



Diagnostics



Agriculture

...we call it *Gediting*

Akribion Genomics – Management Team

from the start with a strong senior management team



Akribion Executive Board

Akribion Senior Management Team

Dr. Michael Krohn
Co-Founder & CEO

Lukas Linnig
Co-Founder & CEO

Dr. Paul Scholz
Head of R&D

Dr. Dirk Sombroek
Head Strat. Partnerships

Dr. Oliver Grünvogel
Chief of Staff

Former Head of R&D at BRAIN Biotech and headed the gene editing program

- PhD in Molecular Biology
- Project Manager and Tech Unit Head at BRAIN
- BRAIN ExCo member

25+ years experience in management and business development

Former BRAIN Biotech CFO and executive board sponsor for Akribion.

- Kellogg Exec. MBA, CFA
- Project manager at Venture capital firm
- Financial Consultant to BRAIN during its IPO

Strong experience in Biotech, Finance, M&A, BD and startup environments

Former scientific head of gene editing program and main inventor of Gediting technology

- PhD in Biology
- PostDoc in at the University of Bochum
- Scientific Project Manager at BRAIN

Strong experience in Gediting technology and R&D program & team management

Former Unit Head BioActives & Performance Biologicals at BRAIN Biotech

- PhD in Biology
- PostDoc at DKFZ Heidelberg in oncology
- Project Manager & Platform Coordinator at BRAIN

Strong experience in Biotech, Oncology, BD and partnerships

Former management consultant supporting the spinoff of Akribion Genomics.

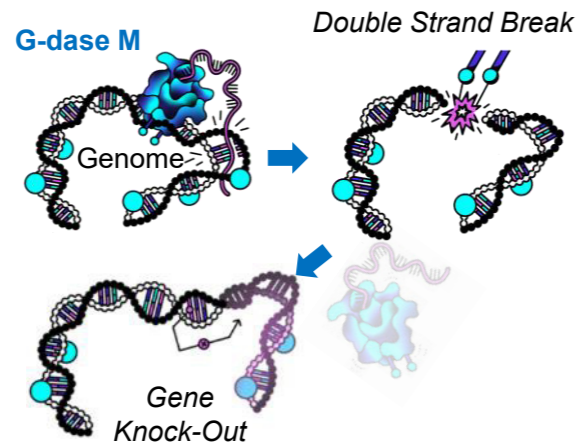
- PhD in Biology
- BCG strategy consultant (Pharma/Banking)
- Chief of Staff for a life science tech start-up

Strong experience in strategy, project management, startups and Pharma BD/Licensing

Akribion Genomics – Unique Technology Platform

two distinct proprietary CRISPR nuclease families that can go beyond the limitations of current genome editing tools

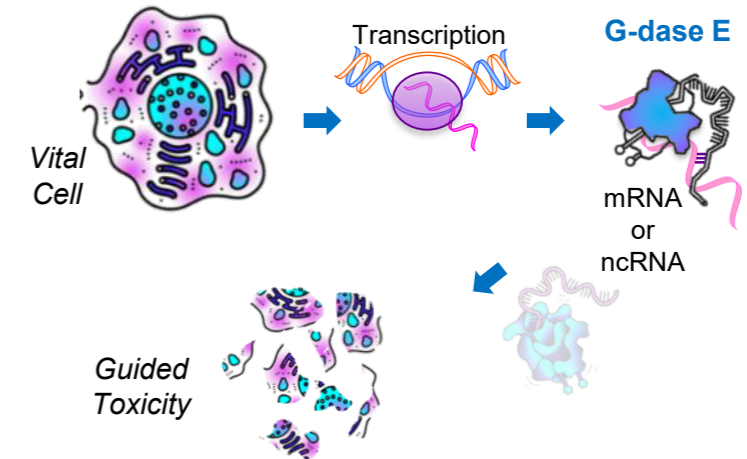
G-dase M



- (Family of) Class II Type V CRISPR enzyme(s) useful for targeted gene editing
- Wildtype sequence from unknown organisms with low sequence similarity to Cpf1 / Cas12a (<40%)
- Genome editing activity in prokaryotes, eukaryotes incl. mammalian/human cells

Positioned as an alternative to existing CRISPR tools with easier access and freedom-to-operate

G-dase E



- Novel Class II CRISPR enzyme with a RNA-dependent 'guided toxicity' Mode of Action
- Hybrid nuclease based on metagenome-derived sequences and in-silico based protein engineering
- Fosters genome editing activity in prokaryotes, eukaryotes incl. mammalian/human cells

Represents a novel therapeutics class and can improve diagnostics and industrial processes











Akribion Genomics – Several USPs

technology advantage in G-dase E, supported by independent IP and simpler access

	Market situation and how Akribion can address this	How Akribion can use this to win
1 Proprietary, independent IP	<ul style="list-style-type: none"> Strong market concentration of IP developers (Cas9, Cpfl) and reach-through of these players puts pressure on potential users Independence from these restrictive players is strongly sought after when discussing with potential customers 	Independence Akribion offers an independent alternative from restrictive players
2 Competitive pricing and licensing	<ul style="list-style-type: none"> The (commercial) access to established and more and more common GE tools from current players is expensive and complex There is a strong need for easier/cheaper access to vanilla CRISPR GE tools to be used in routine applications 	Simpler access Akribion offers simpler & more economical pricing for common applications
3 Synergies with other nucleases	<ul style="list-style-type: none"> Most GE tools are limited by the efficiency of primary editing events G-dase E's mechanism of action allows depletion of non-edited cells This can be used to reduce the number of negative clones and improve overall efficiency of genome editing approaches 	Technology advantage Akribion can increase GE efficiency in new and existing workflows
4 Potential for novel applications	<ul style="list-style-type: none"> G-dase E has a novel and unique MoA with its broad collateral activity and sequence-specific cell depletion This can be applied in a variety of previously unavailable or ineffective applications, most notably in specifically eliminating mutated cells 	Technology advantage Akribion offers unique technology with applications beyond GE Core value driver

Akribion Genomics – Markets and segments

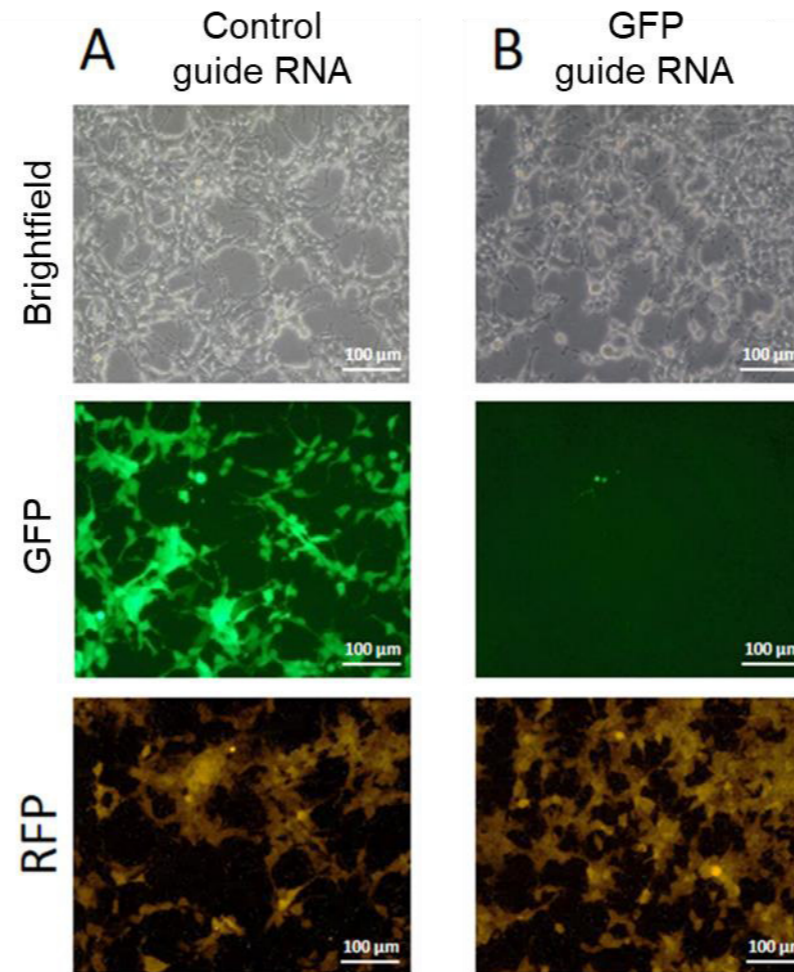
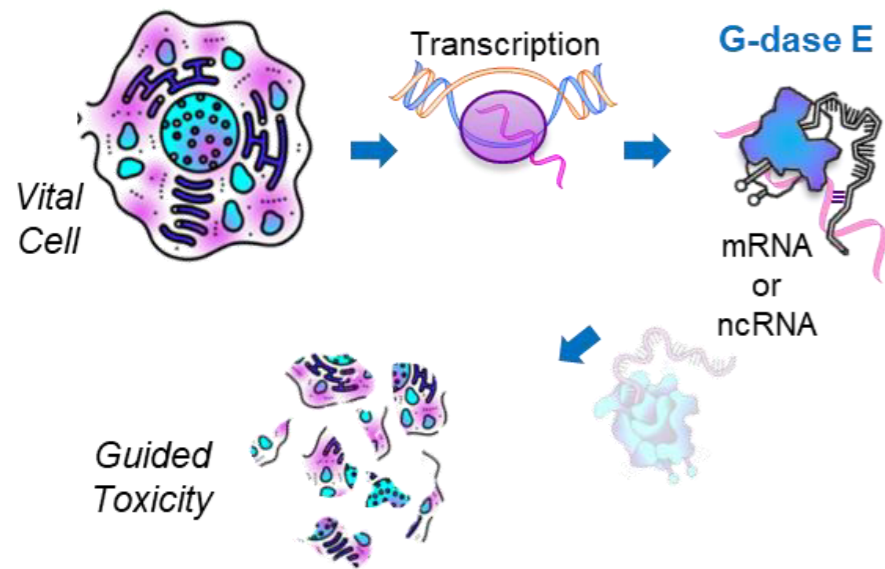
four focus segments with high growth and a combined market potential of over 17 Bn \$ by 2031

First Industries to address	Key applications for G-Dase E & G-dase M	Revenue Generation model	Total Market size (\$m)*
 Therapeutics	<ul style="list-style-type: none"> Depletion/Killing of cancerous cells <i>in-vivo</i> (see slide 79) Cell-based therapies <i>ex-vivo</i> (see slide 80) 	<ul style="list-style-type: none"> Target/ indication specific exclusive outlicensing Revenue generation from milestones and royalties 	
 Industrial Biotech	<ul style="list-style-type: none"> Producer strain optimization, Precise fermentation, Food and feed production, clean meat 	<ul style="list-style-type: none"> Non-exclusive outlicensing Fee for service business (through BRAIN) Product sales (ready to use nuclease) 	
 Diagnostics	<ul style="list-style-type: none"> Rapid Point of Care (PoC) tests Liquid biopsy Dx 	<ul style="list-style-type: none"> Licensing G-dase E to partners for development of indication-specific Dx tests Pot. product sales (nuclease to be used in Dx tools) 	
 Agriculture	<ul style="list-style-type: none"> Crop enhancement Plant resilience Plant cell fermentation 	<ul style="list-style-type: none"> Non-exclusive outlicensing Product sales (ready to use nuclease) 	
 Animal Models & Livestock, Food	<ul style="list-style-type: none"> <i>Not prioritized</i> <i>Example Customer applications: Single/multiple-edited mouse, rat or other models, improved meat & milk production, disease-resistant livestock</i> 		

Sources: (*) Researchandmarkets [\(link\)](#)

Akribion Genomics – G-dase E's unique Mode of Action

G-dase E offers a unique Mode of Action with a targeted cell-killing mechanism



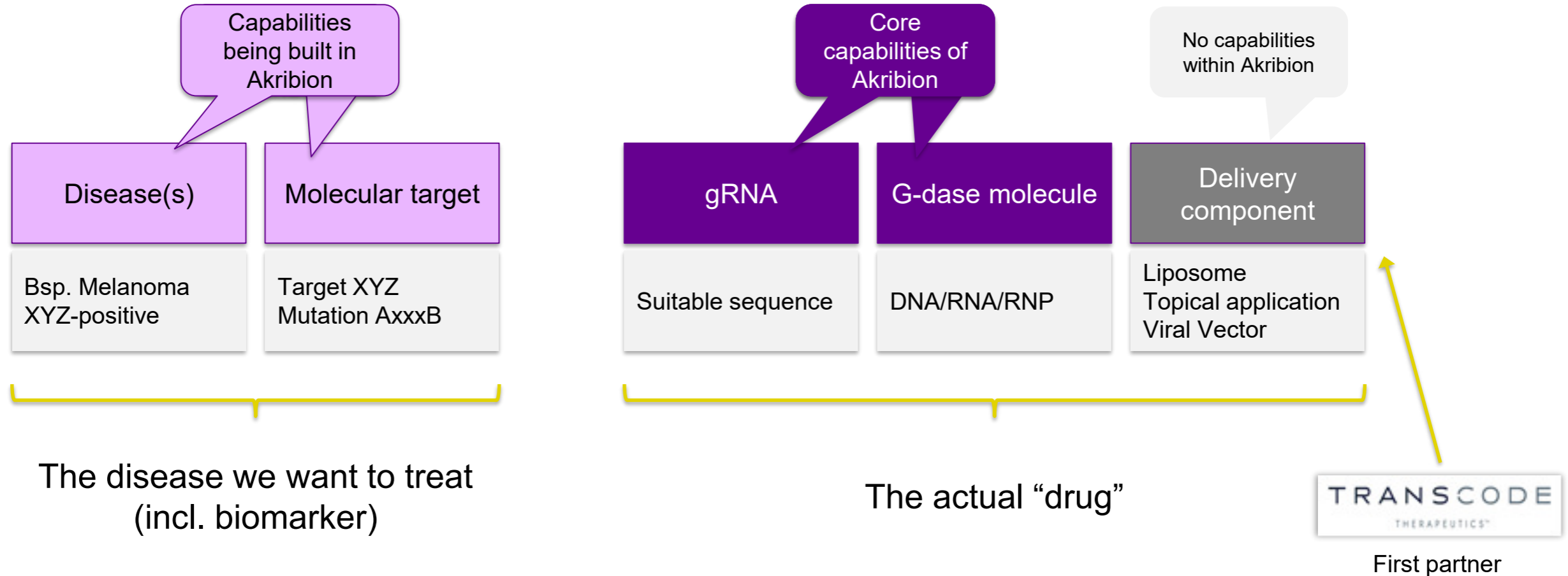
- G-dase E active in human cells
- Specific cell depletion *in vitro* based on a specific RNA marker
- Non-targeted cells survive the addition of G-dase E while being in the same mixture

Experimental setup: 50/50 mixture of GFP and RFP HEK cells transfected with G-dase E and [A] a non-targeting guide RNA or [B] a guide RNA targeting GFP

Akribion Genomics – Unique Therapeutics Application (1/2)

G-dase-derived pharmaceuticals can be applied in oncology for the depletion/killing of cancerous cells in-vivo

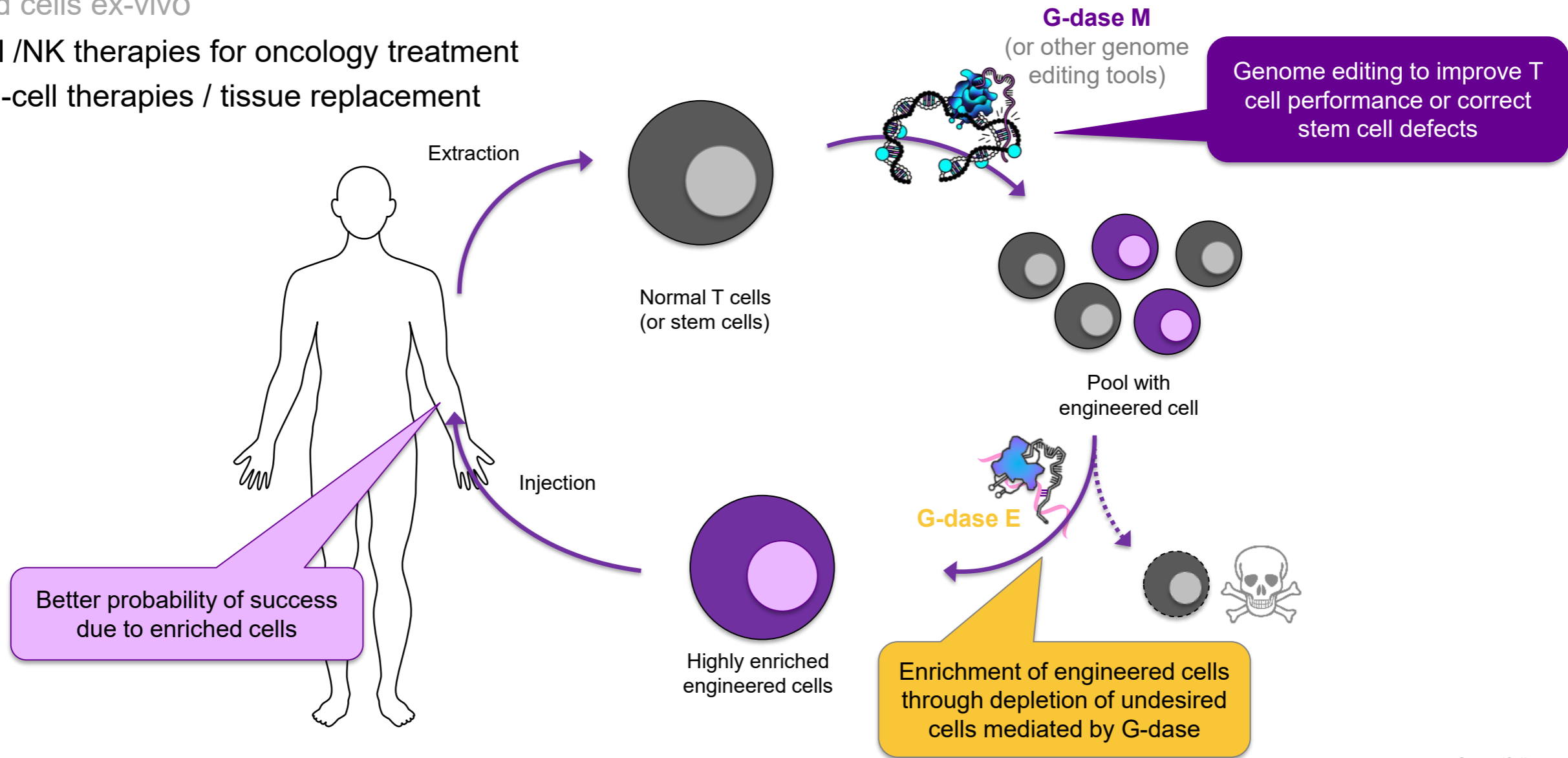
- Specific based on RNA biomarkers
- Various sub-indications targetable



Akribion Genomics – Unique Therapeutics Application (2/2)

combination of G-dase E and M can be applied in cell-based therapies, to increase the editing efficiency in patient-derived cells ex-vivo

- T-cell /NK therapies for oncology treatment
- Stem-cell therapies / tissue replacement



Akribion Genomics – Therapeutics Strategy

increasing levels of “proof-of-concept” will allow us to showcase the value of our technology for therapeutic applications

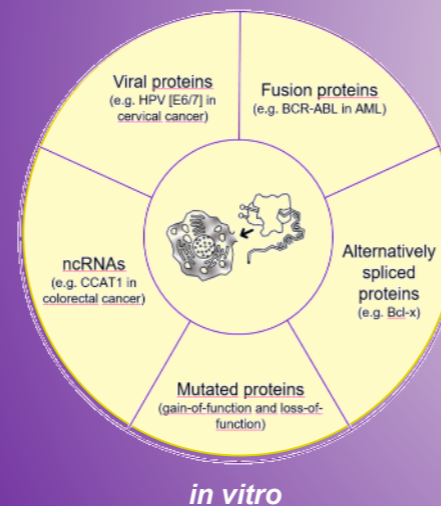
Addressing Tx-Market

- **Level 0:** evaluate & identify potential RNA-based Biomarkers
- **Level 1:** Akribion team will test Level 0 Biomarker strategy *in vitro* in cell-based cell depletion assays (1st proof of concept - PoC)
- **Level 2:** Bus. Dev. will address potential partners with 1st PoC results
- **Level 3:** 2nd & 3rd PoC will be jointly addressed with partners by a) xenografts; b) *in vivo* mouse or c) *ex vivo* human studies

Proof of Concept Levels

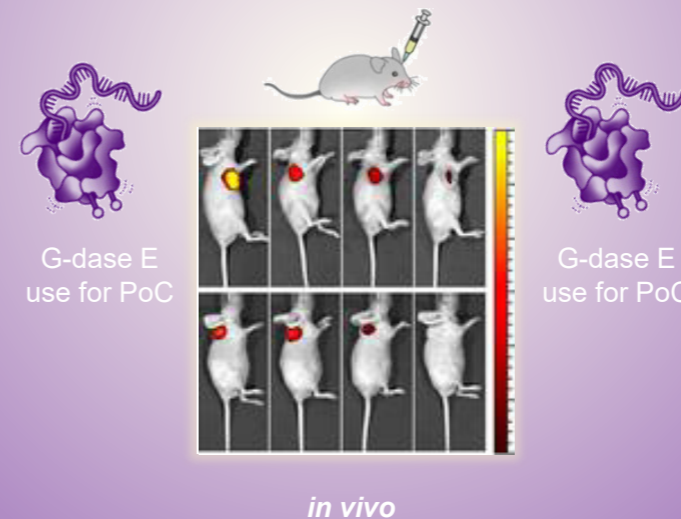
1st Level PoC

Akribion addressing potential RNA based Biomarkers in cell based assays



2nd Level PoC

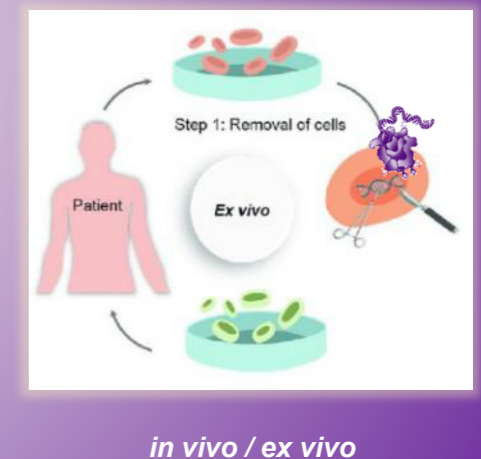
Cooperation with experts in delivery technologies like nano-particles, aav-based viral targeting etc.



3rd Level PoC

Cooperation with oncology experts & centers like Univ. of Freiburg, Pharma etc.

Aiming at IND-Filing & Clinical Trials

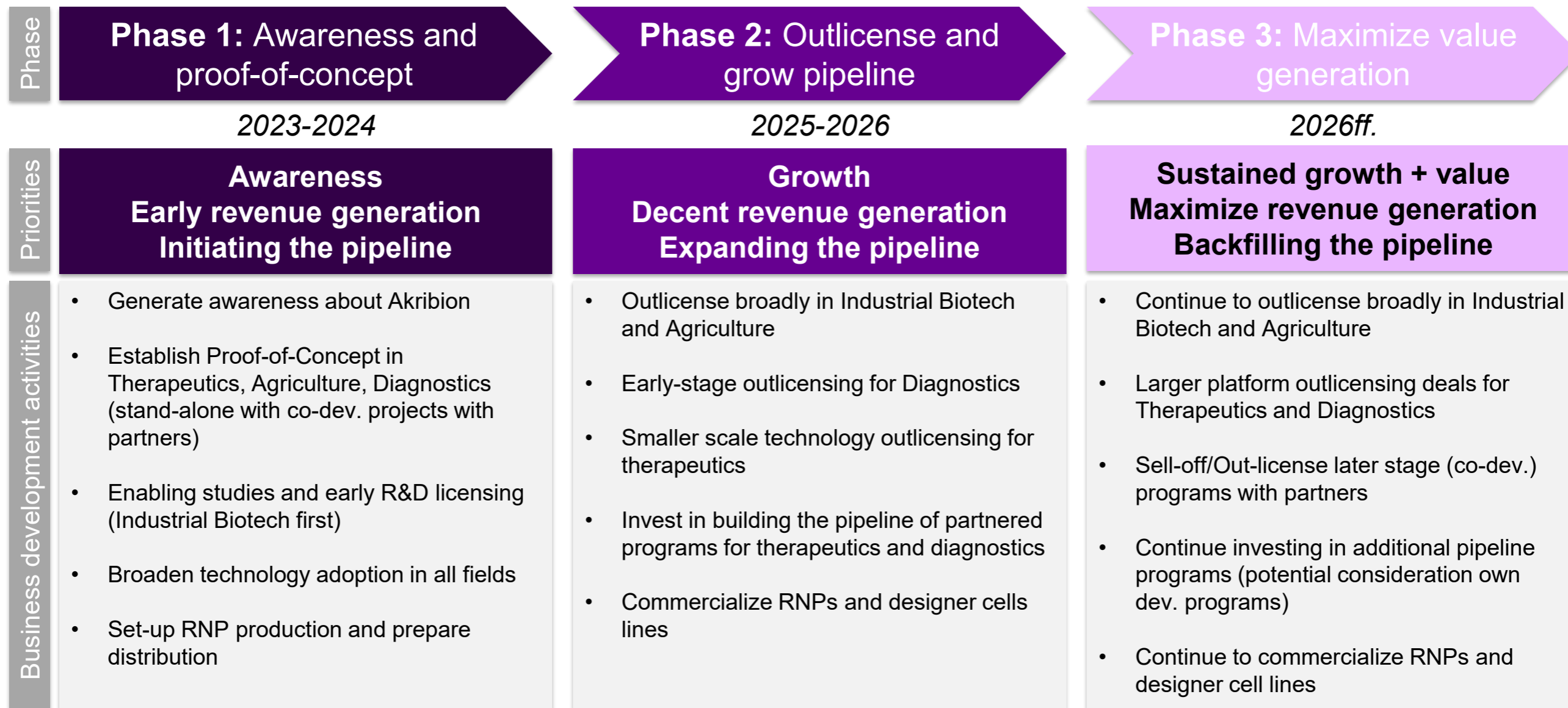


In-vitro: cell culture experiments; *In-vivo*: Animal (mouse) experiments; *Ex-vivo*: Experiments with explanted patient material

Source of images: Boetto J. *et al.* (2021) *Cancers*, Hu XY. *et al.* (2018) *Molecular Oncology*, Li H. *et al.* (2020) *Signal Transduct Target Ther*

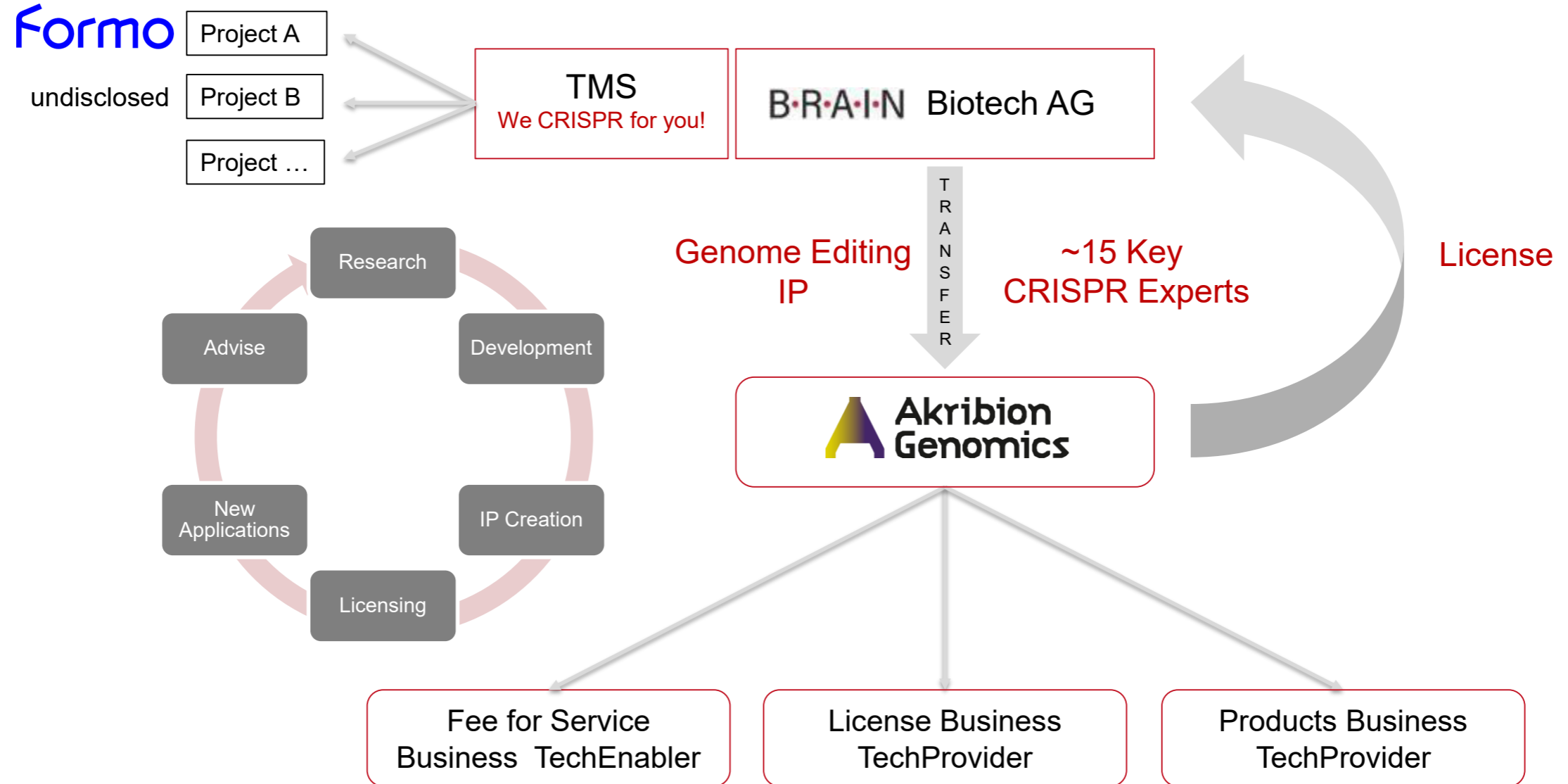
Akribion Genomics – Business Development Roadmap

core priorities will evolve in three distinct phases, in turn shifting the focus of our business development activities



Akribion Genomics – Relation to BRAIN Biotech AG

BRAIN will focus on applying CRISPR in White Biotech applications, while Akribion focuses on developing and commercializing the technology platform with a focus on therapeutics



Akribion Genomics – A Very Exciting Business Opportunity

- Unique technology platform with the potential to create a new class of treatment for cancer → Edit the living for the better!
- Huge market potential in therapeutics with highly attractive alternative use cases
- Strong partners are successively confirming the viability of our technology
- Spinning out Akribion allows for a more condensed focus on therapeutics and a venture capital style investment approach with the long term target exit as an own IPO
- The team is highly motivated and committed to building a global player in genomics