

# BRAIN Biotech AG

Creating a #BiobasedFuture

## Investor Relations Presentation 2022

Zwingenberg, August 2022



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.



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# Safe Harbor Statement

This document may contain forward-looking statements. These forward-looking statements are subject to risks and uncertainties, as they relate to future events and are based on current assumptions of the Company, which may not occur at all in the future or may not occur as assumed. They do not represent a guarantee for future results or performance of the Company, and the development of economic and legal conditions may materially differ from the information expressed or implied in the forward-looking statements.

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# BRAIN at a Glance

~ €38m

'20/'21 Revenues

> 28

Years of Experience

~ 330

Employees

> 350

Specialty B2B Products

> 150

Industrial Partnerships

2016

Listed, Frankfurt Prime Standard

## Creating Breakthrough Bioproducts & Solutions for Nutrition, Health and Environment

Industrial Biotech  
(white)



Three  
Product Platforms



Enzymes



Microorganisms



Bioactive  
Natural  
Compounds

## From Lab to Production

# Mission & Vision

“Mission is what an organization is or does. Vision is what an organization desires to become”

## Mission

Creating Breakthrough Bioproducts and Solutions for Nutrition, Health and the Environment

## Vision

We will be the **Industrial/White Biotech Specialists** in finding and exploring high-value niches in our products business and novel solutions in our science business. We will be much more agile than others and will always look to produce products in-house or with partners

# When Should You **#Think BRAIN?** in the center of mega-trends

## Health & Nutrition

**Vegan & Vegetarian Food:** Alternative Protein Base  
(Precise Fermentation / Microbial Production Hosts)

**Healthy & Better Tasting Beverages:**  
Natural Flavors (like NatBev 1 & 2)

**All Natural Preservatives:**  
Perillic Active from Fermented Orange Oils

**Calorie-Free Natural Sweeteners:**  
Plantbased Sweeteners (Brazzein, Sweet Box)

**Healthy Food:**  
reduction of salt in foods (SALT-1)

**Biological Wound Care:**  
Biological Wound Management (Aurase/SolasCure)

## Creating a BiobasedFuture

**Genome Engineering:**  
Novel Non-Cas9 Nucleases

**Biological Production:**  
Enzymes & Large Scale Fermentation

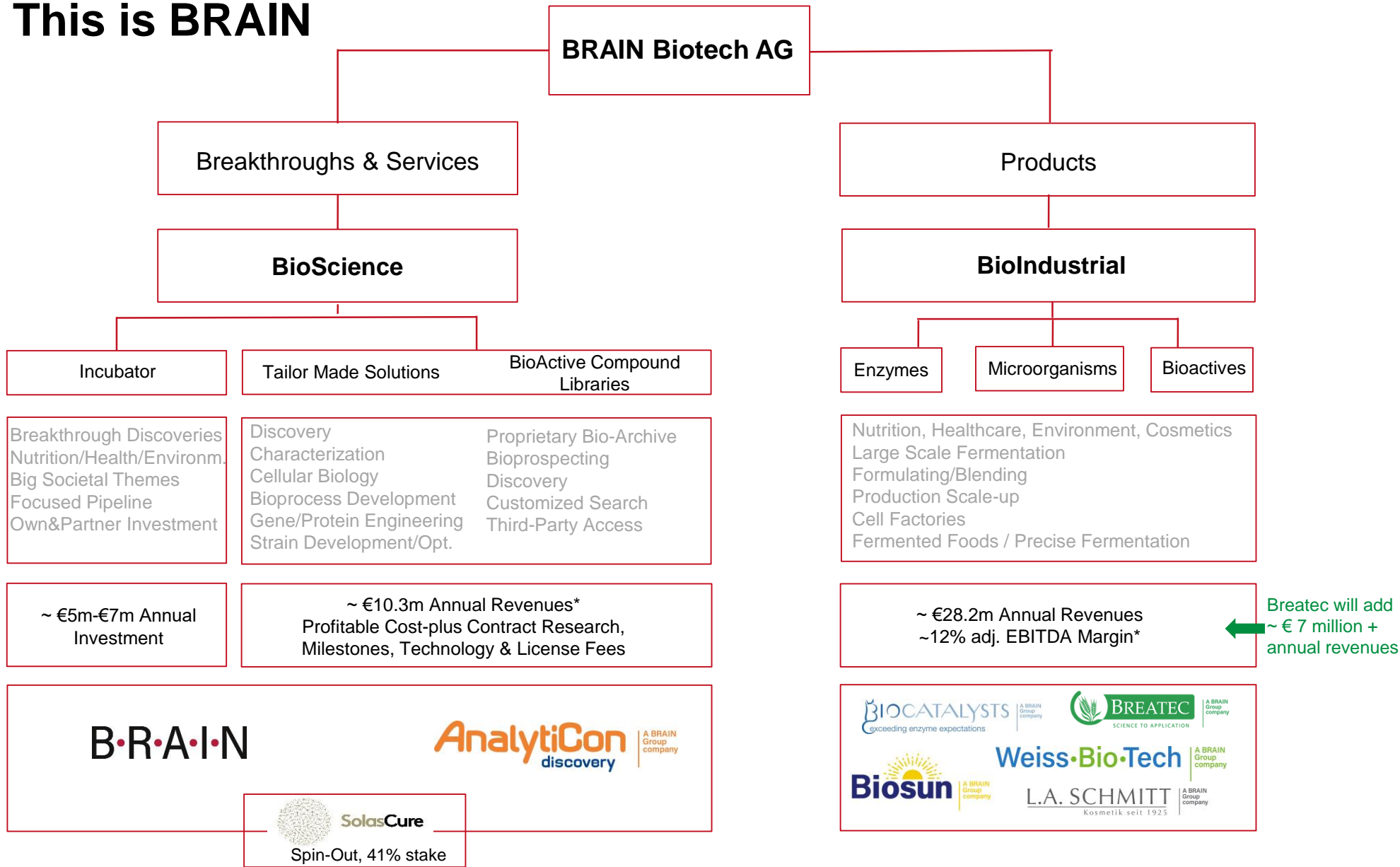
## Environment

**BioMining:**  
Sustainable Metal Extraction (Urban Mining)

**Biological Production:**  
Enzymes & Large Scale Fermentation

**Making Waste Valuable:**  
Fermented Food from Side Streams  
Microbial CO<sub>2</sub> Usage

# This is BRAIN

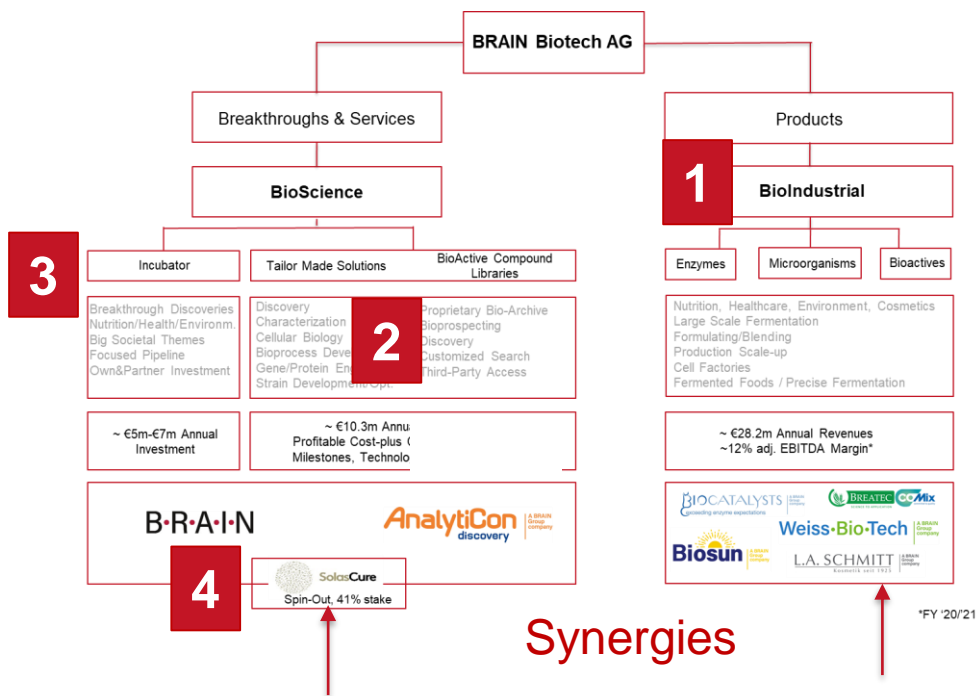


\*FY '20/'21



# BRAIN Group – Solutions Provider

## Value Creation & Synergies



- Enzymes: integrated value chain from lab to production
- Industrial Scale-up and application know-how
- In-house strain optimization & development
- Customer strain development & Bio Process
- Variable scientist pool for internal/external projects
- TMS creates strong industrial partner network
- Utilize TMS knowledge for Incubator Projects and alternative use-cases
- Shared corporate services & financing

- 1** Products Business
  - Focus on high-growth & high-margin niches
  - Re-shape from a purchase for resale to an own production model
  - Strong target markets with healthy sales and margin growth in F&B, healthcare and environment
- 2** TMS /Libraries Business
  - TMS: longer term contract research programs (average duration 2 years); strong industrial partner network; rich pipeline of possible new projects; “CRISPR for You”
  - Libraries: main customers from food, pharma & cosmetics industries. Access fees and upside from milestone payments / license income
- 3** Incubator
  - Focus on breakthrough products with a strong societal impact
  - Significant value creation from development to launch
  - De-risk R&D with partners and public funding
  - Dynamic pipeline: mature products marketed, new products will enter
- 4** SolasCure
  - Innovative enzymatic wound care
  - Spin-out, 41% participation
  - IP for enzyme Aurase owned by BRAIN
  - All options open to crystalize value from stakeholding



# Six Strong Reasons to Invest in BRAIN Biotech AG

1. **Mega-trends / UN-SDGs:** our products address the big societal topics – nutrition, health & the environment. We address at least 5 SDGs directly
2. **Incubator products:** big upsides in our breakthrough inventions. BEC/BMC potential to be transformational.
3. **BioIndustrial:** BRAIN is very well positioned to capture high-growth and high-margin niches in its products businesses. We will re-shape our BioIndustrial business and move from a purchase for resale model to an own production model, this creates significant margin and therefore value upside
4. **Strong target markets:** solid target markets for our services & products with CAGRs above GDP and strong EBITDA margin levels also allow BRAIN to harvest healthy sales and margin growth
5. **Value accretive M&A:** space for bolt-on acquisition to accelerate growth with the possibility for transformational growth through larger M&A
6. **R&D:** ability to fund research with partners and from governmental grants to de-risks our own R&D effort and preserve valuable cash

## Six Major Triggers driving Revenue and Margin Growth



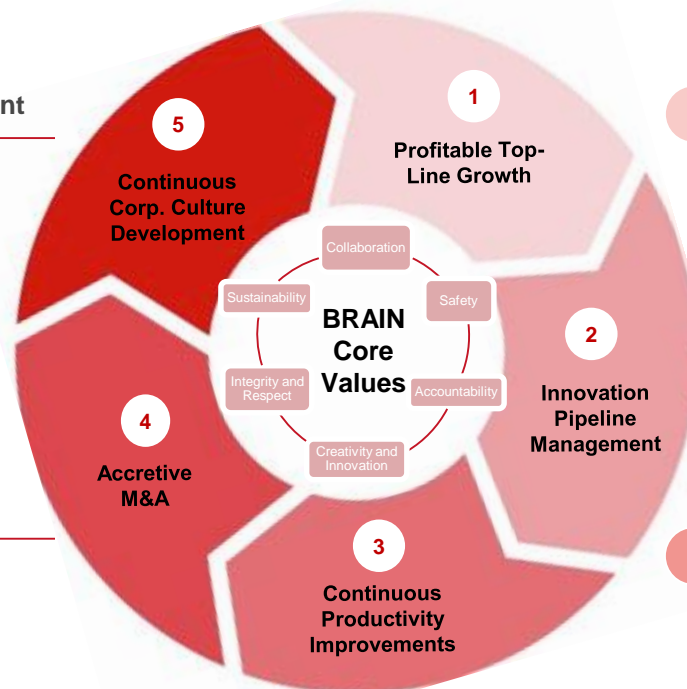
# Five Strategic Initiatives Centered Around our Core Values

## 5 Continuous Corp. Culture Development

- Can do and high ethics culture
- Talent management
- Innovation is our passion
- Teamwork is our basis
- Sustainability as a guiding principal

## 4 Accretive M&A

- Successful track record of integrating acquired entities
- Further build with bolt-on acquisitions
- Transformational M&A in adjacencies



## 1 Profitable Top Line Growth

- Excel in specialty niches with high margins
- Selectively grow outside of Europe
- Always look for ways to produce ourselves

## 2 Innovation Pipeline Management

- Balanced portfolio across markets and technologies
- Breakthrough solutions for big challenges for accelerated growth
- Key customer and application focus

## 3 Continuous Productivity Improvements

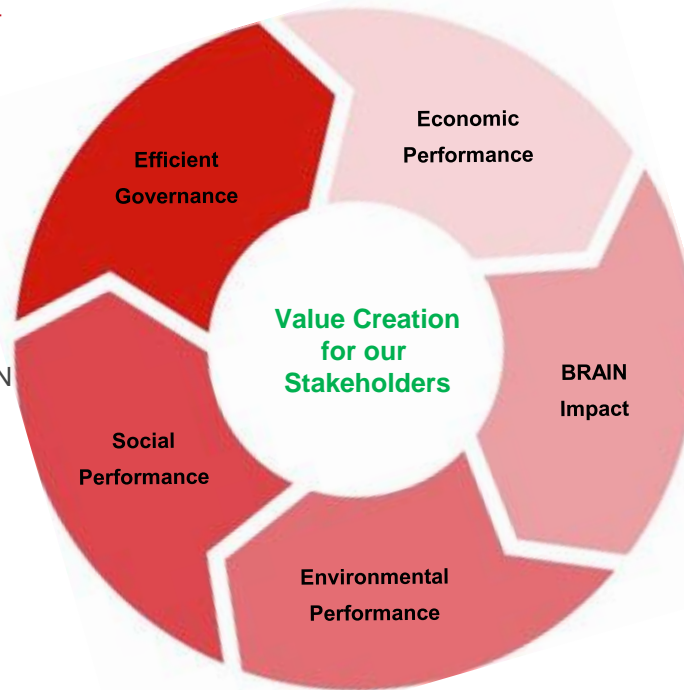
- Strain development
- Focus on working capital efficiencies, cost improvements and free cash flow
- Group revenue synergies
- Bio-Informatics

# ESG+: Responsible Group Management

five key focal points for sustainable value creation

## Efficient Governance

- German Corporate Governance Code (DCGK) compliance
- German Sustainability Code (DNK)
- Member UN Global Compact (UN GC)
- Quality, health and safety policies
- Internal compliance: qualified internal compliance officer, permanent risk assessment, audit committee, internal audit team and risk reporting, external audit, BRAIN Financial Control Framework, BRAIN Red Book
- Monthly reporting and audit meetings with the subsidiaries



## Economic Performance

- Profitable top-line growth
- Organic growth enhanced by value accretive M&A
- Target: reach a self-sustained cash flow profile



## BRAIN Impact

- We make a real difference: our products & services address at least 5 SDG's directly



## Social Performance

- Occupational health & safety
- Employee development & training
- BRAINway corporate culture enforcement
- Safe labour practices
- Community Education & Dialogue
- Promoting women in management



## Environmental Performance

- Energy efficiency
- Reduced travel footprint
- Water management
- Waste management



# Targets ESG+ Roadmap 2032 / 2050

## Minimizing the Environmental Impact from our Operations **E**

### Goals

- By 2032, reduce Scope 1-2 GHG emissions by 30% in relation to current revenue base\*
- By 2050, Scope 1-2 GHG emissions to net zero

### Detailed Actions

- Switch to sustainable sourcing of primary energy
- Building renovation and change of cooling/heating design
- Electrification of processes and transport
- Establish employee best idea contest on cost, energy savings and process optimization

## Livable & Satisfying Employment **S**

### Goals

- By 2032, share of women in management positions above 30%\*
- By 2032, Lost time injury frequency rate (LTIFR) per 1 Million hours worked < 3.0\*

### Detailed Actions

- Attract & retain talent by flexible work options, employee participation programs
- Actively promote female career development to management positions
- Promote safe work environment

## Responsible Business Operations **G**

### Goals

- By 2032, Target zero fines from compliance & operational breaches \*
- Ongoing, significantly increase share of license and royalty income in BioScience in relation to revenues \*

### Detailed Actions

- Evolution of Financial Control Framework (FCF)
- Pro-active IP filing & trade secret strategy to enhance and manifest IP position
- BEC/BMC franchise and producer strains

## BRAIN Impact **+**

### Goals

- By 2032, successful market Introduction of impact products & services from today's incubator \*
- By 2050, launch additional incubator products with an impact

### Detailed Actions

- Continuous incubator pipeline management

\* To be incorporated into the updated executive management compensation scheme as non-financial targets, base year data CY 2020

# Sustainability: Manifold Business Opportunities for BRAIN

enabling technologies & solutions

## Discovery / Biomimicry

Natural and nature-based compounds



## Enabling Biological Manufacturing

Cell-factories  
 Producer strain licensing  
 Bioprocess development  
 Bioactives Development



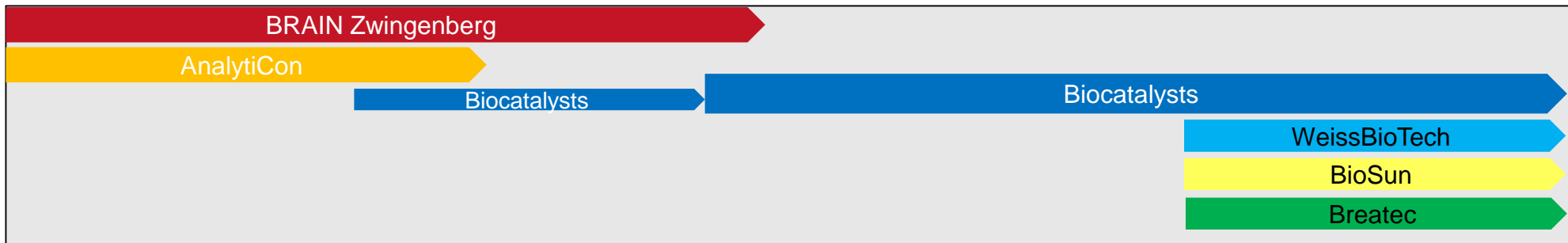
## Biological Production/ Fermentation

Upscaling  
 Process optimization  
 Large-scale fermentation



## BRAIN Group Bio-based Products

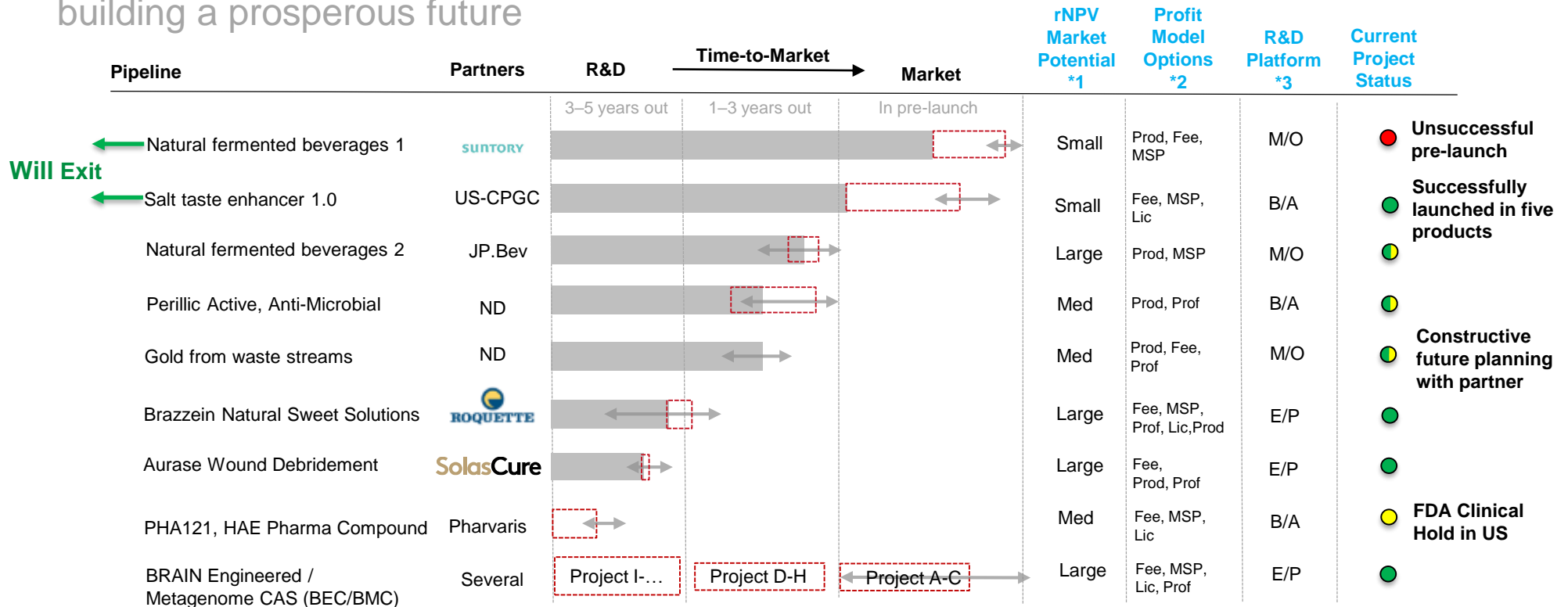
Biological catalysts:  
 Enzyme formulation  
 Mixing / Blending  
 Novel enzyme production



BEC/BMC: powering our value chain + large economic upside from licensing

# BRAIN Incubator

building a prosperous future



- Projects Green Metal Mining, Sweet Taste Enhancer and CO<sub>2</sub> moved to TMS business, fully funded programs
- Projects Salt-E, Fresco shelved, searching for partners
- New enzymes now part of BioIndustrial regular product development, see page 10

Progress since CMD '20, update '08/21

- Programs without contractually bound partners are marked red by default
- Contractual, technology or registration hurdles still need attention
- Phase 1 has been successfully completed but contract negotiations for the next development phase are progressing but not yet finalized

\*1: BRAIN-Group rNPV FCF+TV: **Small** < €5M, **Medium** €5M - €15M, **Large**: €15M+

\*2: **Prod**: Product sales. **Fee**: Research fee income. **MSP**: Milestone payments. **Lic**: License/royalty payments **Tec**: Tech fees **Prof**: Entity formation or profit participation

\*3: **B/A**: BioActives, **E/P**: Enzymes and proteins, **M/O**: Microorganisms/starter cultures

ND: not disclosed

# Management & Employee Incentives

since the IPO BRAIN Biotech AG's board as well as management compensation has been closely linked and aligned with shareholder interests

## Executive Board

- fixed salary
- variable component based on individual quantitative & qualitative targets
- stock component, see ESOP

## ESOP, Employee Stock Ownership Program

- Since June 2018
- Board, managers and employees
- Incentive and retainer
- Details: see appendix

## CoPerBo, Corporate Performance Bonus

- Since FY 2015/16
- Applied for employees at BRAIN Zwingenberg
- Partially share prices based
- Details: see appendix

## Specific Incentives at Daughter Companies

- See appendix

# Financial Highlights 9M FY 2021/22 at a Glance

fourth consecutive strong quarter of sales growth

(in € thousand)	9M 2021/22	9M 2020/21	Growth	Organic Growth	Q3 2021/22	Q3 2020/21	Growth	Organic Growth	Comment
Revenues	35,974	27,845	29.2%	14.9%	12,707	9,844	29.1%	6.2%	
BioScience	8,543	7,416	15.2%	15.2%	2,774	2,742	1.1%	1.1%	Milestones 183K 9M 21/22 Milestones 669K 9M 20/21
BioIndustrial	27,530	20,566	33.9%	14.4%	10,005	7,158	39.8%	8.3%	Strong Biocatalysts 5 months of Breatec consolidation
Total operating performance (1)	37,188	29,966	24.1%	10.8%	12,975	10,167	27.6%	5.5%	
Adjusted EBITDA (2)	-192	-2,238	91.4%	82.0%	-412	-223	-84.4%	-220.3%	(-) EUR 825k ESOP 9M (-) EUR 425k M&A Costs 9M
EBITDA	-1,442	-2,061	30.0%	19.7%	-717	-495	-44.9%	-48.9%	
EBIT	-4,640	-5,008	7.4%	3.5%	-1,857	-1,556	-19.3%	-22.6%	
Net Result	-6,205	-2,942	-110.9%	-116.4%	-2,456	-1,902	-29.1%	-29.6%	
Operating Cash Flow	-1,032	-3,000	65.6%	84.4%	30	1,157	-97.4%	-141%	
	30.06.2022	30.09.2021							
Cash	13,309	24,545	-45.8%	-46.0%					

	9M 21/22	9M 20/21	Growth	Organic Growth
Number of Employees	306	288	6.3%	2.8%
Material Expense Ratio	44.4%	44.6%	- 0.3% PP.	- 3.6% PP.
Adj. Personnel Expense Ratio	42.5%	50.7%	- 8.2% PP.	- 4.6% PP.

➤ CRISPR investments @ 9M € 1.4 million

## Major Events 9M '21/'22:

- **BioScience:** slower organic growth in Q3, order pipeline shows acceleration in Q4 as planned
- **BioIndustrial:** solid organic growth despite typical seasonal effects, ongoing supply chain constraints and new fermenter commissioning
- **Breatec:** added to inorganic growth for 5 Months, integration progressing according to plan

(1) Revenues + change in inventories + other income + R&D grants

(2) The full reconciliation from adjusted to unadjusted EBITDA can be found in the 9M report



# Cash & Cash Flow

strong OCF 9M, cash position remains solid despite Breatec purchase & Capex spend

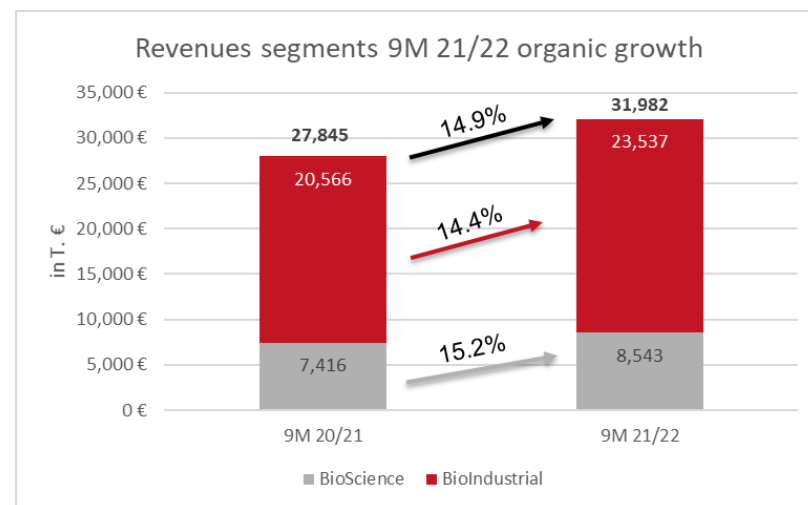
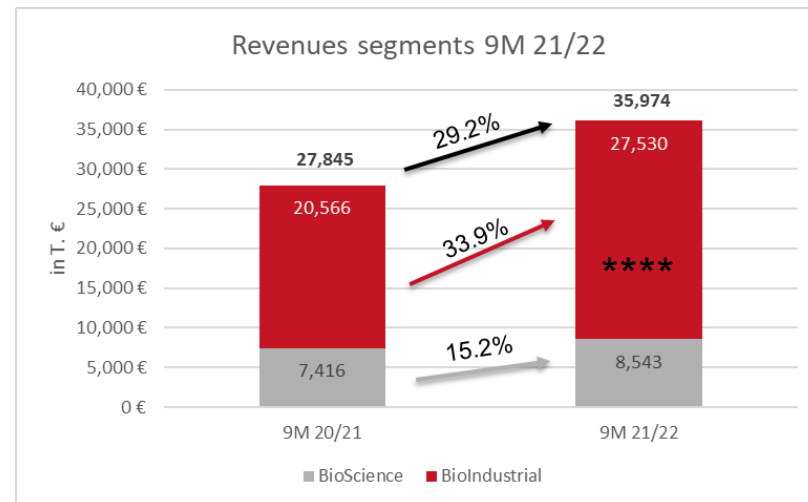
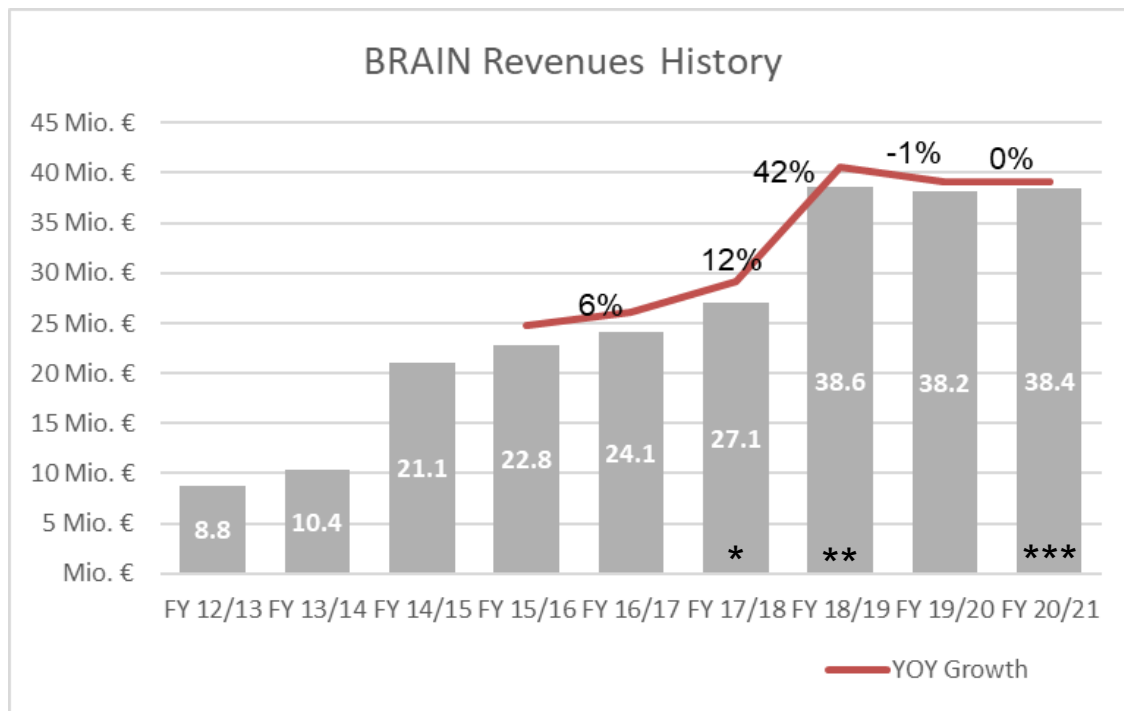
(in € thousand)	9M 2021/22	9M 2020/21	Growth	Q3 2021/22	Q3 2020/21	Growth	Comment
Gross Cash Flow	-3,695	-4,061	9.0%	-1,494	-924	-61.7%	
Operating Cash Flow	-1,032	-3,000	65.6%	30	1,157	-97.4%	
Investing Cash Flow	-8,653	-1,999	-332.8%	-2,029	-574	-253.8%	Purchase Breatec Capital Increase SolasCure Capex Biocatalysts
Financing Cash Flow	-1,584	-6,826	76.8%	-1,073	-5,291	79.7%	
Net change in Cash & Cash Equivalents	-11,269	-11,824	4.7%	-3,073	-4,708	34.7%	
	30.06.2022	30.09.2021					
Cash	13,309	24,545	-45.8%				
Equity	32,681	41,828	-21.9%				

- EUR ~3.1 million Breatec purchase price payment Q2
- EUR ~1.2 million SolasCure Series B capital increase Q2
- EUR ~ 3.7 million Capex Biocatalysts 9M
- Change in equity position due to reduction in capital reserves, Breatec put option rights
- EUR 7 million undrawn credit facility available on top
- NewCo formation will open additional financing optionality



# Long-Term Revenue Growth Trajectory

strong organic growth in both divisions, Breatec inclusion for 5 months



- As stated: we will go back on the growth track in FY 21/22 – confirmed now by three quarters
- Breatec added to growth since Q2, consolidation for 8 months in this financial year

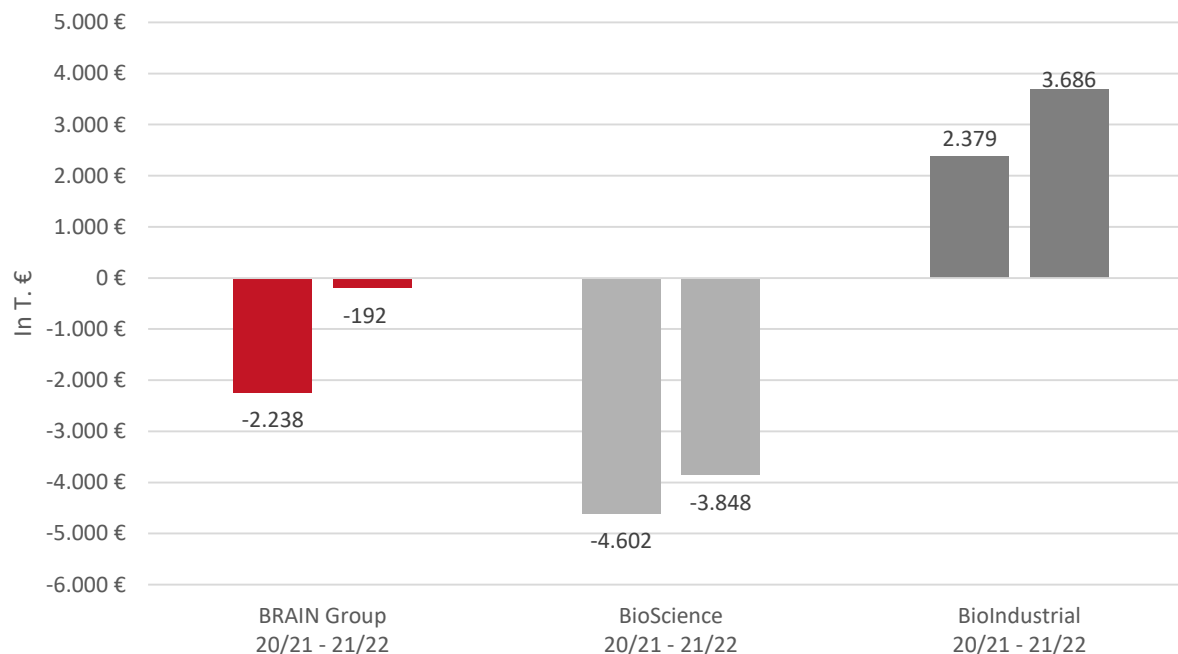
\*purchase BioCatalysts Ltd.    \*\*divestment Monteil Cosmetics    \*\*\*purchase BioSun    \*\*\*\*Breatec integration from Feb '22



# Adjusted EBITDA

BioScience: positive operating leverage, BioIndustrial: strong Biocatalysts fermentation

Adjusted EBITDA 9M 21/22



- **Group** adj. EBITDA strongly improving due to dynamic sales growth and positive operating leverage; good cost control
- **BioScience:** good YoY recovery despite significantly lower milestone payments 9M; Tech Access Fees up due to USP BEC/BMC; TMS order book remains solid
- **BioIndustrial:** especially Biocatalysts performing strongly; Breatec inclusion contributing ; higher EBITDA results at other subsidiaries would have been possible without existing supply chain constraints

➤ BioScience includes CRISPR investments @ 9M ~€ 1.4 million

# Rising Supply Chain Risks & Cost Inflation

persisting supply chain constraints, rising input and labor costs

## Summary:

**Supply chain constraints persist and hinder even more dynamic growth in BioIndustrial. Inflationary pressures keep building.**

## Potential Challenges:

- Omicron: virus varieties might temporarily impose new economic insecurity and travel restrictions making deal making in BioScience again more challenging as well as dampen general demand
- **Supply Chain**: managing supply chain shortages stays a larger risk factor starting from raw materials, logistics costs, over laboratory consumables to packing materials. All units are affected to different degrees and hindering an even more dynamic organic growth, especially in BioIndustrial
- **Cost Inflation**: trying to pass on product and energy cost inflation to customers. Wage inflation still within planning framework but larger second round labor effects become more likely in the future
- **Energy Supply**: energy supply is essential for BRAIN's operations. Our full year forecast is based on the availability of an uninterrupted and stable energy supply, especially for electricity and gas

## Covid

### Secure:

- Health aspects
- Supply chain
- Operating business
- Future pipeline

### Targets:

- Safety of employees
- Business continuity
- Minimize disruptions
- Fulfill customer contracts

### Measures:

- Vaccination @ work
- Booster @ work
- Covid-19 task force
- Hygiene concept
- Corona quick testing
- Masks on premises
- Air Filters
- Personal safety supplies
- Physical distancing
- Home office
- Reduced travel
- Flex work
- Digitalize workflow

# Our Targets

## Guidance and Mid-Term Targets

### **FY 21/22 Guidance** (updated incl. Breatec<sup>\*\*</sup>)

#### **Group sales: around EUR 50 million**

- BS: growth 15-25% (higher end)
- BI: organic growth 10-15%, (lower end)

#### **Adj. EBITDA**

- slightly positive (ex CRISPR)

#### **CRISPR**

- associated expensed investments: EUR 2.5-3.5 million (unchanged)

#### **Group CAPEX**

- 7.0-8.0 EUR million (unchanged)

\*consolidation for 8 months

\*\*integration/M&A costs ~EUR400-450K

### **Mid-Term Targets, Unchanged**

(issued 09/'20, 4-5 year targets)

(excluding CRISPR)

#### **Double group revenue from base '18/19**

- Double digit topline product CAGR
- Accretive M&A
- Contract research "TMS" proportionally reduced (excl. milestones)

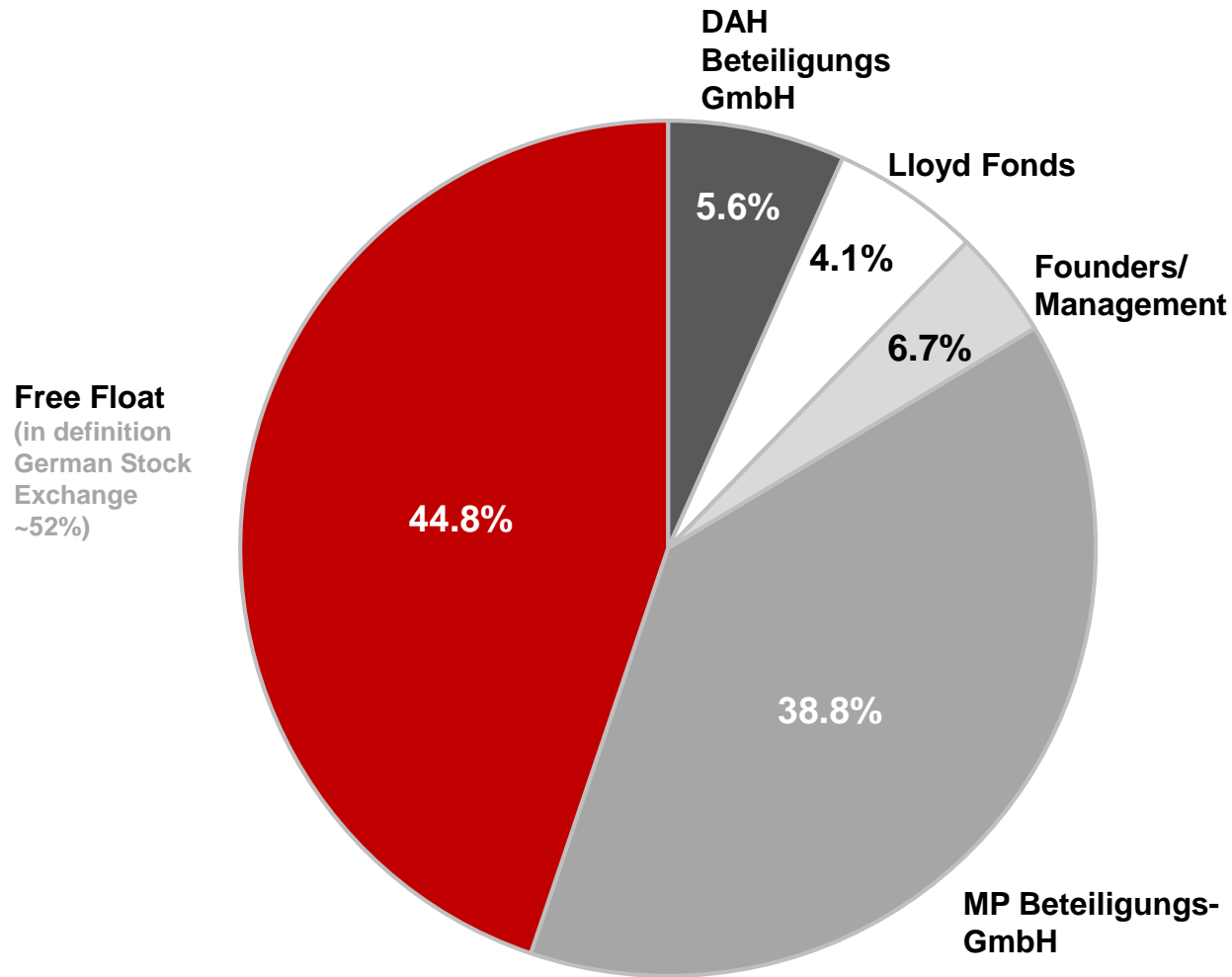
#### **Group adj. EBITDA margin 15% (+/- 5PP)**

- Double digit fermentation production volume of customized novel enzymes
- Mid-single digit annual productivity improvements

#### **Proportion of new product sales: ~30% of total revenues**

- Continuous innovation pipeline management

# Our Share Ownership\*



- Number of shares: 21,847,495
- Free float of ~ 45%
- Strong long-term investor base
- ~ 8,600 shareholders
- WKN 520394 / ISIN DE0005203947
- Symbol BNN
- Prime Standard; Frankfurt/M

\*March 31<sup>st</sup>, 2022



# Financial Calendar



## QUARTERLY STATEMENT

Publication of the quarterly statement as of June 30<sup>th</sup>, 2022 (9M)

**August 29<sup>th</sup>, 2022**



## ANNUAL REPORT

Publication of the annual report as of September 30<sup>th</sup>, 2022 (12M)

**January 16<sup>th</sup>, 2023**



## QUARTERLY STATEMENT

Publication of the quarterly statement as of December 31<sup>st</sup>, 2022 (3M)

**February 27<sup>th</sup>, 2023**



## ANNUAL GENERAL MEETING

Annual General Meeting (FY 2021/22)

**March 8<sup>th</sup>, 2023**



## HALFYEAR STATEMENT

Publication of the half year report as of March 31<sup>st</sup>, 2023 (6M)

**May 25<sup>th</sup>, 2023**



## QUARTERLY STATEMENT

Publication of the quarterly statement as of June 30<sup>th</sup>, 2023 (9M)

**August 30<sup>th</sup>, 2023**

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# Thank you for your attention.

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BRAIN Biotech AG



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# High Barriers to entry

## Our novel products & solutions are based on:

- Proprietary BioArchive with >450 person years to reproduce
- Extensive patent portfolio, around 175 patents granted and around 40 patent families
- Trade secrets
- Broad and deep technology know-how in enzymes, microorganisms and bioactive natural compounds
- Ability to express target compounds in bacteria, yeast or fungi
- Full process capabilities from the lab to production
- Strong industry partner network with over 100 partner collaborations successfully completed
- Strategic alliances for new business development
- Strong scientific and university network
- State-of-the-art technology portfolio
- Our people: first class scientists and process specialists

# NBD Deep Dive, The Pipeline

Large Market Potential

## Natural Beverage 2

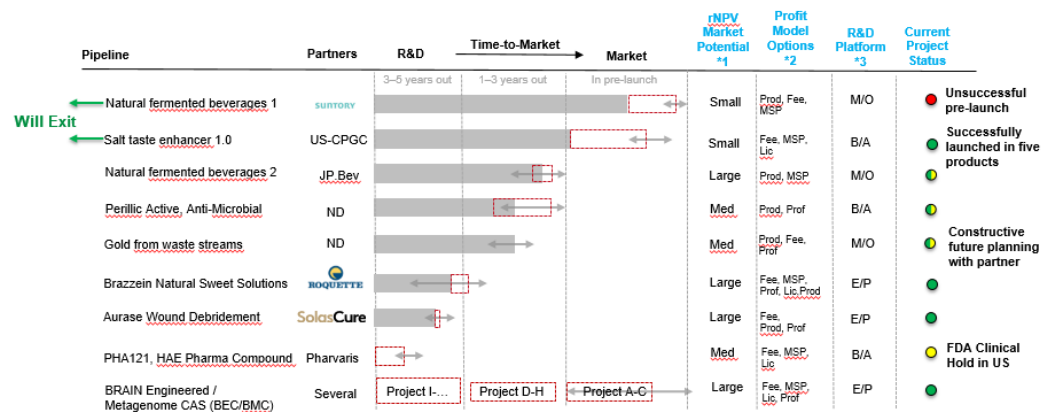
- Partners: Japanese Beverage Company
- Scope: undisclosed, confidentially agreement
- Exclusive to partner
- Technology Platform: microorganism
- Research Business Model: milestone payments
- Commercial Model: starter cultures, production, license fee, JV an option/profit share

## Brazzein Natural Sweet Solution

- Partners: BRAIN, AnalytiCon Discovery, Roquette
- Scope: development, approval and commercialization of new natural sweet solution
- Based on access to our SweetBox and Human Tongue Cell technology derived sweetener candidates
- Technology Platform: BioActive and process development
- Research Business Model: tech access fee, success fees
- Commercial Model: initial production, licensing, royalties

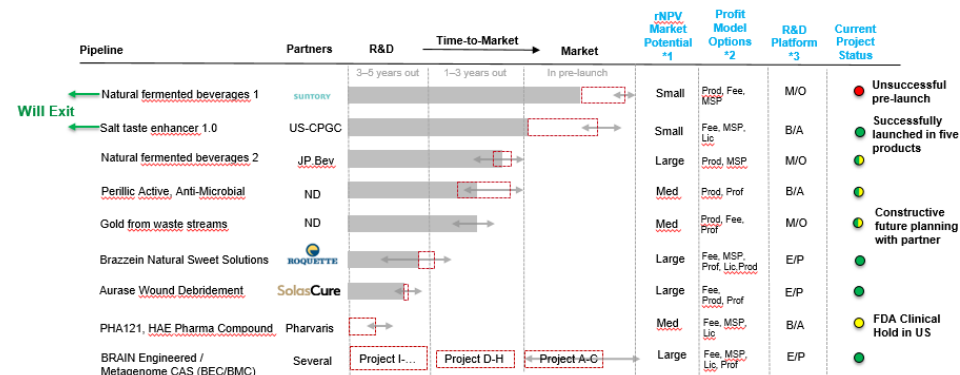
## Aurase

- Partners: Spin-off SolasCure
- Scope: innovative wound debridement agent for the cleaning of chronic wounds
- Exclusive development through SolasCure, active enzyme IP at BRAIN
- Technology Platform: enzyme/proteins
- Research Business Model: fees, technology transfer
- Commercial Model: spin-off, exit optionality, production through BRAIN (independent from owner)



# NBD Deep Dive, The Pipeline

Large Market Potential



## BRAIN CRISPR Non-Cas9 Associated Nucleases (BEC/BMC)

- **Genome Editing:** directed and precise change or use of a chromosomal target in a given organism; “the power to program cells”
- **CRISPR** = clustered regularly interspaced short palindromic repeats
- **CAS** = CRISPR associated sequence
- **CRISPR-Cas** systems have enabled genome editing in multiple species and provided genetic tools with speed as well as simplicity that were previously unavailable
- **Editing** requires only two components (1. Cas nuclease 2. programmable guide RNA), and can be multiplexed for simultaneous modification of multiple sites in a single transformation event
- Novel BRAIN CRISPR Cas system developed using metagenomics sequencing and protein engineering
- Non-Cas9 type genome editing nuclease
- Scarless gene modification at the single nucleotide level
- In-house designed application tools and strategies
- Development of customized screening cells for target identification / validation or bioactive product development / identification
- State of the art technology for the development of high performance producer strains
- Business Model: all option are still being evaluated, NewCo formation in 2022

# BEC/BMC: What is Genome Editing and How Does it Work?

## the power to program cells



The power to program cells → disable, correct or change genes



DNA: biological *four letter* code of living organisms

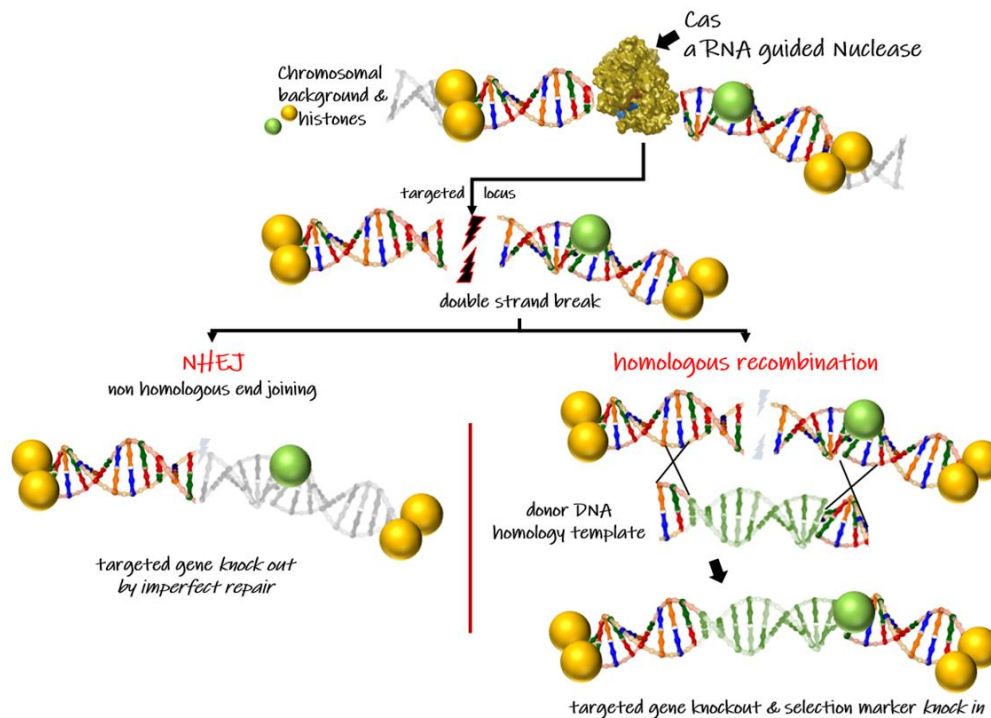
➤ Genes: biological templates making the proteins & enzymes to build & maintain tissue

### Editing only requires two components

1. Cas nuclease
2. programmable guide RNA

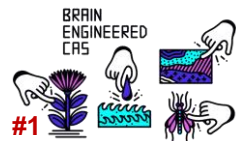
### Edit a genome through

1. gene **knock out**
2. homology-mediated **knock in**



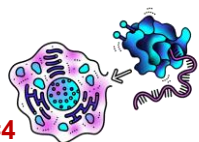
# BEC: Discovery Steps

## Creating a proprietary tool



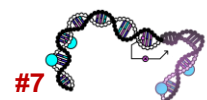
**#1**  
**Let's start with nature**

Metagenomics samples were selected using rational bioprospecting and the DNA of all microorganism living in those habitats was isolated.



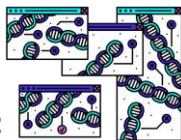
**#4**  
**BEC comes into action**

To perform genome editing, the BEC protein loaded with a specific gRNA is introduced into the target cell.



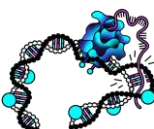
**#7**  
**Gene knock-out**

The native repair mechanism of the target cell repairs the DNA that was targeted by the BEC protein in a non-perfect way leading to small insertions or deletions inside the genome. This mechanism can be used to knock-out genes.



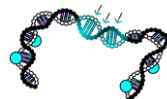
**#2**  
**Metagenomics meets Bioinformatics**

The isolated DNA was sequenced using state of the art next generation sequencing techniques and analyzed to identify novel genome editing tools



**#5**  
**Select the target**

With the help of a specific spacer sequences incorporated inside the gRNA the BEC protein can be programmed to find and bind a specific region on the genome of the target cell.



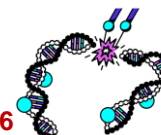
**#8**  
**Gene knock-in**

The targeted DNA can be repaired by the integration of a repair fragment that researchers can design to precisely integrate genes of interest into the genome.



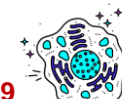
**#3**  
**Shaping the heroes**

The selected metagenomics sequences were optimized by protein engineering to enhance the genome editing activity and specificity and one best performing prime candidate was selected (BEC).



**#6**  
**Processing the DNA**

If the programmed spacer sequence perfectly matches the DNA sequence present in the genome the BEC protein precisely cuts the DNA at the pre-defined position.






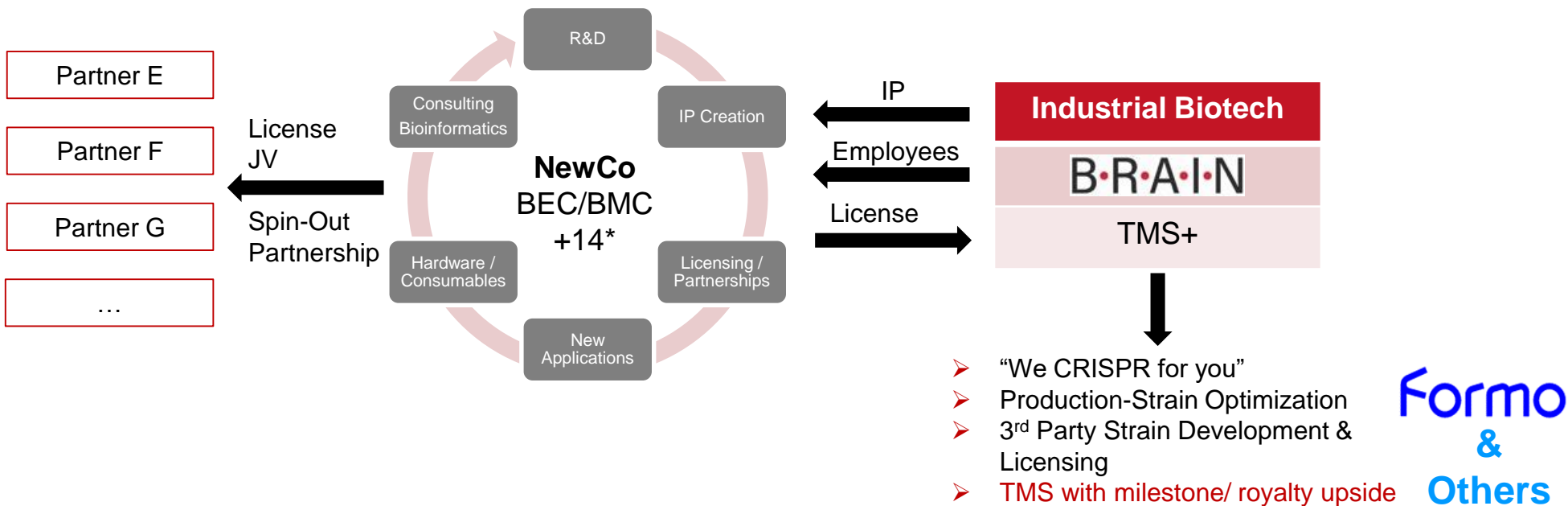
**#9**  
**Optimized Organism**

The BEC protein can be used to specifically knock-out or knock-in genes to optimize the genome of a variety of organisms.

# BRAIN Genome Editing: Platform Business

adding value across the group

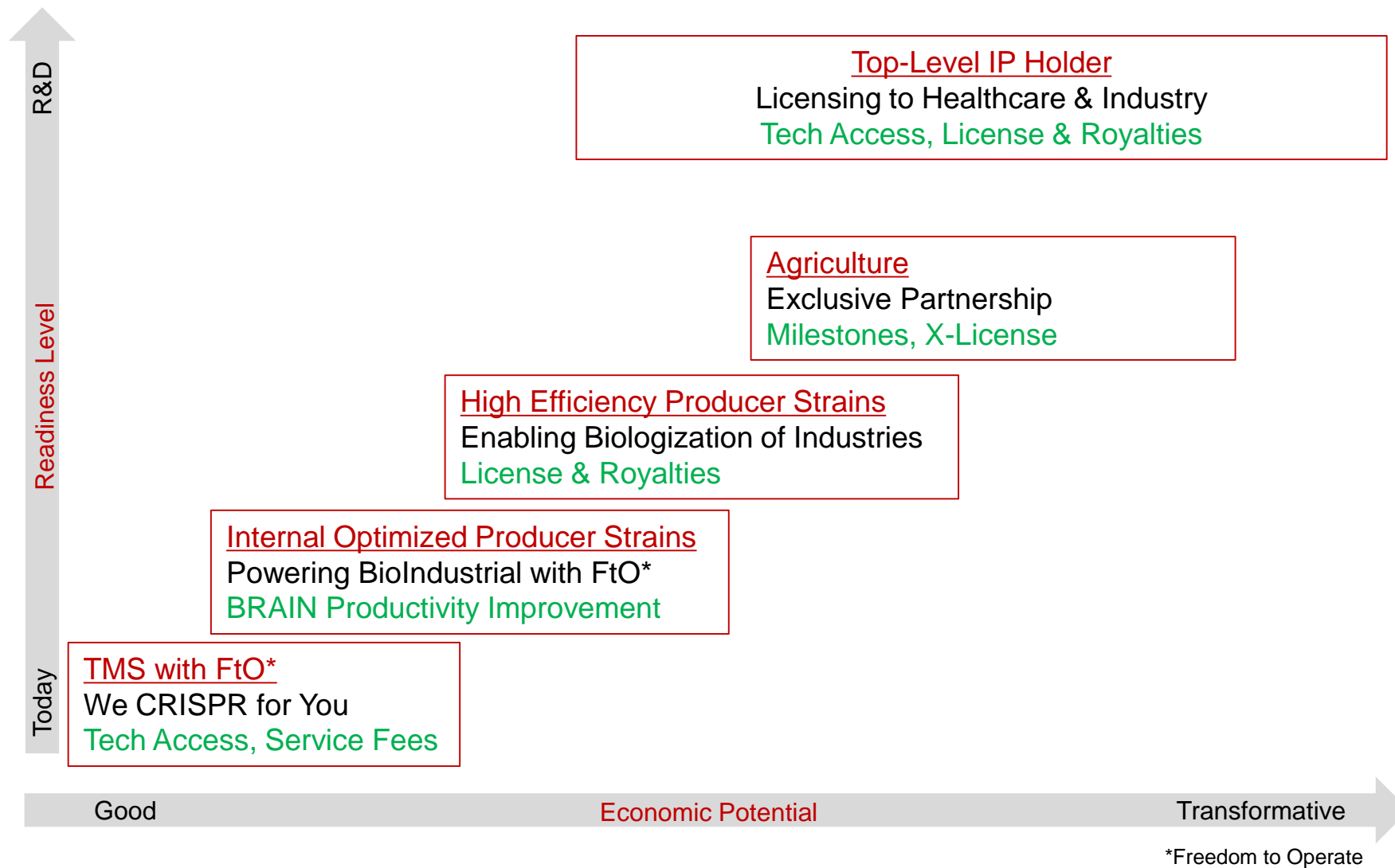
Agriculture	Life Science Application	Marine Application	Producer Strains
Non-Disclosed Int.			
Exclusive License	Non-Exclusive License	Research License	Cooperation



\*additional nucleases filed for IP protection

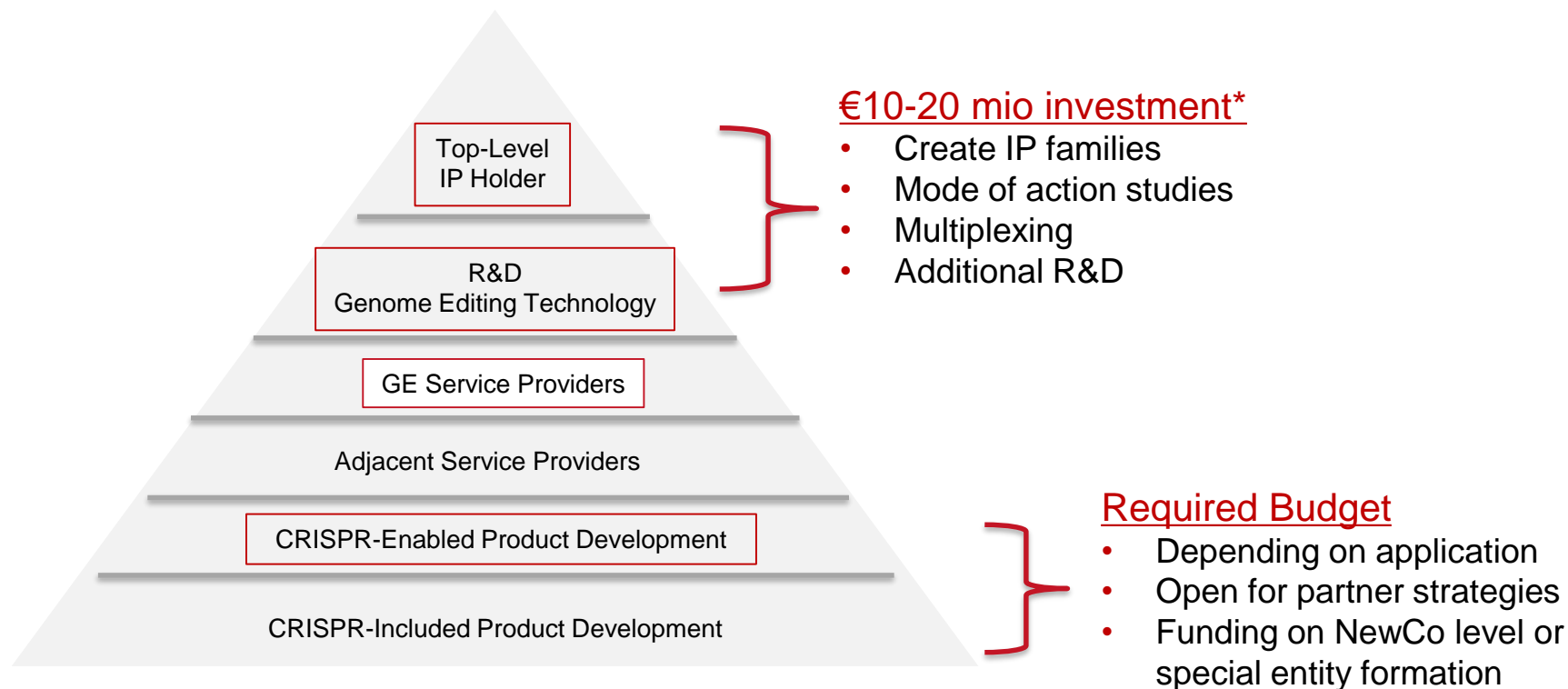
# BEC/BMC Has Transformational Characteristics for BRAIN

freedom to operate, fees, creating licence & royalty opportunities



# BEC/BMC Budget

a first indication



\*as previously guided



# SolasCure Ltd.

Revolutionizing Chronic Wound Care through Biomimicry



SolasCure

## For BRAIN:

- Discovering a unique technology and spinning it out in 2017 as a separate company
- 41% shareholding of BRAIN Biotech AG, at equity consolidated
- Created a targeted team at SolasCure Ltd.
- Share the commercialization financing burden with new investors
- Allows monetization at exit (e.g. IPO, Strategic Investor, PE)
- Aurase® IP stays with BRAIN Biotech AG, (patent estate, WO 2010/099955)

## The Market:

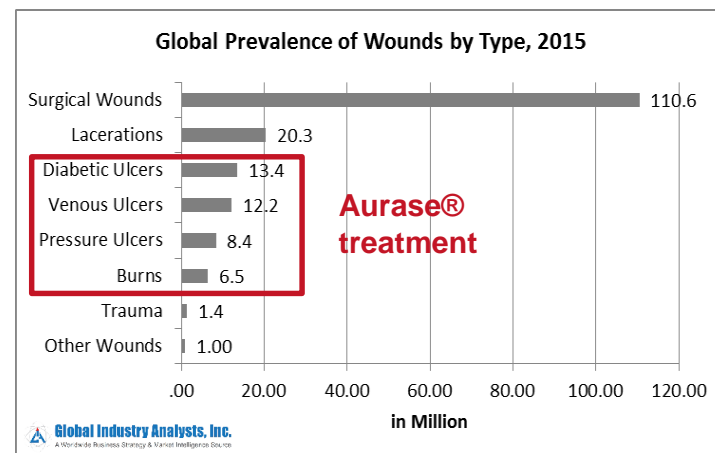
- Chronic wounds effect about 40mln people and consume about 10% of health care expenditures
- Advanced wound care market CAGR expected at 6,5% '18-26\* (aging, diabetes and obesity are the main growth drivers)
- Alternative to ineffective and painful surgical or autolytic debridement
- Current target market size ~€600mln

## The Product:

- Aurase® is a hydrogel containing a safe, active, highly specific enzyme
- The enzyme has been isolated and cloned from medical maggots (green bottle fly)
- Currently phase 2 of clinical trials
- Aurase® to be produced in a GMP biotechnological process
- Santyl® of S&N is currently the market leading drug for non-surgical wound debridement

## Latest Funding, Q1 '22

- GBP 3.7 Mio Series B1 in total
- BRAIN participated around pro-rata stake
- Pre-Money valuation +50% versus last capital injection
- BRAIN invested GBP 1.0 Mio cash
- New partner attracted

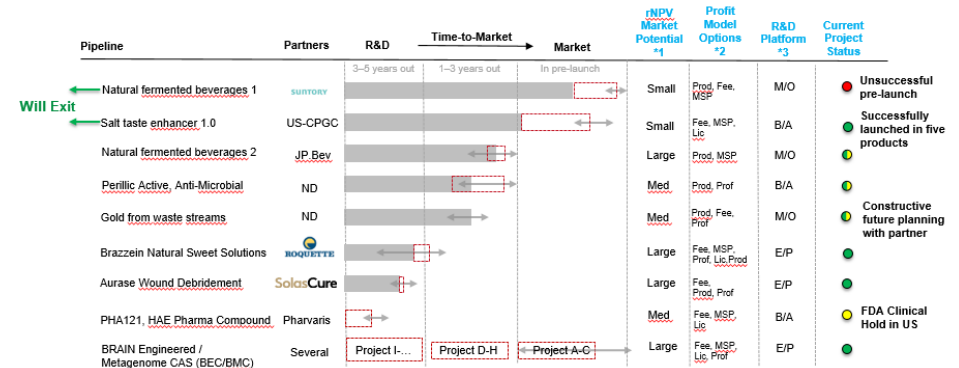


\*allied market research '19



# NBD Deep Dive, The Pipeline

Medium Market Potential



## Perillic Active

- Partners: US distribution partner contracted (non-disclosed); toll manufacturing
- Scope: nature based anti-microbial for food, feed, drinks and cosmetic applications, generated from industrial side streams; fermented orange oil
- US patent granted
- Technology Platform: BioActive
- Research Business Model: fee
- Commercial Model: JV/profit share

## Gold from Waste Streams / Urban Mining

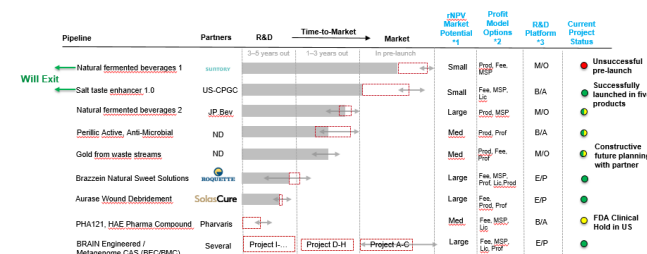
- Contract signed with undisclosed partner
- Scope: CO<sub>2</sub> efficient biological process for gold extraction from waste streams such as e-waste, today these valuable waste streams are deposited
- Technology Platform: microorganisms
- Research Business Model: own development, partially public funding, partner funding
- Commercial Model: flexible, dependent on partner and options for BRAIN (options: royalty, license, JV or franchise system)

# PHA121 / Pharvaris

## Value Creation

### The Market\*

- Large global HAE (hereditary angioedema) market of ~**USD 2 Billion size** with robust growth ~9% CAGR
- Rare but potentially life-threatening genetic condition: painfully, hospitalization
- At least 6,600 patients in the US, at least 8,900 patients in Europe
- Cash-Runway Pharvaris for > 2 years, USD 353 million gross financing proceeds since inception
- Supporting on-demand as well as prophylactic treatments of HAE
- Superior preclinical potency and longer duration compared to icatibant (Shire/Firazyr, SC injection)
- IP: issued US patent expires in 2038



### Value Creation\*\*

- PHA121 discovered by AnalytiCon
- Licensing agreement combined with a research agreement for Lead Optimization and CMC as a TMS service
- **Milestone payments** based on clinical development, regulatory events and sales development (**up to EUR 11.4 million**, paid to date EUR 1.15 million (€250K '16, €100K'18, €300K '19, €500K '21))
- **Tiered Royalty Agreement:** low to medium-single digit on direct and/or indirect net sales

- Successful example how we can create long-term value for BRAIN shareholders initiated by the TMS business
- Has entered our incubator as a project initially with “Medium” rNPV potential, could become “Large” when entering Phase III

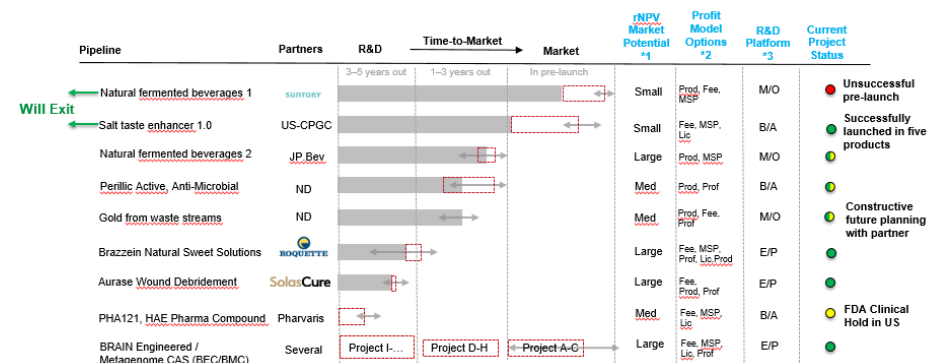
\*Source: Pharvaris corporate presentation

\*\*Source: Pharvaris Form F-1 Registration Statement



# NBD Deep Dive, The Pipeline

## Small Market Potential



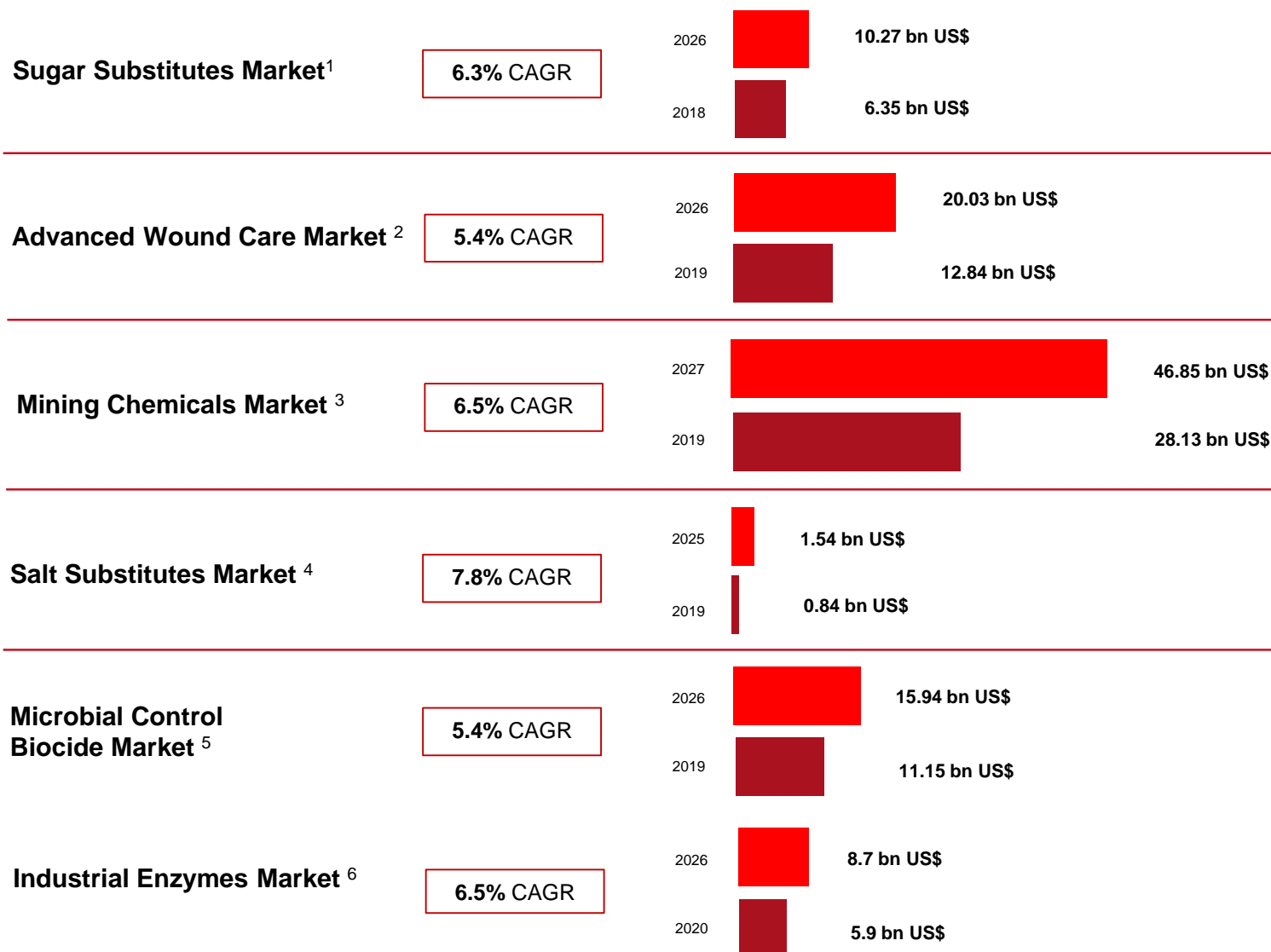
## Natural Beverage 1

- Partners: Suntory
- Scope: nature based low calorie drink innovation through fermentation
- Exclusive to Suntory, in a certain field
- Technology Platform: microorganism/starter cultures
- Research Business Model: milestone payments
- Commercial Model: starter cultures, license fee, royalties
- In market pre-launch

## Salt Taste Enhancer 1.0

- Partners: US-Consumer Packed Goods Company
- Scope: salt reducing taste enhancement via taste modulation
- Exclusive development with partner for one identified molecule
- Technology Platform: BioActive
- Research Business Model: fee, milestone payment (research phase finalized)
- Commercial Model: royalties
- Launch expected 2022

# NBD Deep Dive, The End-Markets



<sup>1</sup> Fortune Business Insights; 05/2020, <sup>2</sup> Industry Research; 08/2020 <sup>3</sup> Coherent Market Insights; 08/2020 <sup>4</sup> Industry statsreport BMRC; 01/2020 <sup>5</sup> Global Market Insights, 07/2020 <sup>6</sup> Markets and Markets, PR Newswire, 04/2020



# Service Business Deep Dive

## Programs with industry partners

- BRAIN Biotech AG has a long track record with dedicated contract R&D programs
- Monetization: tech-access, fees and milestone payments, royalties or entity formation/profit participation
- **Non-cyclical service contract business with secular growth**

## Tailor Made Solutions (TMS)

Novel natural products & solutions for the industry

- Partnered projects with the industry
- Active NBD sales approach
- Cost-plus contracts, milestones & license fees
- Cross selling of IP to non-exclusive areas
- Strong industry network with over 100 collaborations completed
- Deep and broad knowledge in enzymes, microorganisms and bioactive natural compounds
- Focus areas: nutrition, health and the environment
- From lab to production
- Multi-year contracts

## Libraries Business

BioArchive – industry leading collection of natural resources and metagenome libraries

- MetXtra™: unique in silico enzyme selection (Biocatalysts)
- ABEL®: Activity-Based Expression Libraries (BRAIN Zwingenberg)
- LIL®: Large Insert Libraries (BRAIN Zwingenberg)
- METAGENOME®: substantial metagenome libraries (BRAIN Zwingenberg)
- CompActives®: easily scalable compounds for bioactivity screenings (BRAIN Zwingenberg)
- MEGx: world's most sustainable collection of purified natural products, isolated from plants (MEGxp) and microorganisms (MEGxm) (AnalytiCon Discovery)

↑ \_\_\_\_\_ Strong link & interaction \_\_\_\_\_ ↑

# Partnerships „BRAIN Inside“












More than 100 exclusive partner collaborations successfully completed

	 <p><b>Speciality Enzymes</b></p>	 <p><b>High-performance Microorganisms</b></p>	 <p><b>Bioactive Natural Compounds</b></p>
<p><b>Industrial Partner*</b></p>			

\*confidential partnerships not disclosed

# Partnerships „BRAIN Inside“

Novel Solutions with high value added for our partners

	 <p><b>Speciality Enzymes</b></p>	 <p><b>High-performance Microorganisms</b></p>	 <p><b>Bioactive Compounds</b></p>
<b>Product range</b>	 		
<b>BRAIN inside</b>	<p>Low temperature detergent enzymes</p> <p>Flavorpro™ 786P Flavor creation in cheese processing</p>	<p>Optimisation of microbial strain for Isomalt production</p>	<p>Beiersdorf <b>Eucerin</b></p> <p>Skin anti-irritant Symstitute 1609</p>
<b>Industrial partner</b>	  <p>#3 detergent business globally</p> <p>BRAIN subsidiary</p>	 <p>#1 European sugar company</p>	 <p>#4 ingredients supplier globally</p>



# Enzyme Production, Expression Hosts

For expression hosts, a wide variety of protein expression systems are available

Enzymes can be expressed in cell cultures of bacteria or yeasts.

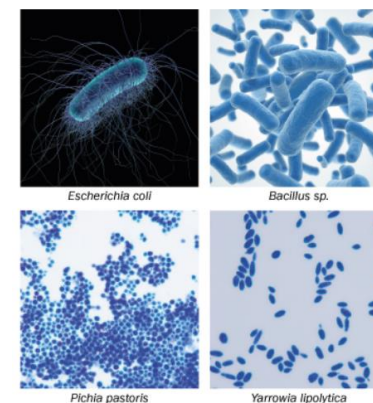
## Factors for choosing an expression system

- Protein quality
- Functionality
- Regulatory
- Production speed and yield

## Biocatalysts and WeissBioTech

- Use either bacteria or yeasts for the recombinant production of the enzyme being manufactured
- Have the ability to perform the fermentation process over a range from 250mL to 10m<sup>3</sup> scale
- This makes it possible to efficiently optimize the production yield

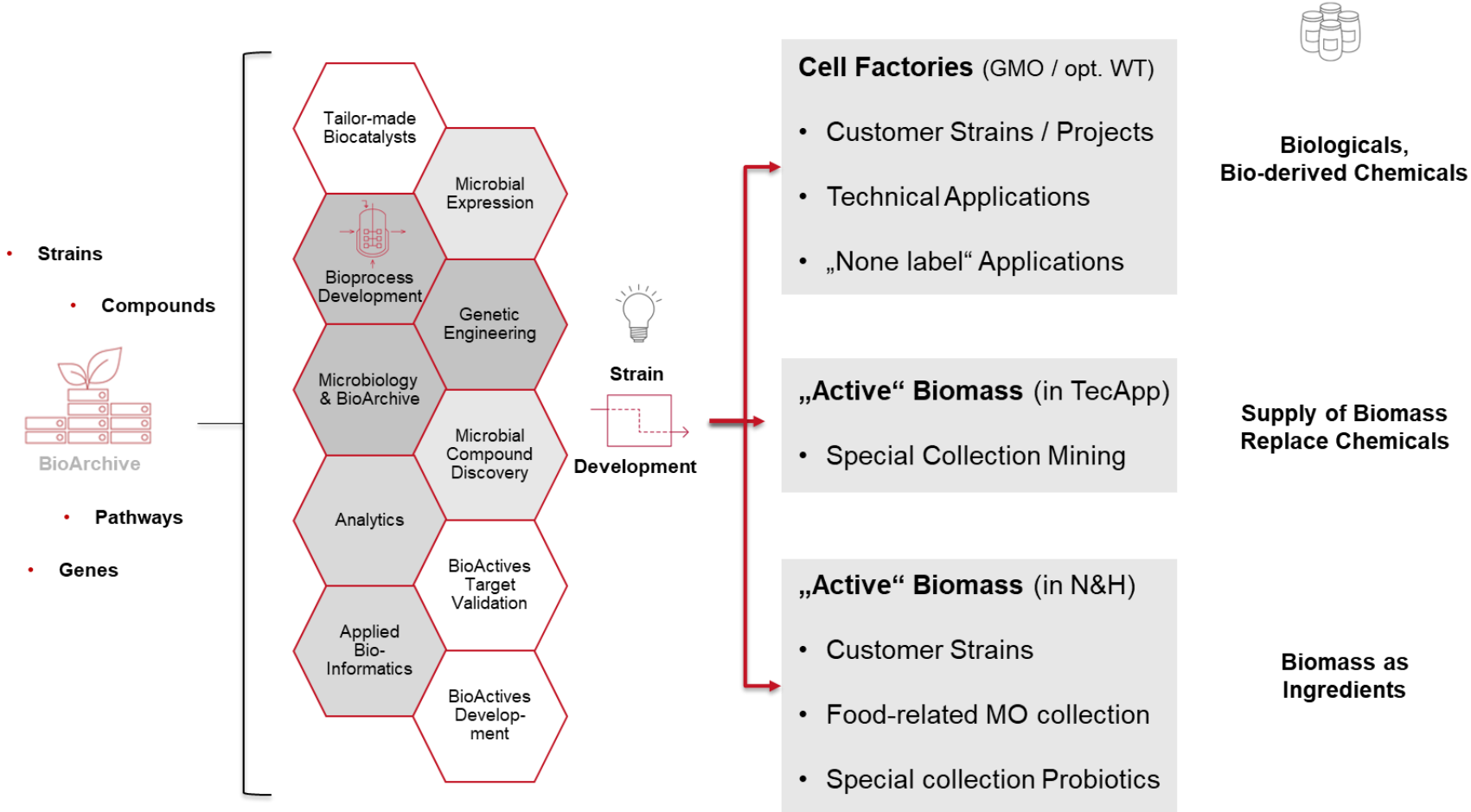
**Ongoing development & optimization of our expression hosts is key for the cost competitiveness of our products. In-licensing is also under consideration.**



\*source: Biocatalysts

# Enzyme Production, Expression Hosts

## Strain Development: Setting the Scene



# We Cover the Entire Enzymes Value Chain

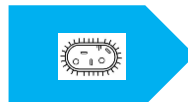
All steps are underpinned by strong customer application knowledge



Discovery



Protein and Enzyme Engineering



Expression/Secretion: Bioprocesses & scale-up



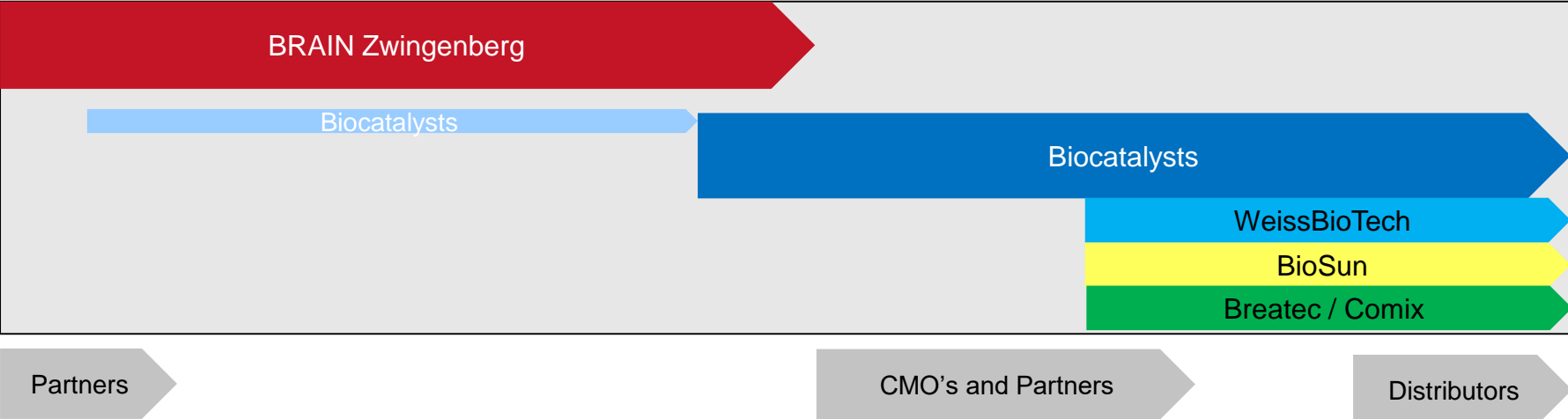
Large Scale Fermentation



Formulation And Blending



Marketing and Sales



**Bolt-on M&A further strengthens our offering**

# BRAIN BioArchive – Nature's Toolbox

~ **53,000**

Characterized  
Microorganisms

**450**

Habitat collections  
and environmental  
samples

**464**

Gene libraries  
available for  
screening

~ **13,000**

Plant fractions  
available for isolation  
campaigns

~ **13,000**

Plant fractions available  
for isolation campaigns

~ **50,000**

Natural and naturally  
inspired compounds

**54**

Metagenome  
libraries

**231**

Giga-bp DNA ready  
to screen

~ **300 Mio.**

Reusable ready-to-  
screen Metagenome  
clones



## High Value:

- ✓ >450 person years to reproduce
- ✓ ~175 patents
- ✓ ~40 patent families
- ✓ Powering TMS, NBD & product sales

# HR: People – Our Core Capital\*

BRAIN is a Knowledge Driven Enterprise

Innovation is our Passion & Teamwork our Basis

- Strong corporate culture
- Technology campus
- Global scientific and university network
- BRAIN alumni platform

**~39**

years average age

**9**

years average tenure

**54%**

female employees

**8**

trainees

**55%**

Academics

**~ 7%**

Average fluctuation since '04



strong support for PhD and  
master theses

**23%**

PhDs



equal pay policy

\* numbers refer to BRAIN Biotech AG



# Detailed Management & Employee Incentives

- ✓ **Since the IPO BRAIN Biotech AG's board as well as management compensation has been linked and aligned with shareholder interests**

## Executive Board

(Fix + performance based bonus)

variable component based on individual quantitative & qualitative targets  
stock component, see ESOP

## CoPerBo

Corporate Performance Bonus

- ❖ Since FY 2015/16
- ❖ For all employees without personal targets
- ❖ Annual bonus based on basic salary
- ❖ Three factors, 1/3 each
  - Total operation performance BioScience
  - Adj. EBITDA BioScience
  - Absolute share price performance in FY
- ❖ Payout range between 0-30% of basic salary

## ESOP

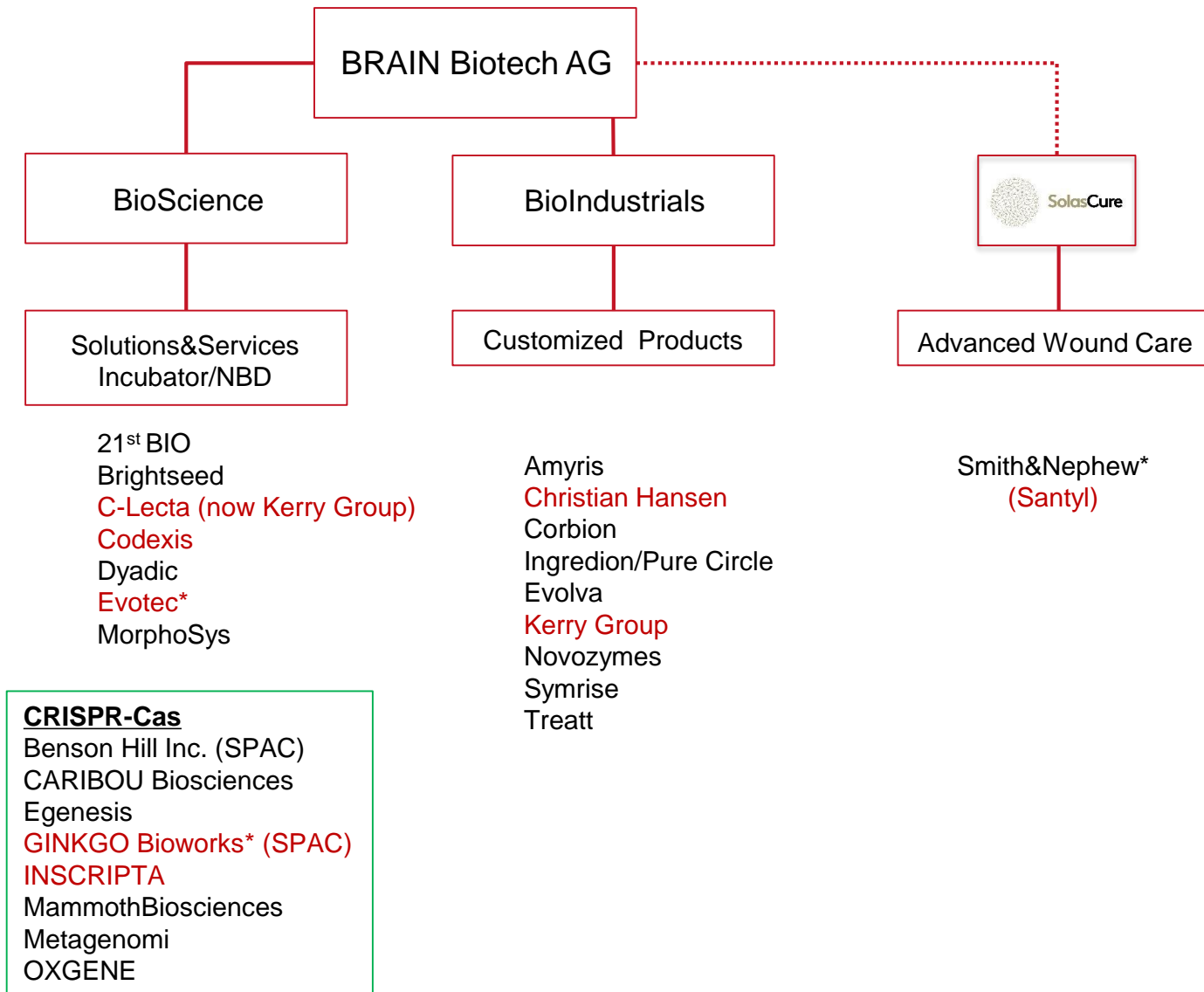
Employee Stock Ownership Program

- ❖ Since June 2018
- ❖ Board, managers and employees
- ❖ Incentive and retainer
- ❖ 1 Option = 1 Share at exercise price
- ❖ Strike price €20,67 and €10.64 from ESOP 2017 and 2018
- ❖ Beneficiary needs to still be employed
- ❖ Earliest exercise day, 4 years after grant
- ❖ Caps partially in place
- ❖ Monte Carlo model applied for fair value calculation
- ❖ 437,600 options outstanding as of Sept.30<sup>th</sup> 2019

## Specific Incentives at Daughter Companies

- ❖ Growth equity program Biocatalysts Ltd.
  - Incentivize and retain managers
  - Share program without voting or dividend rights
  - Put option based on reporting Sept. 30<sup>th</sup>, 2022
  - Growth incentive with pre-defined EBITDA multiples
  - Cash settled, €17.07 value/share as of September 30<sup>th</sup>, 2019
- ❖ Employee share scheme, AnalytiCon Discovery
  - Put options for employees and management until February 2020
  - Remuneration in 3 tranches
  - Ownership now at 100%

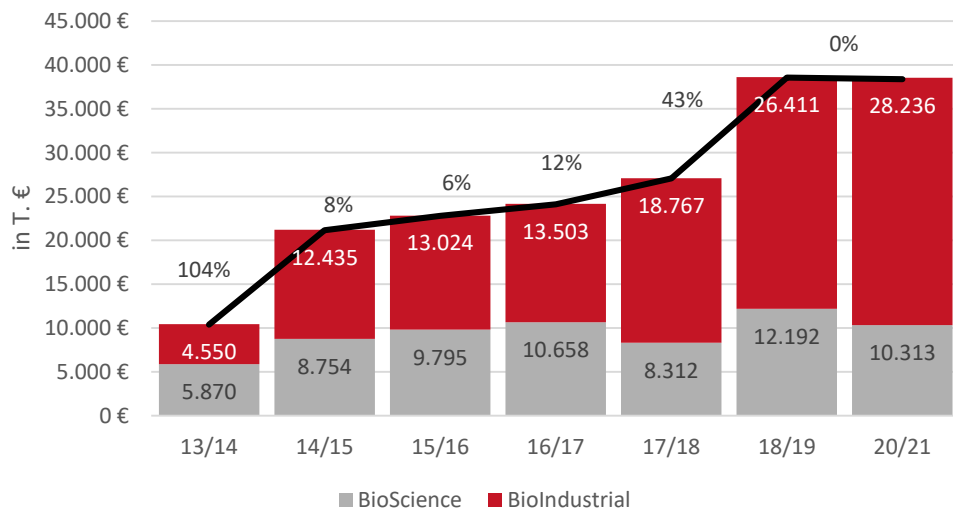
# Peers by Business Activity



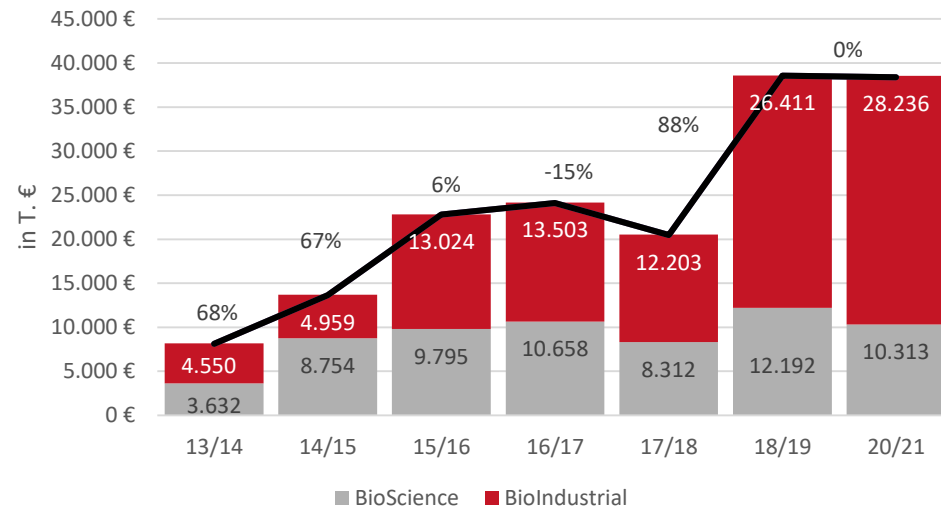
\*peers by business model

# Detailed Financials – Organic vs. Reported

Long-term reported revenues per segment

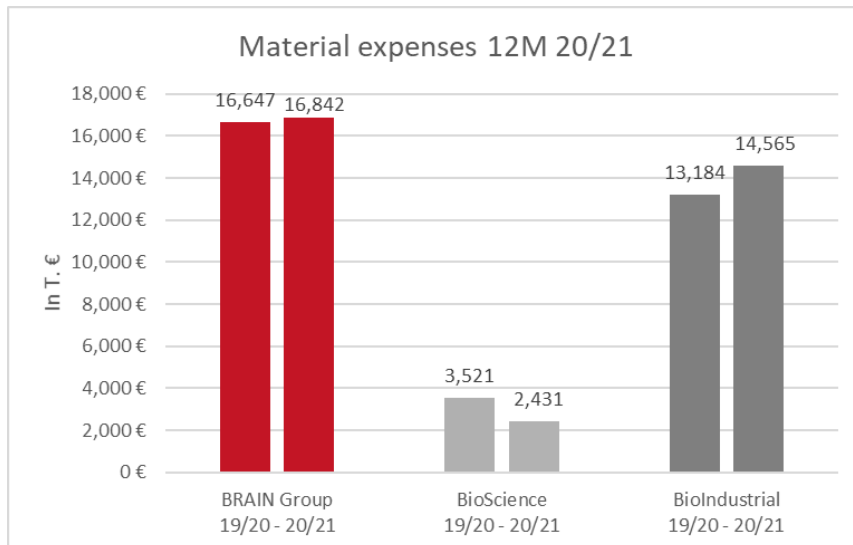
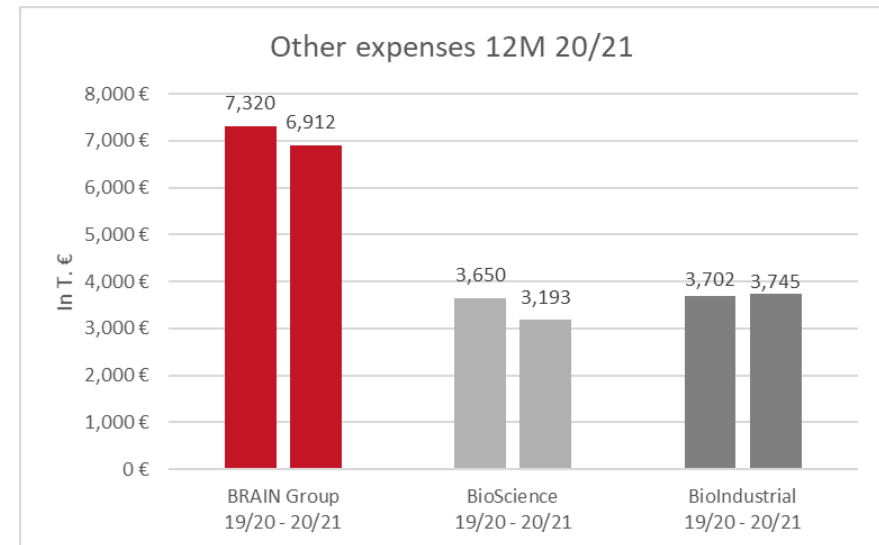
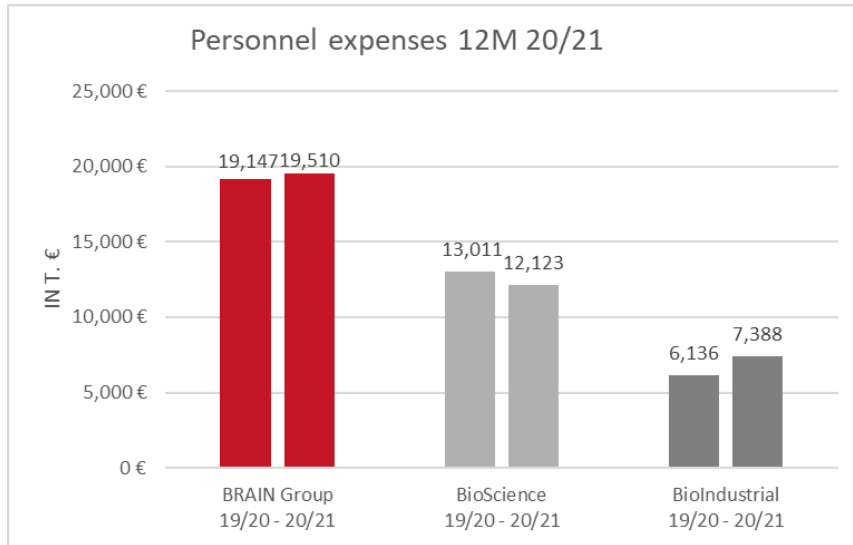


Long-term organic revenues per segment





# Detailed Financials – Expenses Development



# Detailed Financials – Adjusted vs. Reported

For a like-for-like comparison BRAIN Biotech AG adjusts its EBITDA for its employee stock ownership program, performance based numeration in daughter companies, acquisition & integration costs

(in € thousand)	12M 20/21	12M 19/20
<b>EBITDA</b>	-2,533	-3,876
Gain on bargain purchase	858	0
Share-based employee compensation	-989	-629
Acquisition and integration costs incurred in the expansion of the BRAIN Group	-313	-222
Board Changes & Corona Bonus	0	-1,007
<b>Adjusted EBITDA</b>	-2,089	-2,018

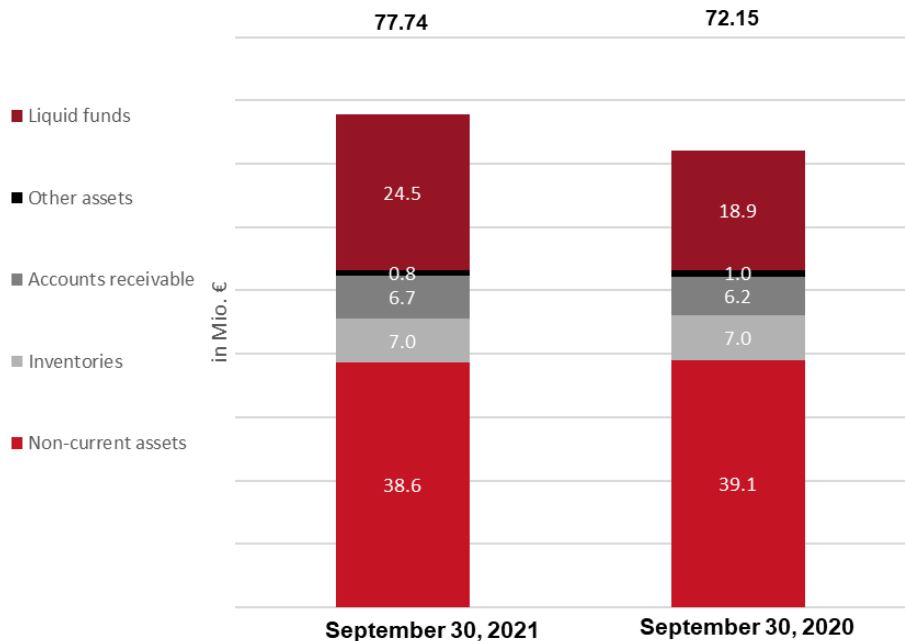
# Detailed Financials – Financial Debt vs. Financial Liabilities

For or a detailed analysis of our EV calculation, our financial liabilities include:

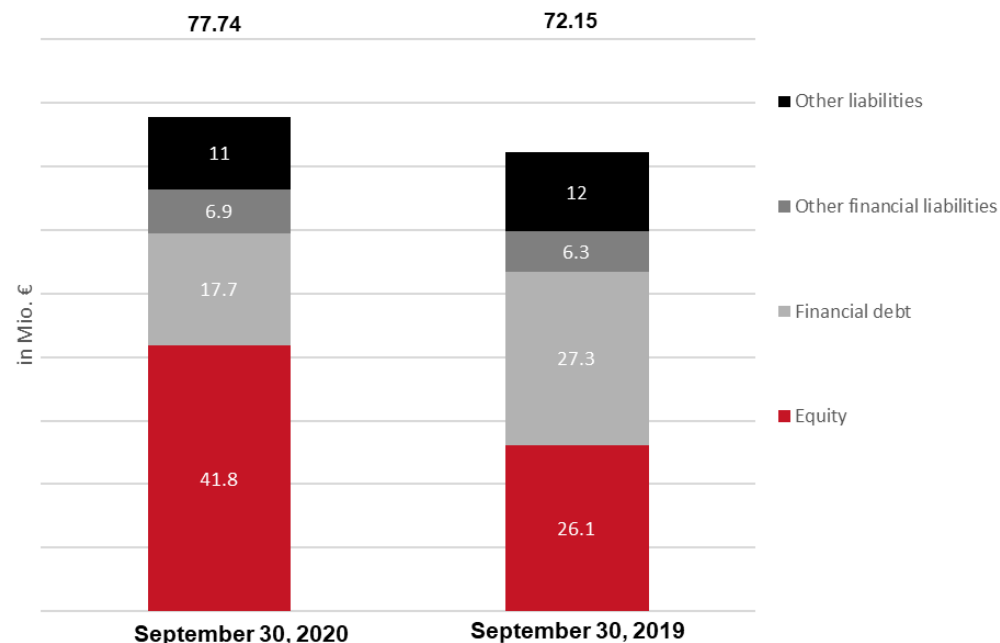
€thousands	Sept 30th, 2021	Comment
Liabilities from put option rights	4,401	Biocatalysts Ltd. Call/Put options '23/'24, earlier exercise possible, currently 80.65% ownership
Non-controlling shareholders' put option rights	6	
Contribution by silent partners	4,526	€1.5mln Hessen Kapital I GmbH, €3.0mln Hessen Kapital II GmbH, Hybrid Instruments (silent participation)
Sum I	8,933	
Loans	4,721	€2.5mln secured by Brain AG, Biocatalysts & L.A. Schmitt land charges
Finance Lease Liabilities	6,655	mostly plant & equipment
Derivatives	0	mostly FX hedging
Other	9	
Sum II	11,385	
Total	20,318	
Cash, 12M	24,545	

# Detailed Financials – Balance Sheet

Balance sheet September 30, 2021 vs September 30, 2020



Balance sheet September 30, 2021 vs September 30, 2020



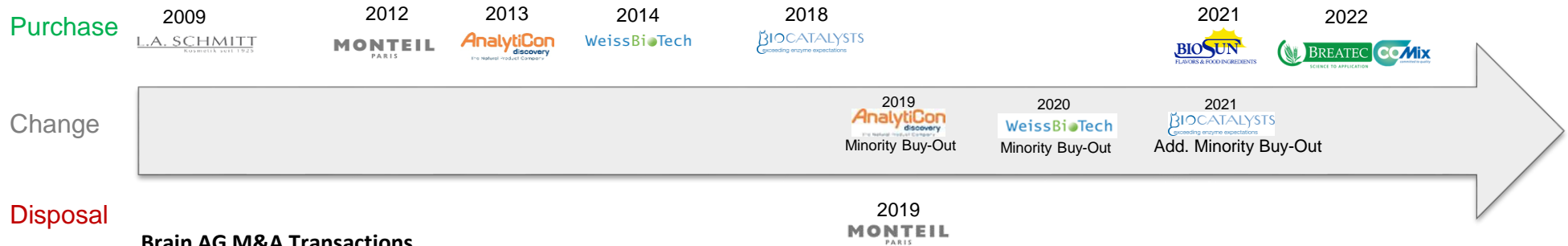
# M&A Criteria & History

## Qualitative mid-term M&A criteria

- B2B only
- Clearly focused on the product business
- Niche applications and producers
- Europe focused, US an option

## Quantitative mid-term M&A criteria

- Bolt-on character
- Profitable or at least break-even
- Value accretive within 1-2 years post synergies
- Realize economies of scale



### Brain AG M&A Transactions

#### Purchases

Target	Time	Description	Comment
L.A.Schmitt	2009	B2B cosmetics	
Monteil Cosmetics	2012	B2C cosmetics	
AnalytiCon Discovery	2013	Library, TMS, R&D, nature-based	
WeissBioTech	2014	distributor, formulator and blender	
Biocatalysts	2018	enzyme design & production	65.55% owned, put/call options in place
BioSun	2021	distributor, formulator and blender	
Biocatalysts	2021	enzyme design & production	stake increased to 82.2%, put/call options in place
Breatec/Comix	2022	extension into baking enzymes	62% owned, put/call options in place

#### Disposals

Asset	Time	Description	Comment
Monteil Cosmetics	2019	B2C cosmetics	refocus of Brain on the B2B segment

# Management CV – Executive Board



**Adriaan Moelker (CEO)**

- Master of Business Administration
- Year of birth 1964
- Joined BRAIN in 2020
- 20+ y of professional experience in industrial biotechnology innovation
- Successful in terms of innovation & revenue
- Extensive global experience in all key industrial enzyme segments



**Lukas Linnig (CFO)**

- B.S. in Economics, CFA
- Year of birth: 1993
- Joined BRAIN in 2015
- 7+ y leadership experience in finance, controlling and legal
- Successful in implementing finance controlling systems
- Prior to BRAIN: VC and consulting
- Advisor during the IPO

# Analyst Coverage

Bank	Analyst	Target Price	Recommendation
	Markus Mayer	20.50 €	Buy
	Falko Friedrichs/Jan Koch	13.00 €	Buy
	Dr. Mohamad Vaseghi	14.00 €	Buy
	Fabien Le Disert	14.00 €	Buy
	Dr. Christian Ehmann	21.00 €	Buy

# Glossary I

Aurase®	Enzymatic agent as part of an innovative gel-based medical device for the biotherapeutic treatment of chronic wounds
Bioactive natural compounds	Used to develop products for the food, beverages, skin care, cosmetics and chemical industries
Bio-based	Bio-based products are goods manufactured from renewable raw materials
Biocatalysts	Enzymes that act as catalysts to accelerate (bio)chemical reactions
Biocatalysts Ltd. and Biocatalysts Inc	BRAIN subsidiaries based in UK (headquarters in Cardiff, Wales) and subsidiary in US (Illinois); global distributor network e.g. Korea, Australia, New Zealand. Key player in the specialty enzyme business
Bioeconomy	Concept for a biobased economy; mega-trend that encompasses the transformation from industries based on fossil raw materials to a more sustainable form of economic activity that mainly utilizes biological resources and processes
BioIndustrial	One of BRAIN's two business segments: development and marketing of the company's own products along the value chain
Biologization of industry	Application of biological processes in an industrial setting with the aim of creating a more sustainable economy
Biorefinery	<p>Technology for the sustainable processing of biomass into marketable products (e.g. food, feed, materials, chemicals) and energy (fuels, electricity, heat).</p> <p>Integrated biorefineries combine various such technologies with the aim of greater flexibility and cost reduction. Integrated biorefineries facilitate the use of byproducts and waste, and enable the production of high-quality products (e.g. fine chemicals) combined with low-quality products (e.g. bioenergy).</p>
BioScience	One of BRAIN's two business segments: cooperation business established with globally operating industrial partners



# Glossary II

Biotechnology	Application-oriented sub-sector of biology; includes insights and methods from microbiology, genetics, biochemistry, technical chemistry and process engineering; utilizes biological processes e.g. for industrial applications
BEC	<b>BRAIN Engineered Cas:</b> BRAIN's first proprietary non-Cas9 genome editing nuclease
BioXtractor	BRAIN demonstration plant for next-generation metal extraction in the areas of green and urban mining based on microorganisms
BRAIN Bioarchive	In-house collection consisting of around 53,000 comprehensively characterized microorganisms (including "chassis microorganism" strains for the development of production organisms) and the BRAIN libraries: an enzyme library, a metagenome library and a substance library with numerous isolated natural compounds (see also BRAIN libraries)
BRAIN Libraries	<p>BRAIN Group collections of enzymes, DNA sequences or natural substances</p> <p>Enzyme library: up to 500 isolated and pre-characterized enzymes and DNA coding for enzymes introduced into expression vectors</p> <p>Metagenome library: screenable DNA library with metagenomes from different habitats; collection serves to identify previously uncharacterized enzymes and metabolic pathways</p> <p>Substance library: collection of natural substances with sub-libraries of specific, well-characterized groups of substances</p>
BMC	<b>BRAIN Metagenome Cas:</b> BRAIN's second proprietary non-Cas9 genome editing nuclease
Bulk enzymes markets	Volume-driven mass markets for enzymes sold in large volumes. This stands in contrast with the high-margin business with specialty enzymes
Business-to-Business (B2B)	Form of the market in which the supply and rendering of services is realized by companies to companies (= business relations between at least two companies)
Cas	CRISPR associated sequence

# Glossary III

Circular bio-economy	Term derived from the fusion of the two concepts of the “bio-economy” and the “circular economy”; circular bio-economy focuses on the sustainable, resource-efficient utilization of biomass in integrated production chains (e.g. biorefineries) while BRAIN demonstration plant for next-generation metal extraction in the areas of green and urban mining based on microorganisms simultaneously utilizing residual and waste materials; the sequential use (cascade use) of biomass resources for different purposes ensures value optimization.
Circular economy	Concept for the complete recovery of raw materials utilized, beyond a commodity’s life cycle, through to new production processes; component of the bioeconomy
Clone	Genetically identical organisms, created by natural division or reproduction, or artificially created
Compliance	Alignment of companies with laws and directives, as well as voluntary codes
CRISPR	Clustered regularly interspaced short palindromic repeats
CRISPR-Cas	systems have enabled genome editing in multiple species and provided genetic tools with speed as well as simplicity that were previously unavailable
Development pipeline	Total number of BRAIN Group development projects for New Business/Product Development
Development projects	R&D projects of the BRAIN Group for New Business/Product Development
DNA	Deoxyribonucleic acid: biomolecule that carries genetic information (genes)
DOLCE	Strategic partnership initiated by BRAIN for the development of natural sweeteners and sweet taste enhancers
Editing	requires only two components (1. Cas nuclease 2. programmable guide RNA), and can be multiplexed for simultaneous modification of multiple sites in a single transformation event

# Glossary IV

Enzymes	Proteins that accelerate biochemical reactions in their function as biocatalysts; play an important role in the development of biobased products; BRAIN identifies and develops optimized enzymes and biocatalysts for complex process and application requirements
FRESCO	BRAIN development program for freshness and product stability utilizing natural bioactive substances; suitable for the food and feed industry, for medical products, paints, cleaning agents and other household products
Genome Editing	Directed and precise change or use of a chromosomal target in a given organism; “the power to program cells”
Giga-bp DNA	Length of a DNA sequence, indicated by the number of base pairs (1 Giga bp = 1,000,000,000 base pairs); common metagenomics measure
GRAS status	Generally Regarded as Safe status: declaration of safety for the use of substances (e.g. microorganisms) to manufacture foodstuffs; GRAS organisms can be utilized without restriction in biotechnological production
Green mining	Sustainable mining, e.g. ore treatment to extract gold, silver or copper using microorganisms rather than chemicals
Habitat	An organism’s natural environment
High-performance microorganisms	Biotechnologically optimized microorganisms that serve as microbial “cell factories”
HTC technology	Human Tongue Cell Technology; in vitro test system based on human tongue cells, established and patented by BRAIN to test substances for their sweetening power
Industrial biotechnology	Also known as white biotechnology; drives innovation for a paradigm shift away from petroleum-based towards biological processes and bioeconomy products
Metagenome	All the genomic information present in all the microorganisms of a specific community
Metagenomics	Genomic analysis of a community of organisms by gene sequencing; genetic material is extracted, sequenced and analyzed directly from environmental samples, which saves the previous cultivation of microorganisms

# Glossary V

Microorganism	Microscopically small unicellular or multicellular organisms, e.g. bacteria, algae, fungi or viruses
New Business Development (NBD)	Systematic further development of existing and development of new business opportunities including e.g. R&D and marketing activities
New Product Development (NPD)	R&D activities that aim to develop product candidates for the BRAIN Group's own market offerings
Peptides	Linear, sometimes ring-shaped chain of molecules consisting of two or more amino acids; long polypeptide chains are called proteins.
Product sales	Sales of products in the fso known as white biotechnology; drives innovation for a paradigm shift away from petroleum-based towards biological processes and bioeconomy productsorm of merchandise, technologies or biotechnological system solutions; can be achieved via the BRAIN Group's direct B2B business or through joint product developments with industrial partners and corresponding licensing agreements; scalable-product business option offered by the BRAIN Group (see also R&D cooperation partnerships)
R&D	Research and development
SALT-E	BRAIN development program for healthier foods through salt reduction
SDG-UN	United Nations Sustainable Development Goals
Specialty chemicals	Specific chemical products with a broad range of activities on which a large number of other industrial sectors depend
Synthetic Biology	Area of biology in which organisms are modified to develop new, useful abilities
Specialty enzymes market	Markets for high-margin specialty enzymes business

# Glossary VI

Tailor-Made-Solutions TMS	Dedicated contract R&D programs for the development of tailor-made solutions for industry
Urban mining	Sustainable extraction of valuable substances from secondary raw materials and waste flows in order to retain them in value chains in the long term
White Biotechnology	Includes the application of modern biotechnology in industrial production processes. Chemical starting materials are converted by enzymes and cells into products suitable for further processing. Also known as industrial biotechnology