PreveCeutical Medical Inc.
CSE:PREV | OTC:PRVCF | FSE:18H

BIOGENE
THERAPEUTICS

Q2 – 2025

Investor Presentation

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Our Mission

BioGene commits to

Delivering the Future of Genetic Medicines

with Precision Delivery, opening the door to alternative patient-friendly routes of LNP administration through innovative products and platforms that target key tissues of interest in obesity and diabetes… and beyond!

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DISCLAIMER

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Board of Directors

Stephen Van Deventer

Stephen is the **Chairman, CEO and President** of BioGene Therapeutics and **PreveCeutical Medical**, with extensive experience in capital markets with a focus on life sciences. Stephen has started and raised millions in the capital markets space.

Deepak Sampath, PhD

Deepak will serve as an Independent Director for BioGene. He is the Senior VP, Head of Research at **Ultragenyx**, with previous experience at **Pfizer** and **Genetech**, along with over 100 publications, 20 issued patents and numerous IND, NDA, BLA filings and drug approvals for the treatment of cancer.

Steve Glover

Steve joins BioGene as a Board Member, bringing multifaceted experience in Fortune 100 and start-up environments. He sits as Chairman and CEO of Nasdaq-listed **ZyVersa Therapeutics** and was former Chairman of **Ambrx**, which was acquired for $2B.

Dr. Linnéa Olofsson, PhD

Linnéa has been as a Board Member at BioGene Therapeutics and sits on the board at **PreveCeutical Medical**. Linnéa is an accomplished biophysicist with years of experience with expertise in pharmacology, oncology, cell biology and gene editing.

Patroski J. Lawson, MSP

Patroski is the founder and CEO of **KPM Group DC**, a strategic public affairs firm. With over 20 years of experience in government affairs, he has worked across local, state, federal, and global levels, including roles at **Solvay Pharmaceuticals**, **Abbott**, and **Lundbeck**.

Senior Management

Stephen Van Deventer

Stephen is the **Chairman, CEO and President** of BioGene Therapeutics and **PreveCeutical Medical**, with extensive experience in capital markets with a focus on life sciences. Stephen has started and raised millions in the capital markets space.

Alex McAuly, CPA

Alex serves as the **Chief Financial Offocer** for BioGene. He is a Chartered Professional Accountant of Canada with vast experience in running publically traded companies through his astute knowledge of accounting principles in North America and Europe
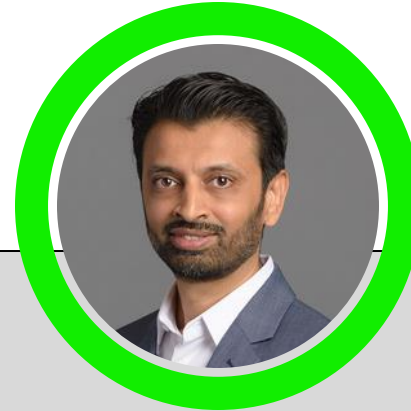
Harry Parekh, PhD

Harry is welcomed to the BioGene team as **Chief Science Officer & Scientific Founder of BioGene**. Harry is currently a Director of Research and Research Group Leader at the **University of Queensland, Australia**. He also serves as **CRO & Scientific Founder** for PreveCeutical Medical.

Dr. Linnéa Olofsson, PhD

Linnéa has been appointed **Director of Science** at BioGene Therapeutics and sits on the board at **PreveCeutical Medical**. Linnéa is an accomplished biophysicist with years of experience with expertise in pharmacology, oncology, cell biology and gene editing.

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Scientific and Corporate Advisory Board

Prof. Mirela Delibegović

As a member of BioGene's **Scientific Advisory Board**, Mirela brings a wealth of knowledge in metabolic physiology with a focus on diabetes, obesity and CVD. Prof Mirela holds the prestigious **Regius Chair of Physiology at The University of Aberdeen, UK**.

Barry Ticho, MD, PhD

Barry will serve on BioGene's **Scientific Advisory Board**. Barry holds several prestigious roles as Founder and Board Member at **Verve Therapeutics, Cardior Pharmaceuticals, Sania Therapeutics and Stoke Therapeutics.**
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Mariya Georgieva, PhD

Mariya will serve on BioGene's **Scientific Advisory Board**. Over the past 5 years, Mariya has worked with **AstraZeneca,** as a Director of Alliances in the Diagnostic Precision Medicine division. She is adept in molecular biology, super-resolution microscopy and relationship development.
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Brian Gallagher, Jr.

Brian will sit on the **Corporate Advisory Board** bringing critical investment experience within the life sciences sector raising capital through various channels including the **Michigan Biomedical Venture Fund, Slate Bio and Trek Ventures.**

Kathy Rokita

Kathy is joining the **Corporate Advisory Board** and currently is a Managing Director at **CBIZ** and has provided consulting services for physician groups and healthcare organizations for over 30 years. She has had successful exits, most notably as a Principal at Somerset CPAs.

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BIOGENE AUSTRALIA

BioGene has established a wholly-owned subsidiary in Brisbane, Queensland, Australia, to bolster their research and development interests and provide significant cash-back R&D grants from the Australian government.

Brisbane hosts a series of globally-renowned research, manufacturing and clinical trial facilities.

BioGene to receive **43.5%** cash back from Australian Federal Government on all R&D, clinical trial and operational costs.

Brisbane

R&D Formulation & Preclinical Facility

GMP Manufacturing Facility
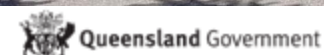
Queensland Government
Royal Brisbane and Women's Hospital
Metro North Health

Queensland Government | Children's Health Queensland

Queensland Government | Metro South Health

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A Global Epidemic

1 OBESITY
Cases have tripled in the past decade leading to elevated risk of mortality: heart disease, stroke and dementia.

2 DIABETES
1 in 10 adults are diagnosed with diabetes. Childhood rates of diabetes & obesity are on a steep upward trajectory.

3 DRUG SIDE EFFECTS
Debilitating and even life-threatening side affects have emerged with current marketed weight-loss treatments.

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Obesity Rates

Obesity Cases Triple in a Decade
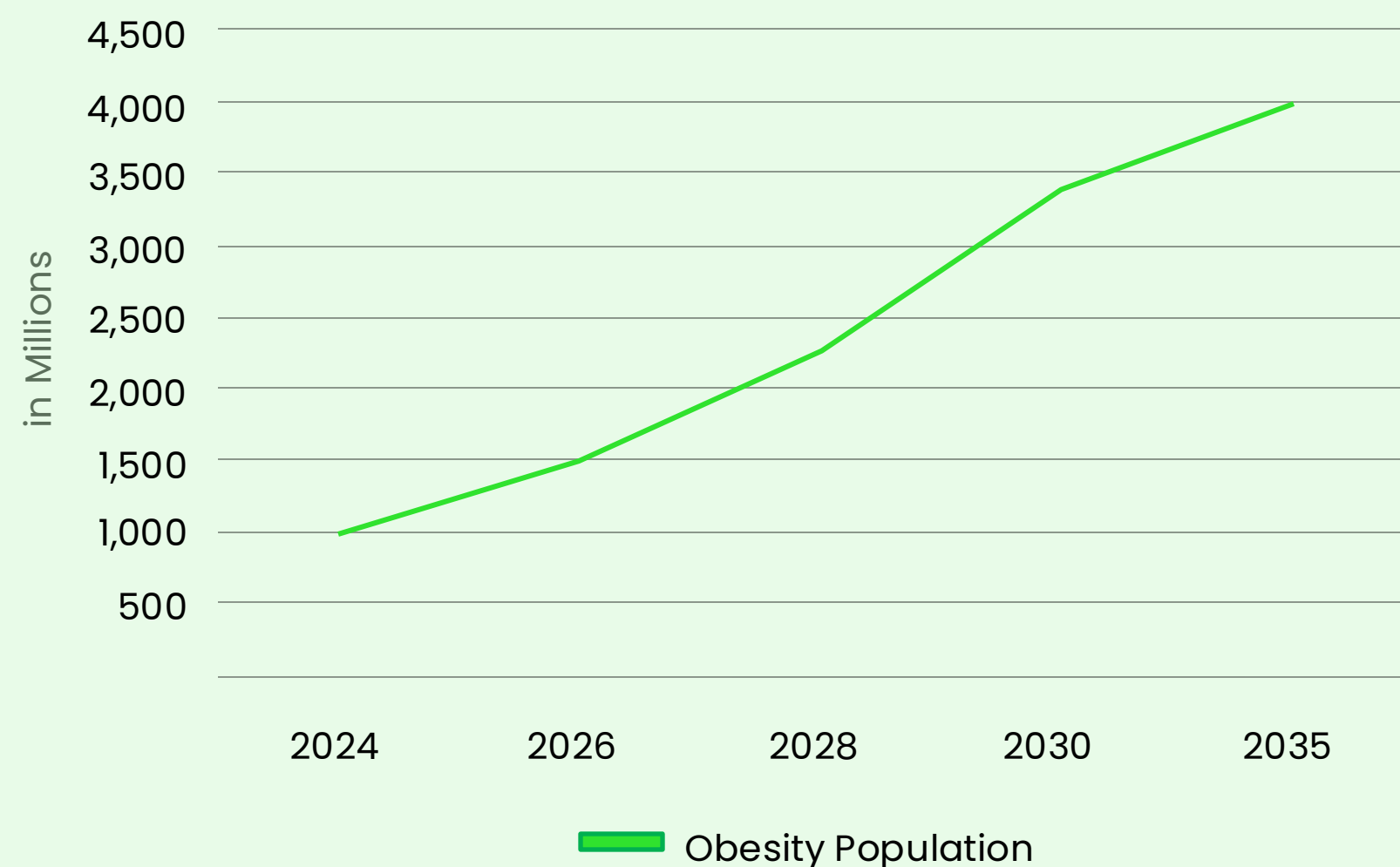
- The World Obesity Federation (WOF) predicts that despite current treatments the economic impact of obesity will reach >$4 trillion annually by 2035.

- WOF report predicts that by 2035, **>HALF** of the world's population (>>4 billion people!), will be classified as "obese".

- Childhood obesity cases are anticipated to impact >200 million boys and >170 million girls by 2035.

www.mordorintelligence.com/industry-reports/weight-loss-diabetes-drug-market

Diabetes Rates

1 in 8 Adults are Diabetic and Children Rates Rapidly Rise

Adults

in Millions

1,000

500

0

2023 2030 2035 2040 2045

■ Adults

Children

600,000

400,000

200,000

0

2017 2025 2040 2060

■ Children (USA only)
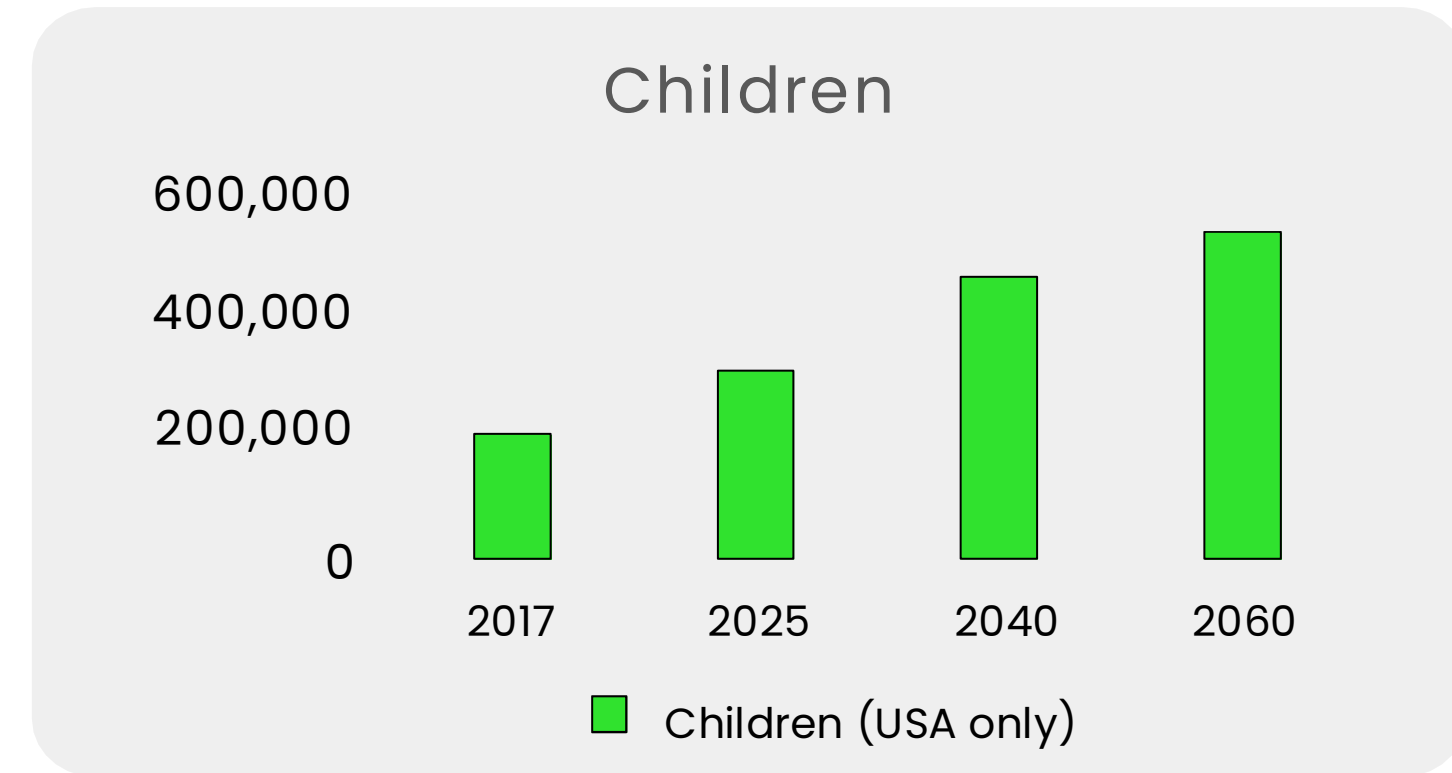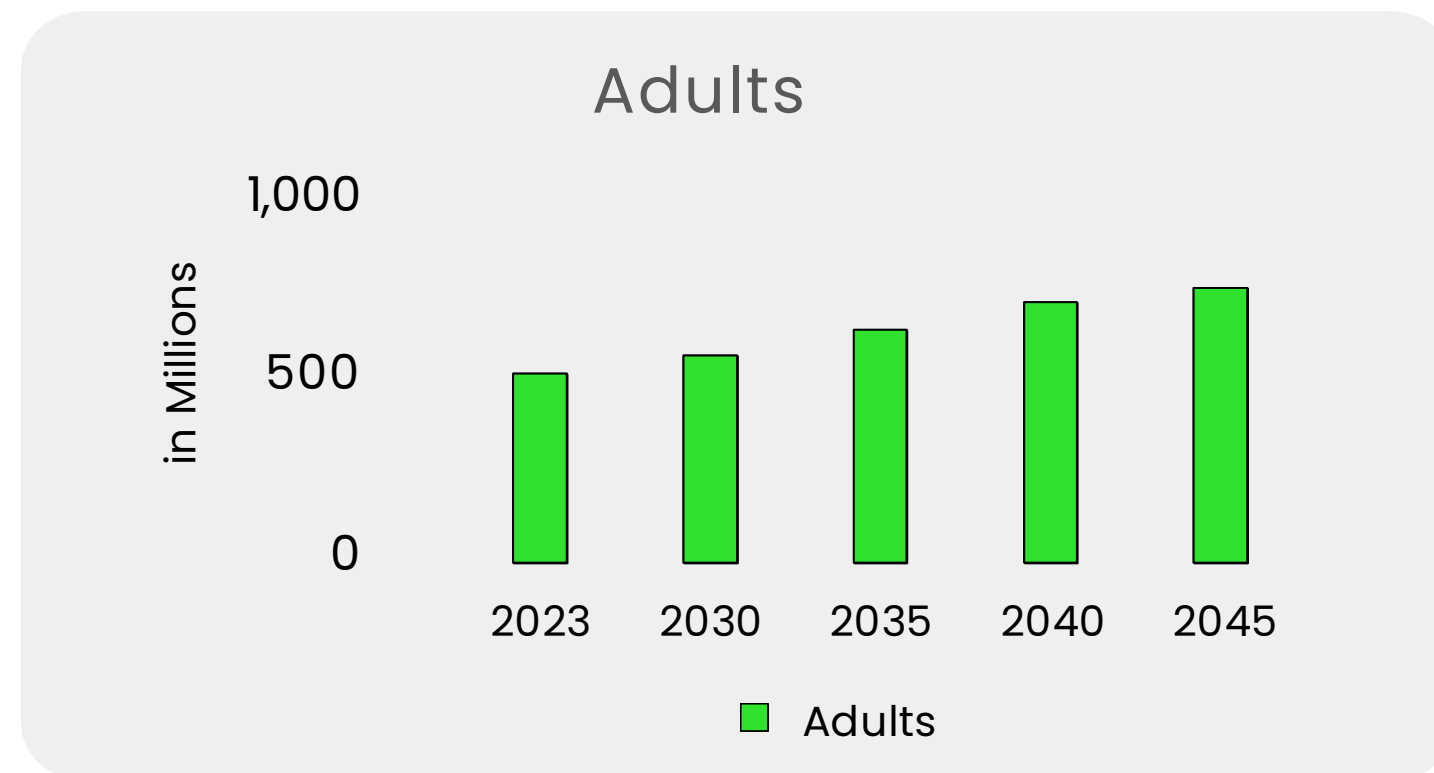
- Leads to >4 million adult deaths a year.
- Over 570 million adults aged between 20 and 79 years are **currently** living with diabetes.
- Projections indicate >640 million cases by 2030, increasing by over 20% to >780 million by 2045.
- Childhood rates of diabetes continue to rise at alarming rates!

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Weight Loss Drug Market

$200Bn in the Next Decade

- The weight loss drug market was *circa*. US$34 billion in 2024.

- Expected to surpass US$43 billion by 2029 (CAGR >5.5%, 2024-29)

- Barclays capital markets projects a US$200 billion market by *circa*. 2030.

https://www.mordorintelligence.com/industry-reports/weight-loss-diabetes-drug-market https://www.cnbc.com/2023/04/28/obesity-drugs-to-be-worth-200-billion-in-next-10-years-barclays-says.html
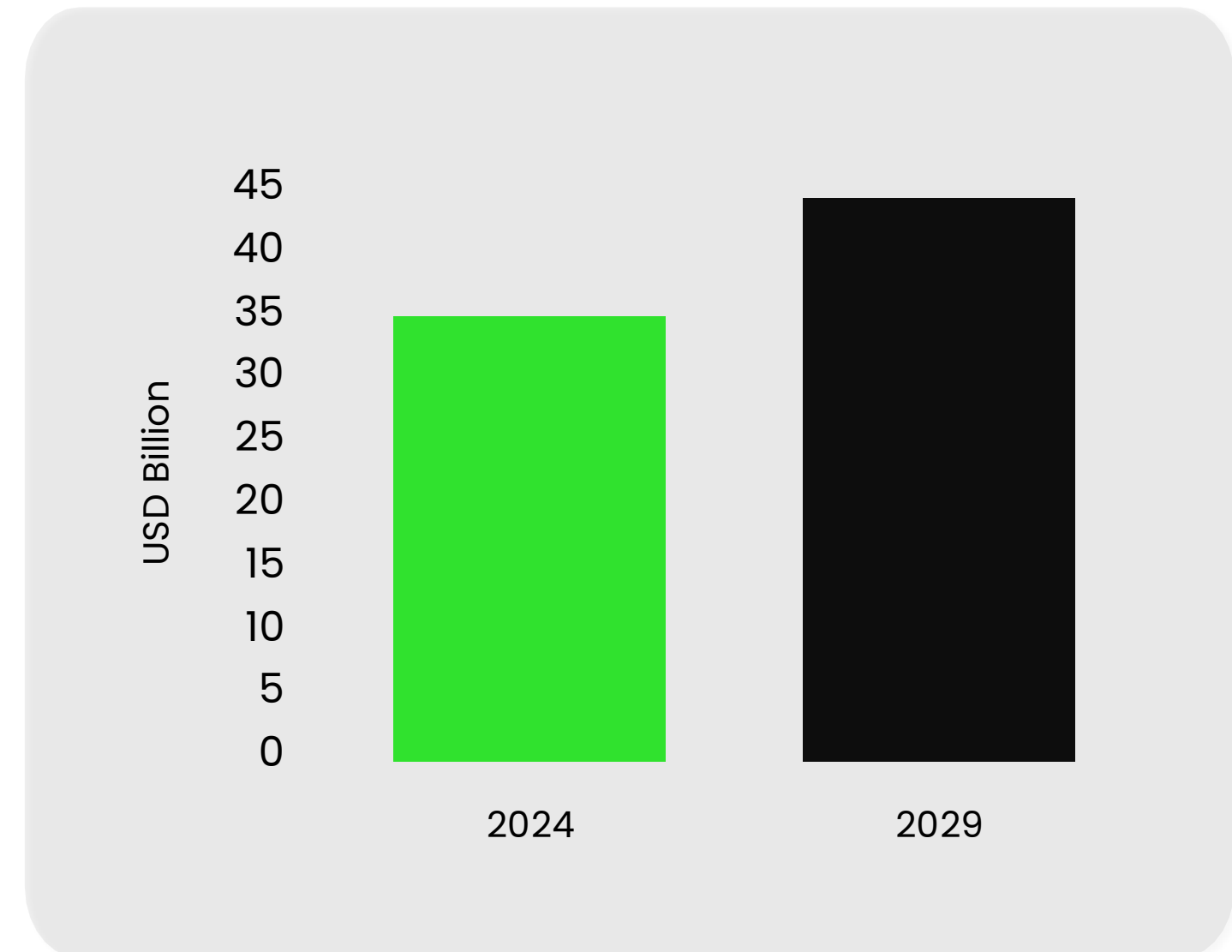
GLP1 agonists have changed the obesity treatment paradigm but unmet medical needs remain high

Present with an array of issues:

- Severe sometimes **life-threatening side effects**
  - **40% of patients stop treatment** by one year
- **20-40% muscle loss**
- Patients build **tolerance** over time
- **Doesn't restore metabolic functions**
  - Rebound or on it for life (if tolerated...)
- Injections are painful, **inconvenient**
- Oral route – real world challenges w.r.t dosing and bioavailability due to poor diet of target population

Muscle Loss Is Significant
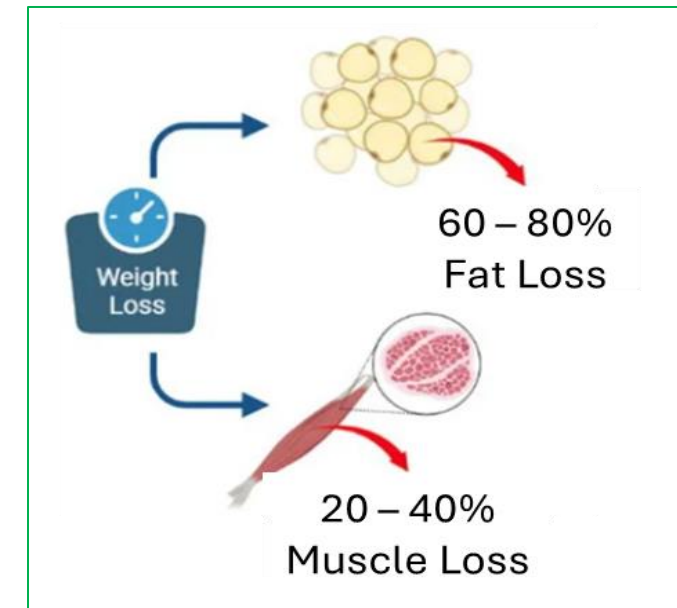
BioGene's solution

Dual Gene Therapy siRNAs targeting obesity and diabetes -> **restore metabolic functions with reduced side effects, increased compliance and cost-effectiveness**

SOL-GEL PLATFORM

A versatile platform revolutionizing Nose-to-Brain (N2B) delivery of therapeutics with global patents pending

+

BIORESPONSIVE LNP PLATFORM

Bioresponsive self-assembling lipid nanoparticle (bLNP) platform technology effectively delivering and releasing genetic cargo

US Patent GRANTED

+

Smart-siRNAs

Metabolically-stabilised and multiple exon targeting siRNAs specifically against PTP1B, validated

=

DUAL GENE THERAPY

Smart-siRNAs targeting PTP1B delivered using our bLNP platform directly N2B with Sol-Gel, in an easy to use nasal spray format

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SOL-GEL Nose To Brain Platform Delivery

Challenges with Oral Delivery Route

Rapid breakdown by enzymes in the gut. Increasing incidence of GI distress from oral dosing of medication complicated by poor diet. Low bioavailability.
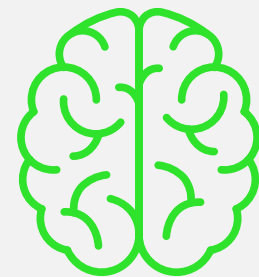
Direct Nose-to-Brain Delivery

Desired patient outcomes are achieved by consistent and sustained delivery to the whole brain, dose after dose.

The Blood-Brain-Barrier

BBB remains a universal hurdle for drugs intended for the brain when administered via conventional routes (oral, injection), which we altogether circumvent.
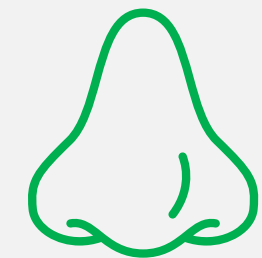
Olfactory Pathway Targeting with Sol-Gel

An ideal and proven pathway for rapid, direct and sustained brain delivery of therapeutic cargo, via our patient-friendly nasal spray Sol-Gel platform.

What is the Sol-Gel Platform?

A *solution* that is engineered to rapidly *gel* upon contact with mucosa...

- Targeted spray delivery and retention on mucosa

- Controlled and sustained release (nanomicellar-formulation) to and through mucosa

- **Sol-Gel delivery altogether circumvents the BBB – not a hurdle for BioGene!**

Room temperature

Solution state permits spraying via devices and extensive/uniform tissue coverage

⬆ temperature
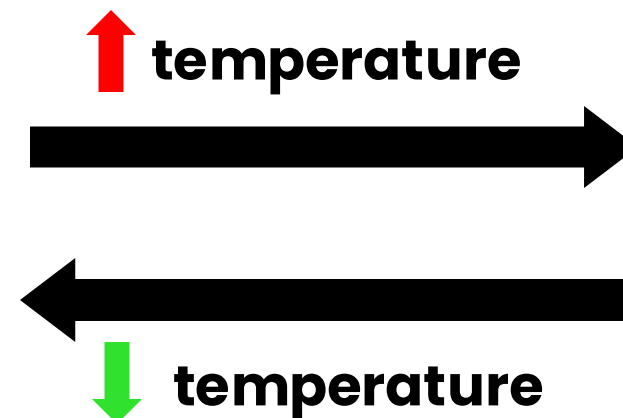
⬅ temperature

Body Temperature
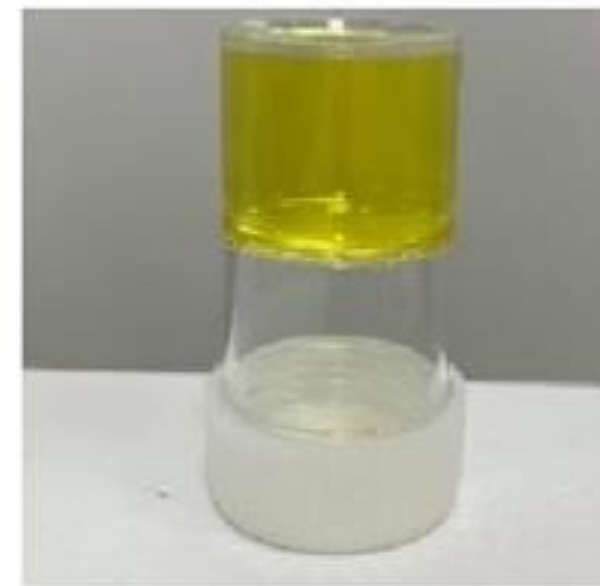
Mucoadhesive <u>functional</u> gel promotes sustained & controlled delivery

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SOL-GEL Platform Technology & Device

Olfactory epithelia

Olfactory epithelia

Conventional nasal sprays deliver formulation throughout the nasal cavity, and are rapidly cleared...

- Anterior & posterior leakage
- Rapid ciliary clearance
- Poor retention
- Unpredictable transmucosal delivery to trigeminal nerves
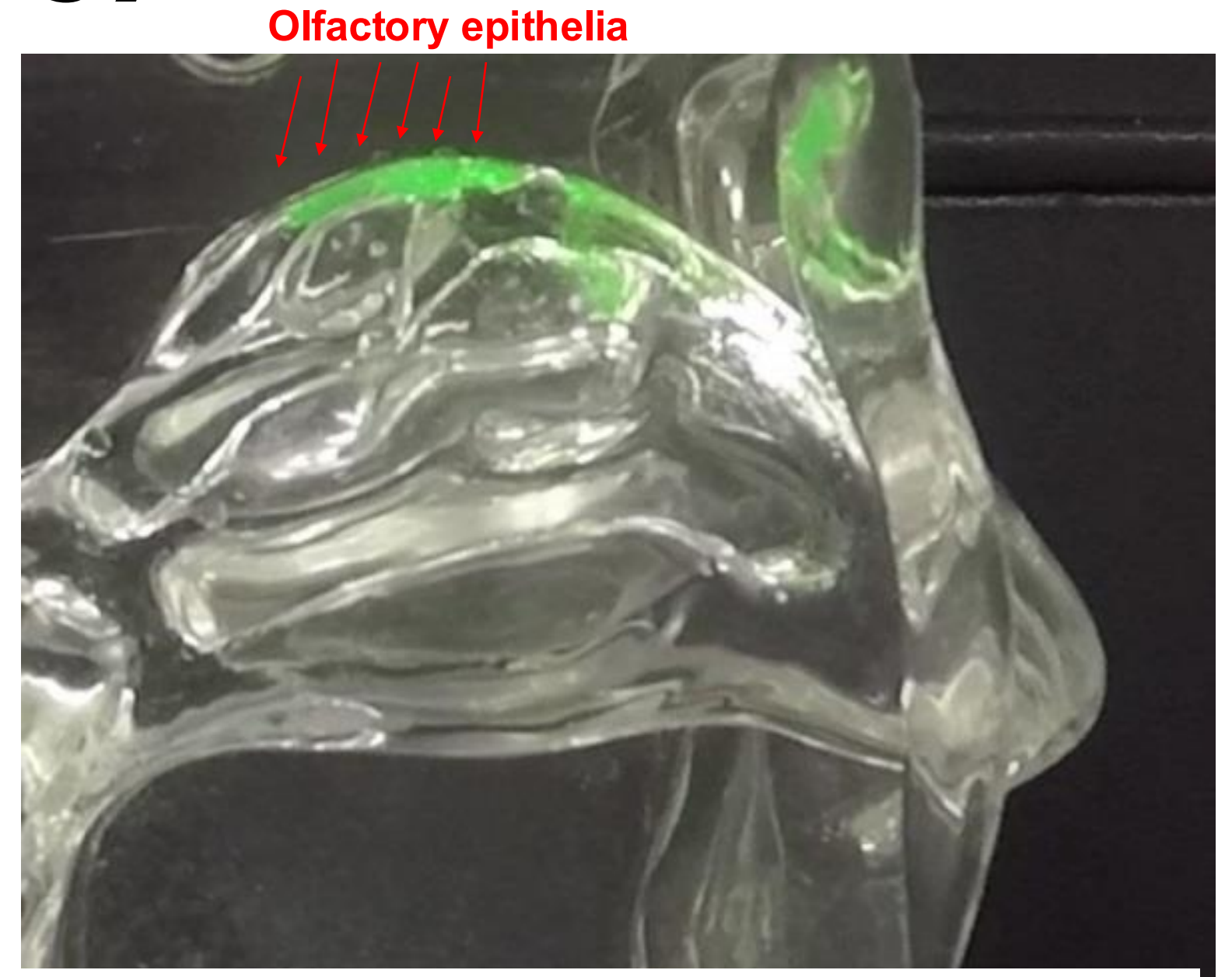
Olfactory mucosa targeting, rapid sol-to-gel transition, muco-retention and sustained delivery

- <u>Exclusive</u> olfactory targeting
- Direct, rapid nose-to-brain delivery
- Mucoadhesive sol-gel provides for sustained & controlled delivery
- Patient-friendly water or buffer vehicle - **<u>no</u>** alcohols or oils

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Non-Viral Vector Platform - BioGene's Bioresponsive LNPs (bLNP)

Vectors possess a unique bioresponsive gene cargo-releasing feature:
US Patent 11,566,044 – granted 31-Mar-23

- **Efficient Delivery**: The bLNP systems possess *endosomal escape features* AND *actively releases genetic cargo* from their carrier

- **Low Toxicity**: Non-viral, self-assembling bio-inspired patented bLNPs that employ naturally-derived building blocks

- **Cost-effective**: Synthesized using robust, scalable, well-established chemistries at *high yield*

Key features of BioGene's Bioresponsive LNPs (bLNP)

- Next generation – non-viral **bioresponsive vector**

- US Patent # 11,566,044 granted, 31st March 2023
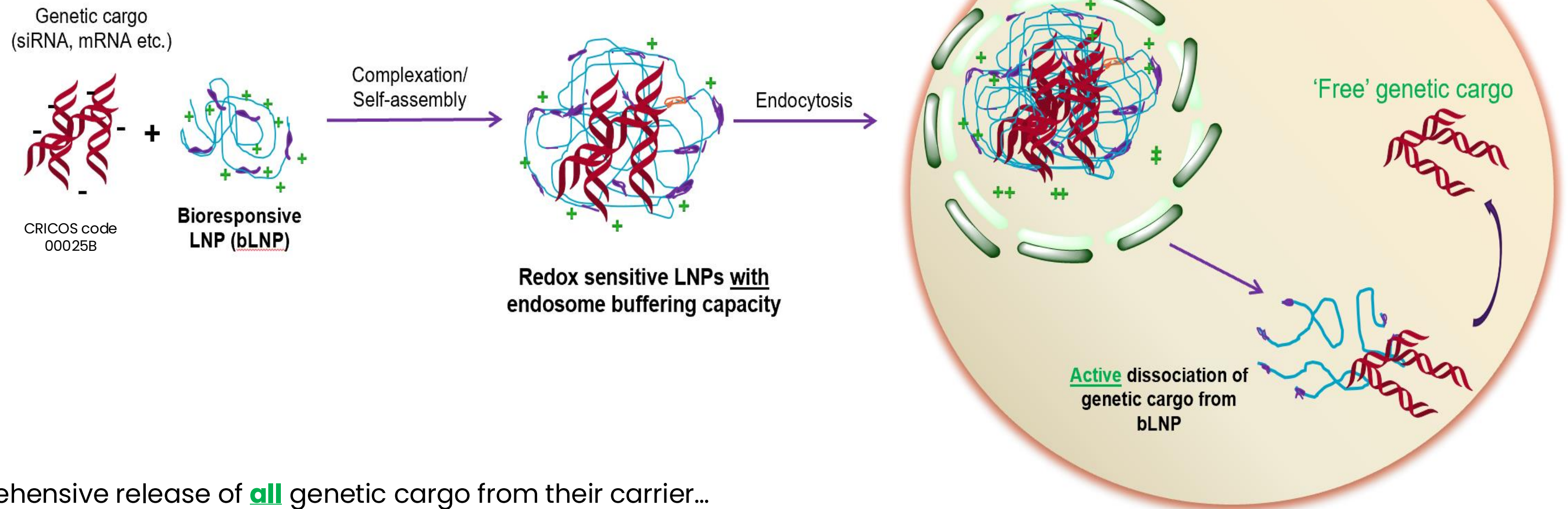
Comprehensive release of **all** genetic cargo from their carrier...

Significant implications for precision medicine in **mainstream** disease re: dosing, pricing and patient accessibility...

PTP1B Validation: Diabetes (Insulin resistance) & Obesity (leptin signaling)

PTP1B directly dephopshorylates the Insulin Receptor while indirectly acting on the leptin receptor to regulate satiety through Jak2/Stat3.

Dual approach : our bLNPs specifically targeting PTP1B has been uniquely designed with lipids with both anti-inflammatory and direct PTP1B inhibition properties

50% reduction in PTP1B deemed adequate to restore metabolic homeostasis.

Source: Delibegović et al, 2024. Nat Rev Endocrinol.
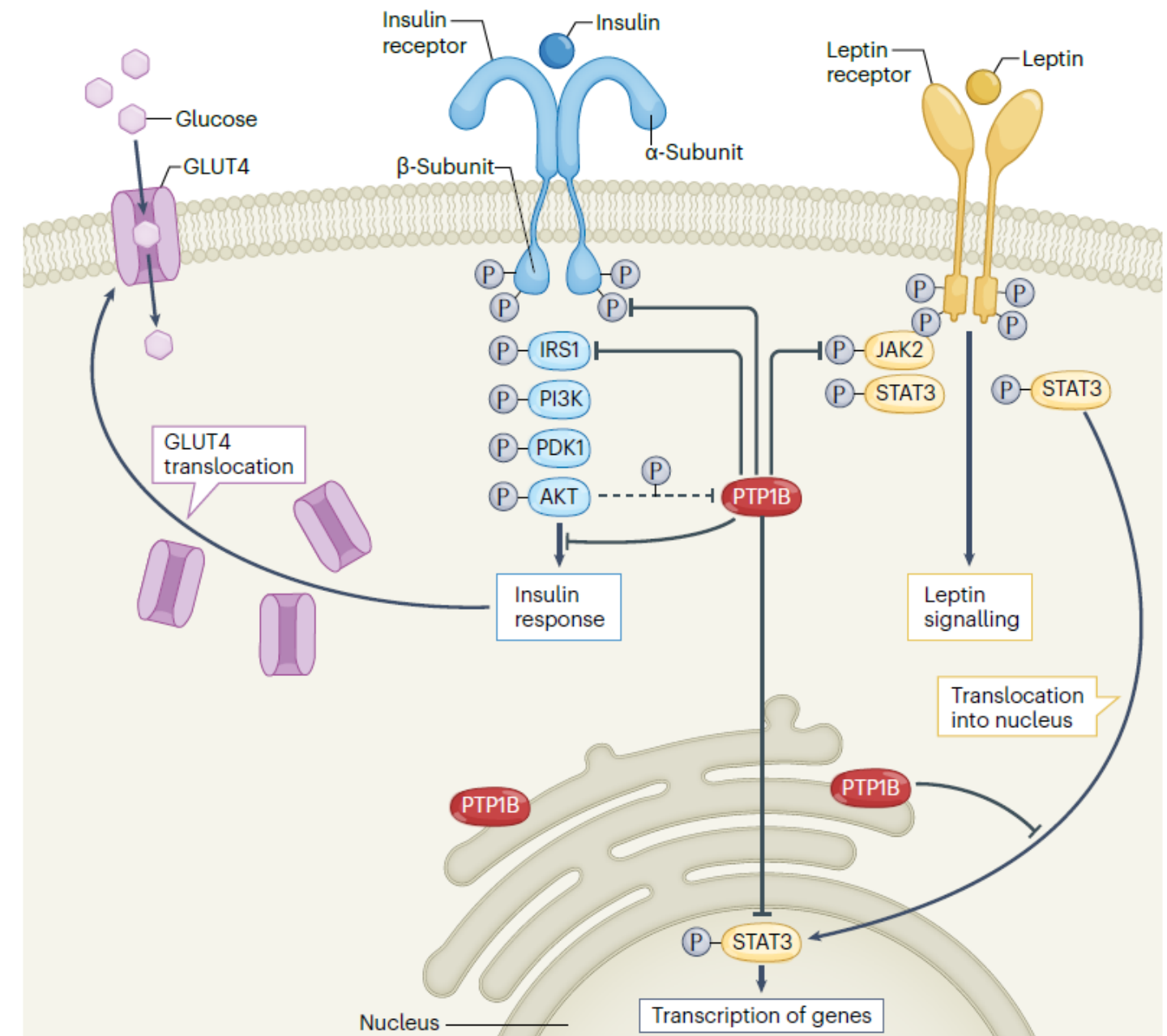
Mice lacking neuronal PTP1B are resistant to diet induced obesity and are protected from developing leptin resistance
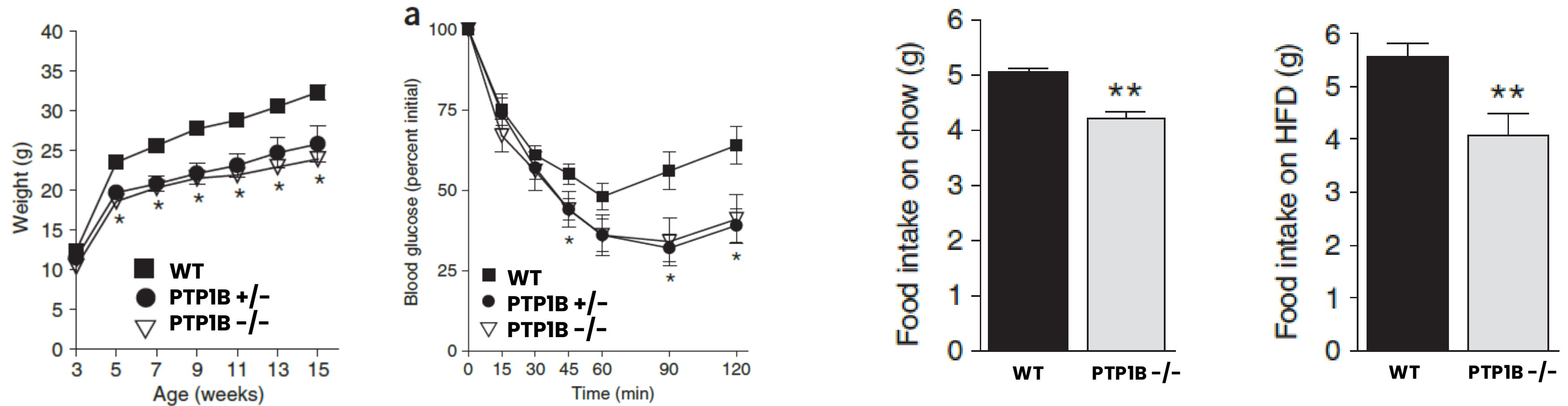
Neuronal PTP1B regulates body weight, adiposity and leptin action

Kendra K Bence[1,4], Mirela Delibegovic[1], Bingzhong Xue[2], Cem Z Gorgun[3], Gokhan S Hotamisligil[3], Benjamin G Neel[1] & Barbara B Kahn[2]

NATURE MEDICINE VOLUME 12 | NUMBER 8 | AUGUST 2006

Conclusion of the study: *"for effective obesity treatment and optimal therapy for type 2 diabetes, PTP1B inhibitors **must be directed to the brain"***

Preclinical development ; downregulating PTP1B in the CNS only, restores both insulin & leptin sensitivity

CNS

Neuron-specific PTP1B -/- leads to

- **Decrease in body weight & fat mass**
- **Increased activity and energy expenditure**
- **Increased leptin secretion**
- **Improved glucose homeostasis.**

PTP1B -/- in leptin-receptor expressing neurons leads to

- **Leptin hypersensitivity**
- **Decrease in body weight & fat mass**
- **Decreased body weight & fat mass gain upon HFD-feeding compared to WT**

PERIPHERY

PTP1B -/- in skeletal muscle leads to

- Body weight effect similar to WT
- **Improved glucose insulin sensitivity**

PTP1B -/- in liver leads to

- No effect on body weight.
- **Decreased gluconeogenesis and plasma lipid levels**
- **Protective against HFD-induced inflammation and ER-stress.**

PTP1B -/- in adipose leads to

- Potential to increased body weight, enlarge adipocytes and impair insulin sensitivity
- **Protection against atherosclerosis**

Body diagram labels: Stroke, Neurodegenerative disorders, Diabetic retinopathy, Leukaemia, Cancer, Sleep apnoea, Immune function, Atherosclerosis, Myocardial infarction and cardiovasular disorders, NAFLD and NASH, Type 2 diabetes mellitus, Obesity, Kidney function, Dermatitis, Wound healing, Sepsis, Arthritis

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(Data derived from phenotypes in genetic constitutive knockdowns in mice - lab of Prof Mirela Delibegović FRSE, University of Aberdeen, UK)

PTP1B is a strong drug target candidate for obesity, T2D and other therapeutic areas
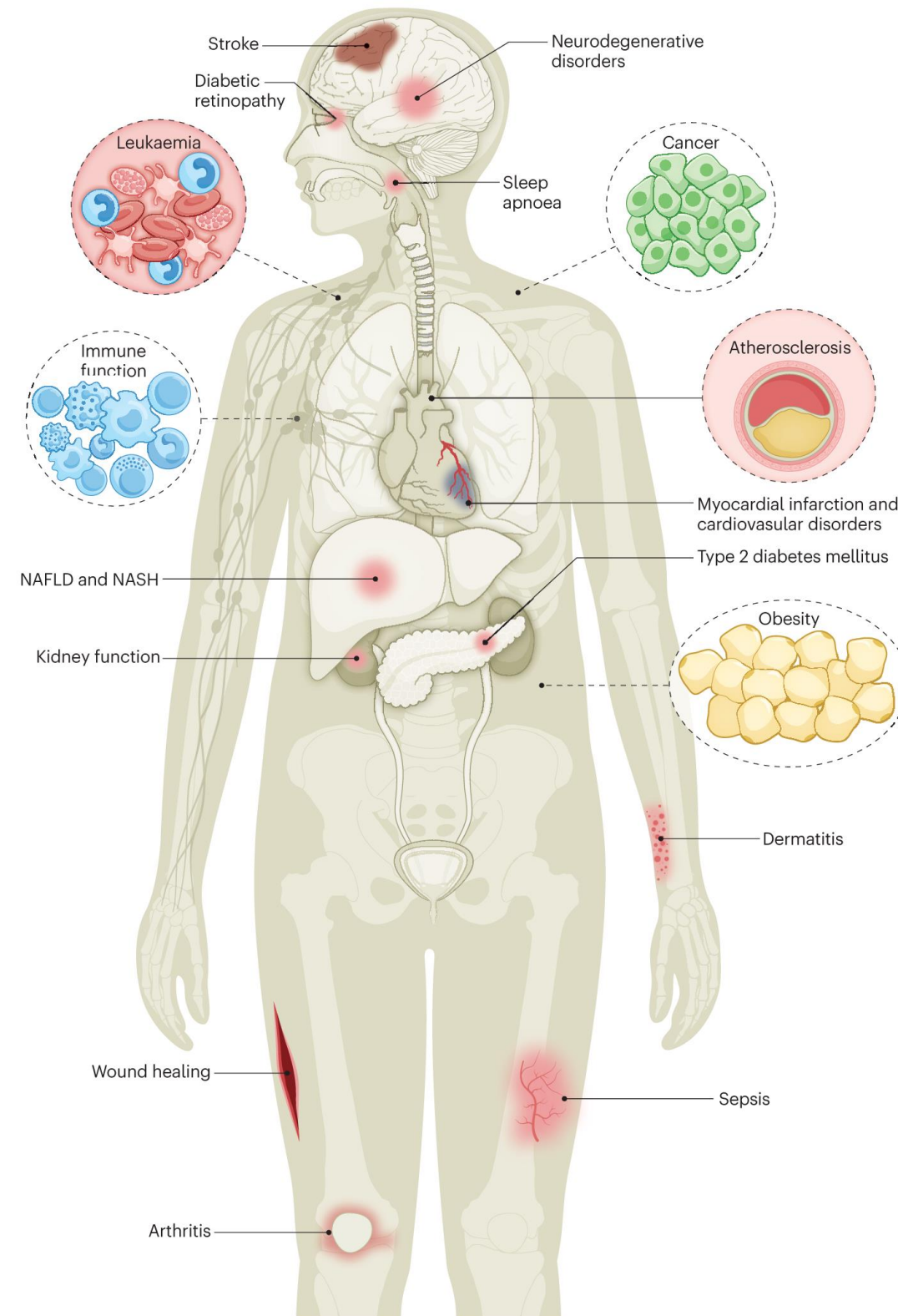
PTP1B inhibition reduces neuroinflammation and fronto-temporal dementia in animal models displaying potential for the treatment of **Alzheimer**

Source: Pharmacological PTP1B inhibition rescues motor learning, neuroinflammation, and hyperglycaemia in a mouse model of Alzheimer's disease, Franklin et al, Exp Neurology, 2024

PTP1B inhibition has been demonstrated to enhance anti-tumor immunity and combat **solid-state cancer**

Source: A small molecule inhibitor of PTP1B and PTPN2 enhances T cell anti-tumor immunity, Liang et al, Nat Comm, 2023

Ongoing clinical trials:

- PTP1B Implication in the Vascular Dysfunction Associated With **Obstructive Sleep Apnea**, Angers, France (NCT04235023)

- Correlation Between PTP1B Expression and **Organ Failure During Sepsis**, Univ Hospital Rouen, France (NCT03189355)

- MSI1436 – PTP1B inhibitor for **metastatic breast cancer**

PTPN1 Gene Targeting Strategy with BioGene's Smart-siRNAs

PTPN1 gene comprises 10 exons, each potential targets for siRNA:

| 1 63bp | 2 91bp | 3 101bp | 4 99bp | 5 138bp | 6 210bp | 7 162bp | 8 224bp | 9 196bp | 10 24bp |
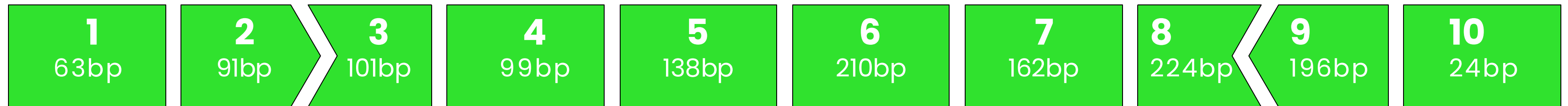
01.
Successfully engineered selective, potent siRNAs independently targeting multiple exons of *PTPN1*

02.
siRNAs against both mouse and human variants of distinct exons were engineered in parallel, paving the way for PoC preclinical and clinical studies

03.
siRNAs sequences were engineered to be biostable ('Smart-siRNAs'), and novel w.r.t the prior art/published sequences

Potent Gene Silencing Confirmed Using BioGene's Bioresponsive LNPs (bLNPs)

- bLNPs possess the unique bioresponsive 'gene-releasing' linker (US Patent #11,566,044 – granted 31/Mar/23)

- UQP12 & UQP15 (top and bottom graphs) represent select Smart-siRNAs showing potent gene silencing when formulated with two distinct bLNPs.

- UQP12 & UQP15 represent only two uniquely designed metabolically-stablized siRNAs from our extensive library that display potent gene & protein silencing.
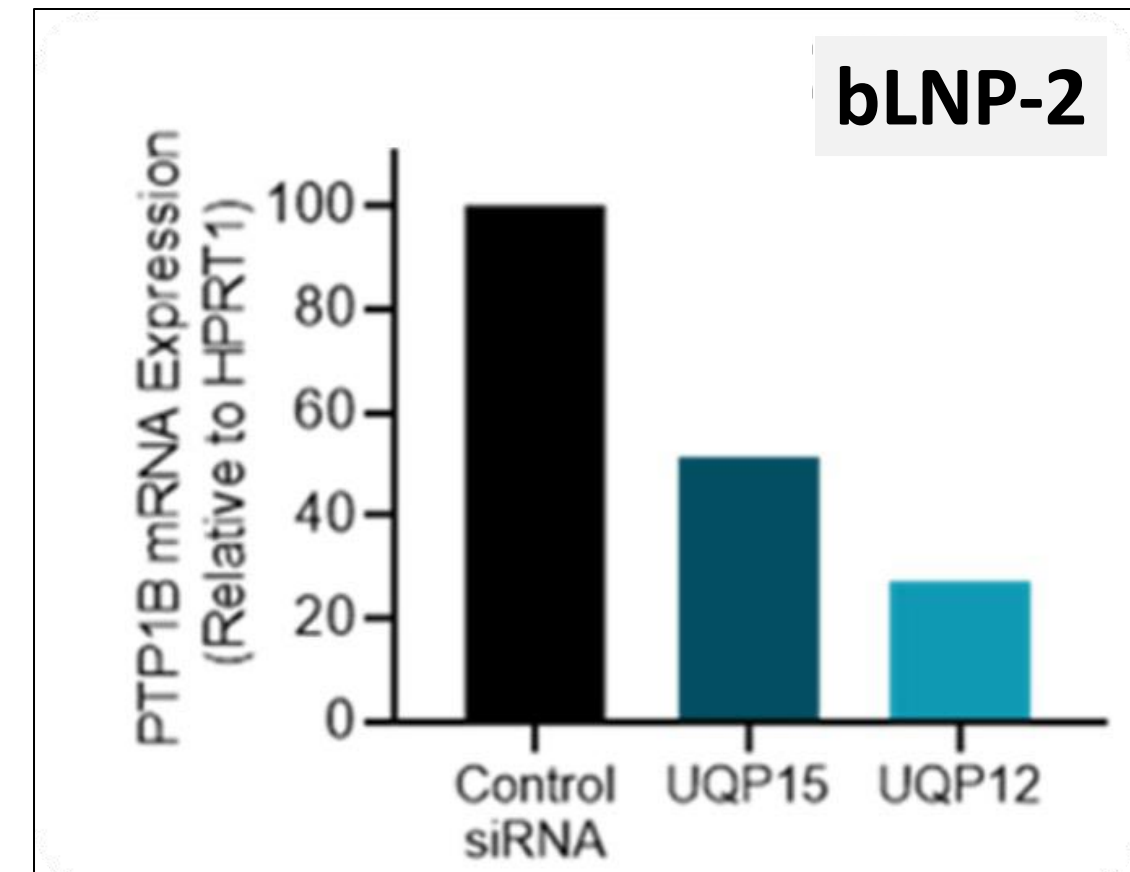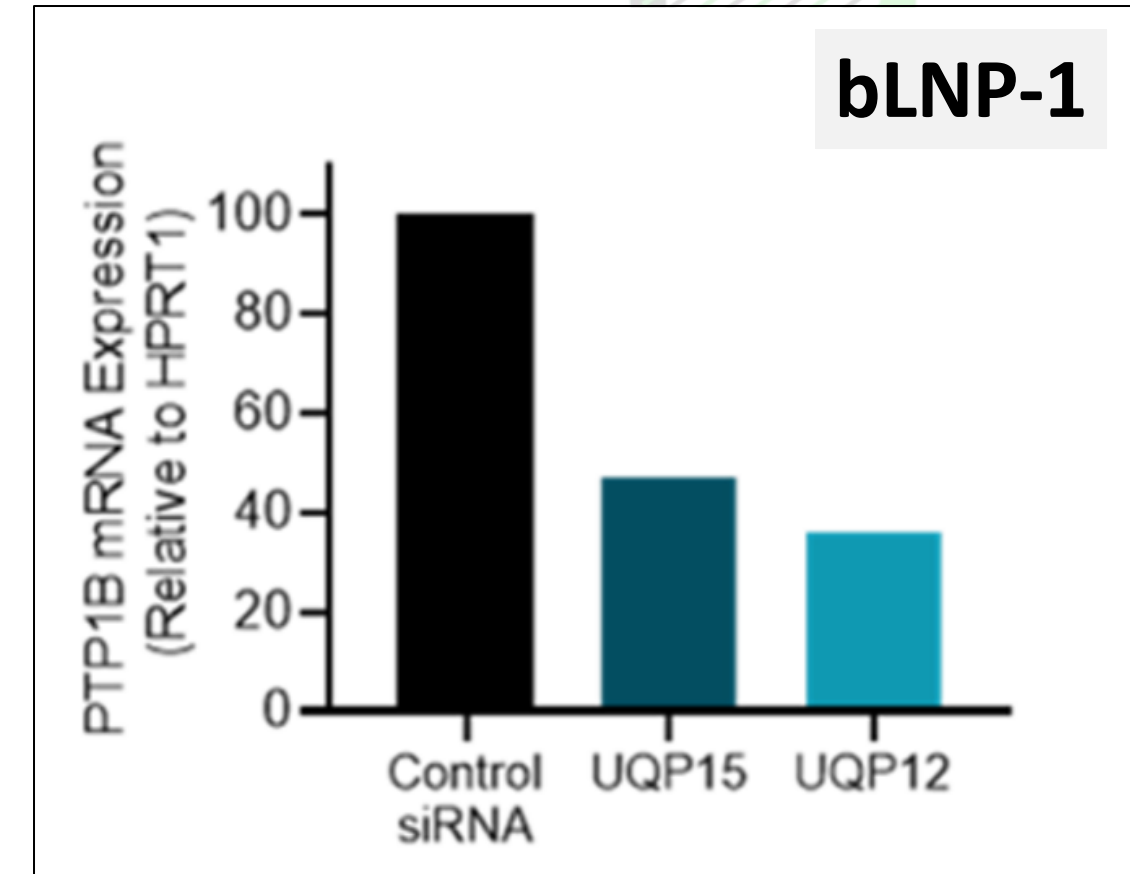
Planned Diabetes and Obesity Preclinical Study

The study will evaluate BioGene's Smart-siRNAs versus conventional constructs using bioresponsive LNP formulations in rodent models of diabetes and obesity.

The study design includes mice cohorts for robust statistical analysis, appropriate control groups, and comparison of administration routes.

01 Location: The University of Queensland, Brisbane
➔ Extensive expertise with Sol-Gel engineering, bLNP formulation & preclinical models of obesity and diabetes

02 Research Team Led by BioGene's Chief Research Officer & Scientific Founder, Dr. Harry Parekh.

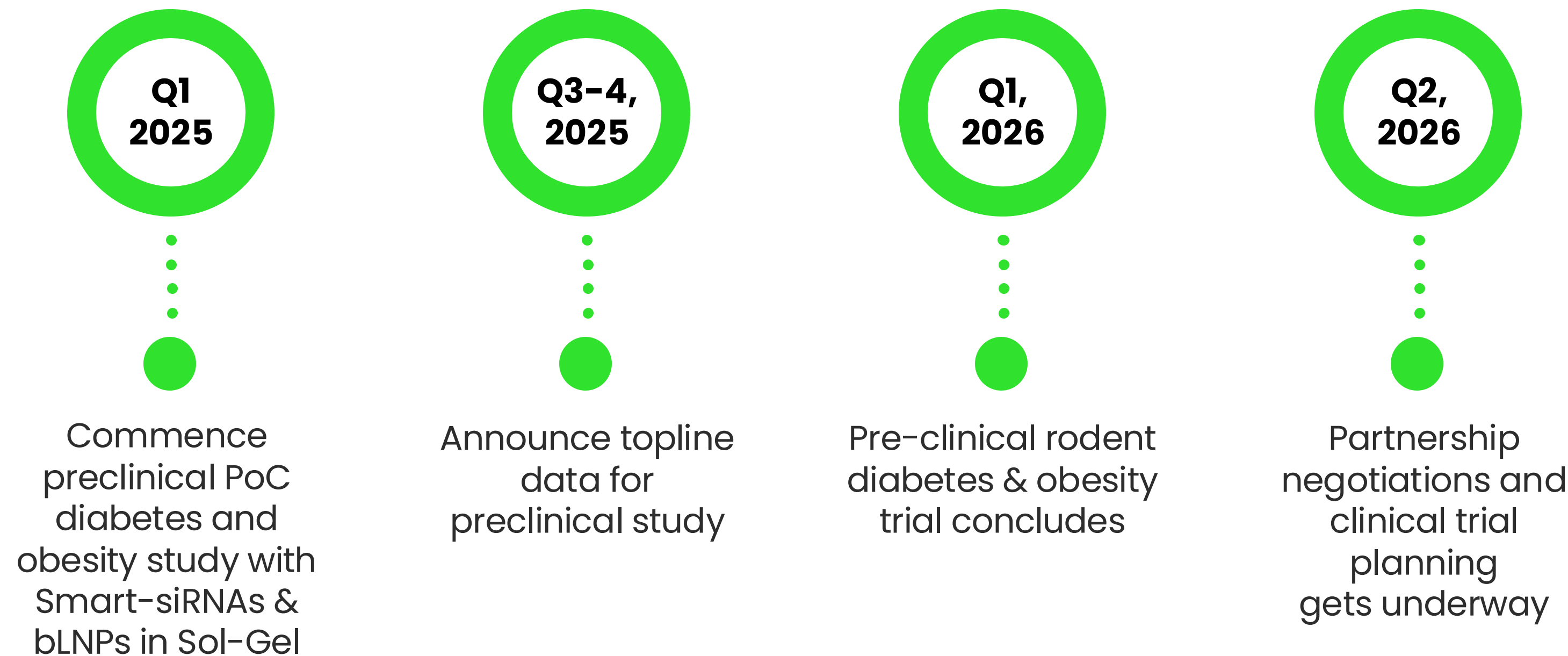**03** Objectives: Assess weight changes, PTP-1B levels in major tissues, tissue histology, and classical blood and urine biomarkers (e.g. glucose, triglycerides) throughout the extended treatment period.

04 Success Criteria: Weight reduction; Restoration of glucose levels/insulin sensitivity, increased activity, and improved behavioral patterns in diabetic and obese mice.

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Timeline

Q1 2025

Commence preclinical PoC diabetes and obesity study with Smart-siRNAs & bLNPs in Sol-Gel

Q3-4, 2025

Announce topline data for preclinical study

Q1, 2026

Pre-clinical rodent diabetes & obesity trial concludes

Q2, 2026

Partnership negotiations and clinical trial planning gets underway

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BioGene's solution

Dual Gene Therapy siRNAs targeting obesity and diabetes -> **restore metabolic functions with reduced side effects, increased compliance and cost-effectiveness**

SOL-GEL PLATFORM

A versatile platform revolutionizing Nose-to-Brain delivery of therapeutics with global patents pending

+

BIORESPONSIVE LNP PLATFORM

Bioresponsive self-assembling lipid nanoparticle (bLNP) platform technology effectively delivering and releasing genetic cargo

US Patent GRANTED

+

Smart-siRNAs

Metabolically-stabilised and multiple exon targeting siRNAs specifically against PTP1B, validated

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DUAL GENE THERAPY

Smart-siRNAs targeting PTP1B delivered using our bLNP platform directly N2B with Sol-Gel, in an easy to use nasal spray format
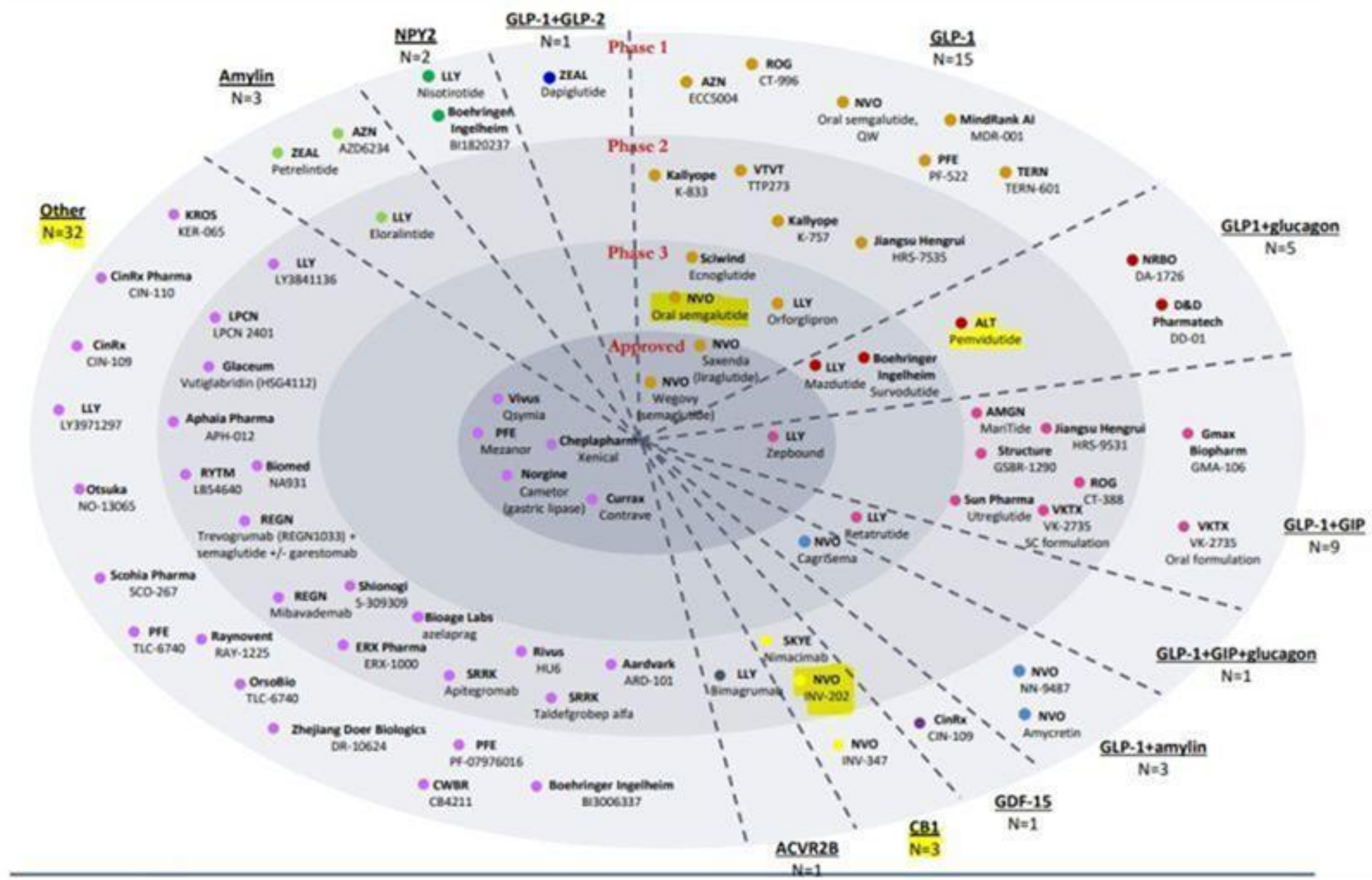
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Accessing non-dilutive funding from the Australian Medical Research Future Fund (MRFF) grant scheme

- The Medical Research Future Fund (MRFF) is a **$20 billion** long-term investment supporting Australian health and medical research

- The MRFF aims to transform health and medical research and innovation to improve lives, build the economy and contribute to health system sustainability

- MRFF grant applicants are encouraged to have industry support (cash & in-kind)....

'Research Translation' is one of 4 main priority themes:

- Examples grant call typically for preclinical-thru-clinical trials

- Funding of innovation programs that deliver a '**moonshot**' by creating a treatment for a currently serious and incurable health condition, through a series of linked projects

- Develop novel health technologies and/or re-purpose existing health technologies in a novel way - **BioGene is a perfect fit!**

- Max funding per application: **AUD 25 million for up to 5 years**

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The Landscape is Rapidly Evolving to Next Generation Therapies

Revenue and Corporate Strategy

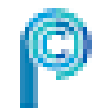Platform Licensing Potential

Acquisition and Partnerships

Direct Listing on NASDAQ

Global Collaborators

Thank You

PreveCeutical Medical Inc.
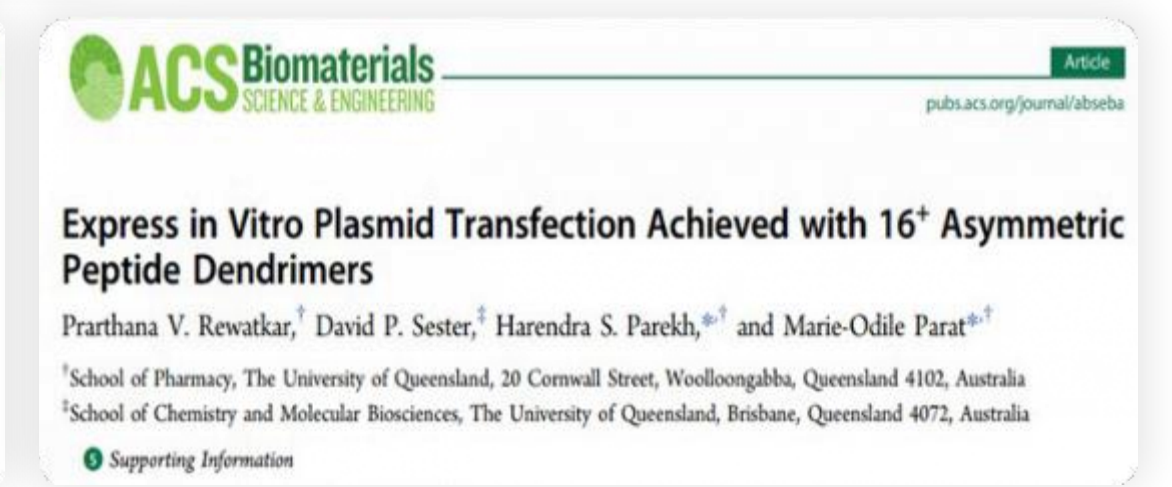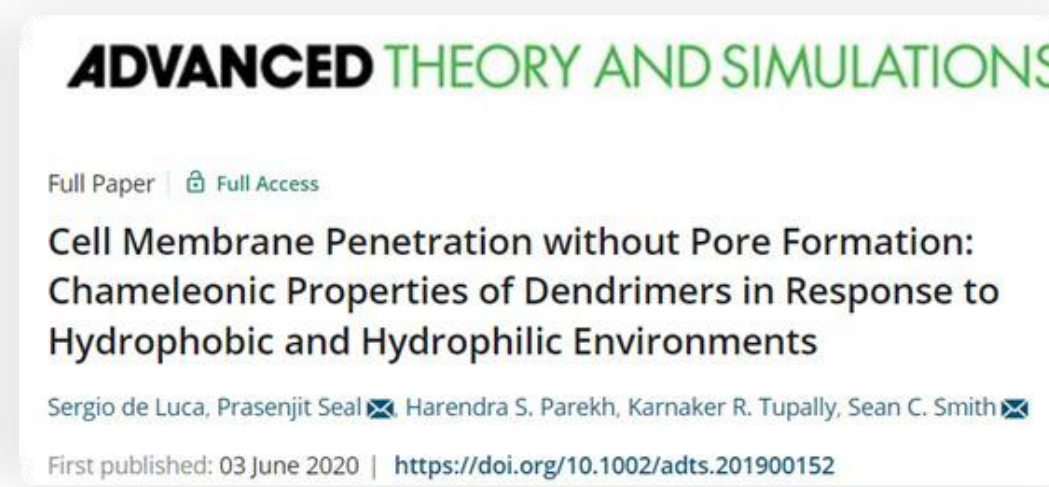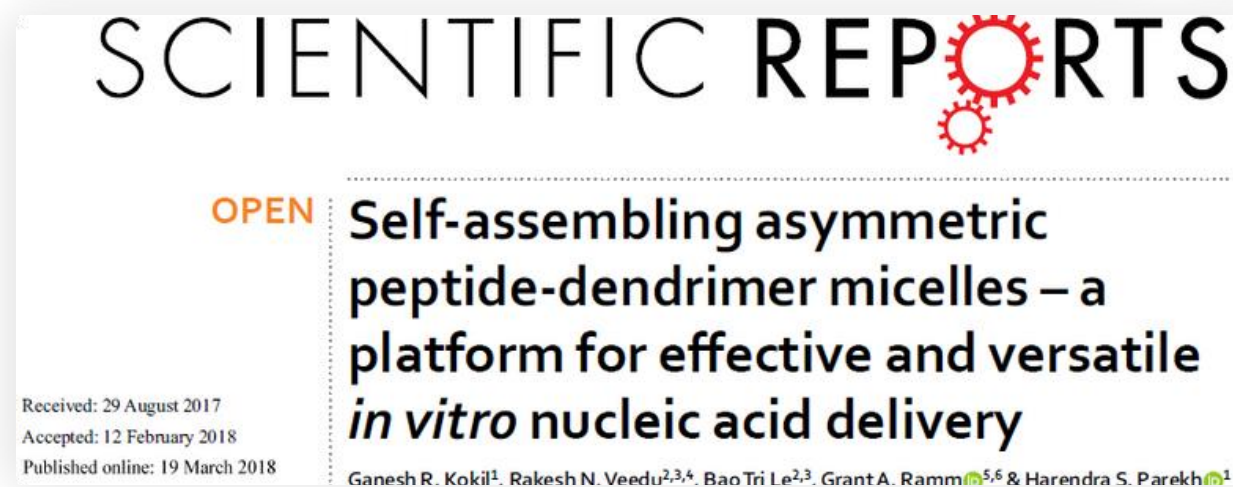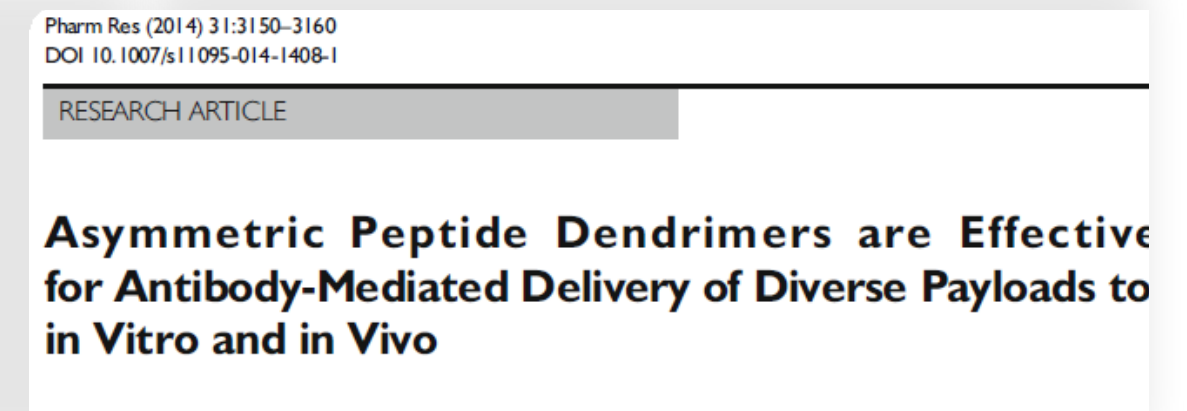**CSE:PREV | OTC:PRVCF | FSE:18H**

Contact Page

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Source

Sources
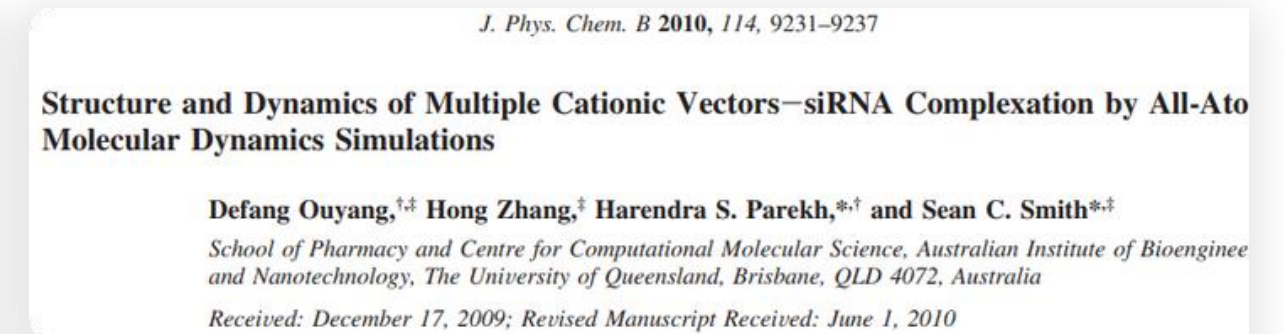
1. https://www.mayoclinic.org/drugs-supplements/semaglutide-subcutaneous-route/side- effects/drg-20406730?p=1

1. cnbc.com - Obesity drug industry could be worth $200 billion within the decade, says Barclays

1. news.harvard.edu - Are new weight-loss drugs the answer to America's obesity problem?

1. zs.com - Pharma needs a commercial model that can solve it

1. msn.com - Obesity drug industry could be worth $200 billion within the decade, says Barclays

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