

Pushing the Limits of Transdermal Drug Delivery



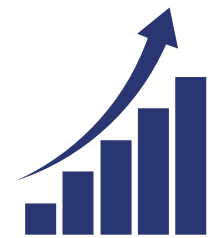
Biotts Innovative Transdermal Technology

PODD, Boston, 28-29 October 2024

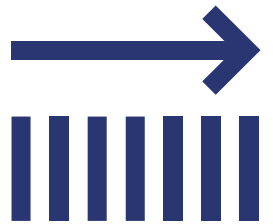
Transdermal drug delivery is a patient-friendly way of drug (API) administration, offering a variety of benefits, including:



Non-invasive, needle-free administration; i.e. improved patient adherence



Increased bioavailability (vs. oral), i.e. API cost efficiency



Sustained, constant delivery



Reduced side-effects



Biotts' **proprietary technology platform** offers the following breakthrough benefits:

01 Larger molecules like proteins and peptides (up to 6000 Da so far)

02 Both lipophilic and hydrophilic

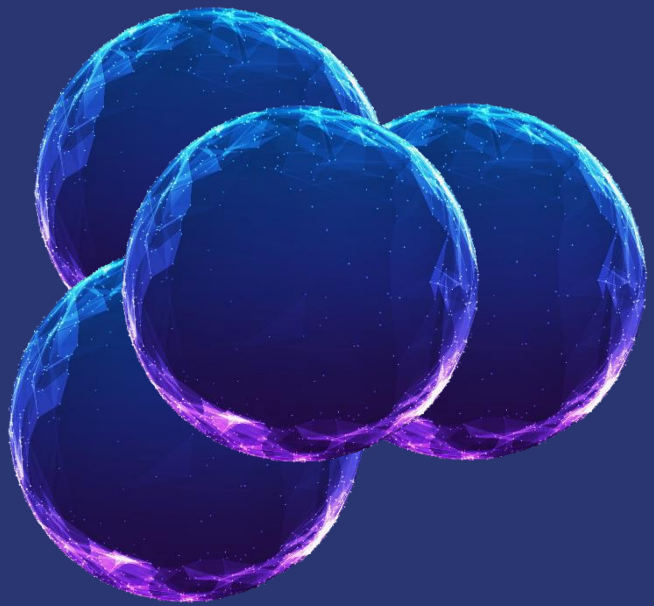
03 Safety confirmed on humans

04 Invention protected by 5 patents

05 Versatile toolkit that may be adapted for a large variety of different molecules

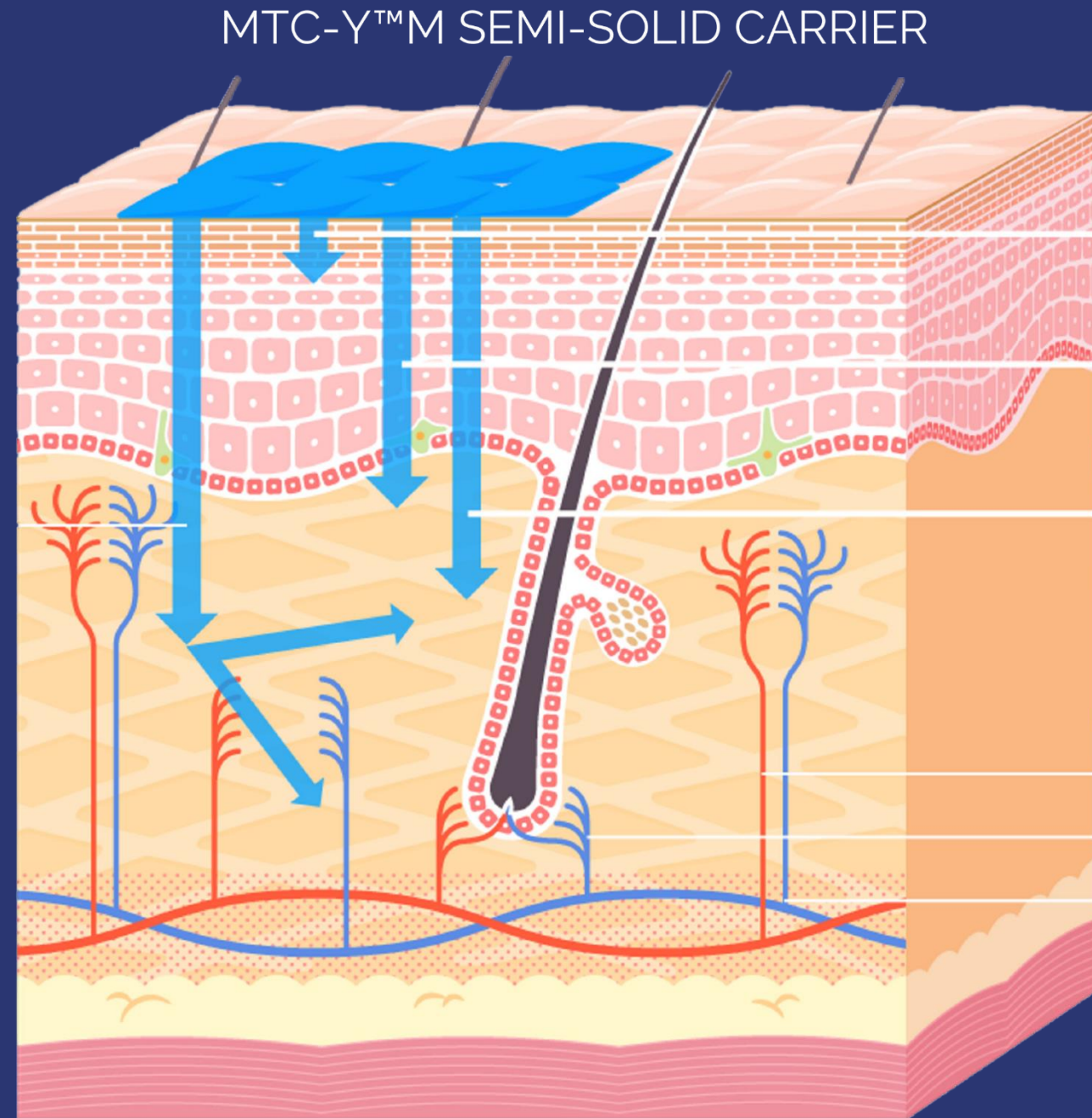


***Unlimited opportunities
for new transdermal
therapies***



Targeted delivery

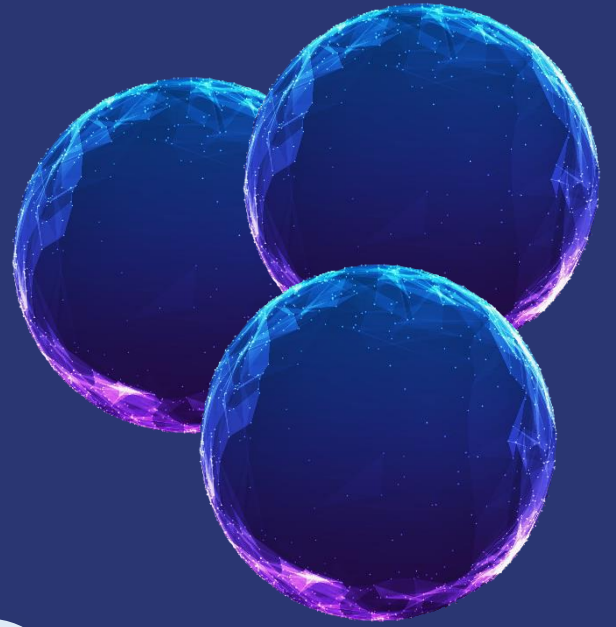
Precise targeting via activation of ionic channels in cell membranes



DEEP ABSORPTION

- Softens extracellular deposits
- Emulsification enables delivery of hydrophilic and lipophilic drugs
- Natural materials promote deeper penetration & absorption

- Blood vessels
- Nerve receptor
- Nerve



A real game changer in transdermal drug delivery:

- 8 pharmacopeial excipients forming a spherical cage carrier structure
- Non-invasive; no micro-needles!
- Targeted delivery through skin into blood plasma, synovial fluid etc.

Market:
US\$ 83 billion
TAM annually
by 2030

Diabetes (Type 1 and Type 2)

- 462 million patients in 2017, 643 million by 2030
- Insulin: US\$ 20 billion in 2022, US\$ 23 billion by 2030
- Glucagon-like Peptide-1 Semaglutide: US\$ 15 billion in 2022, US\$ 60 billion by 2030 (32 million patients)

Obesity

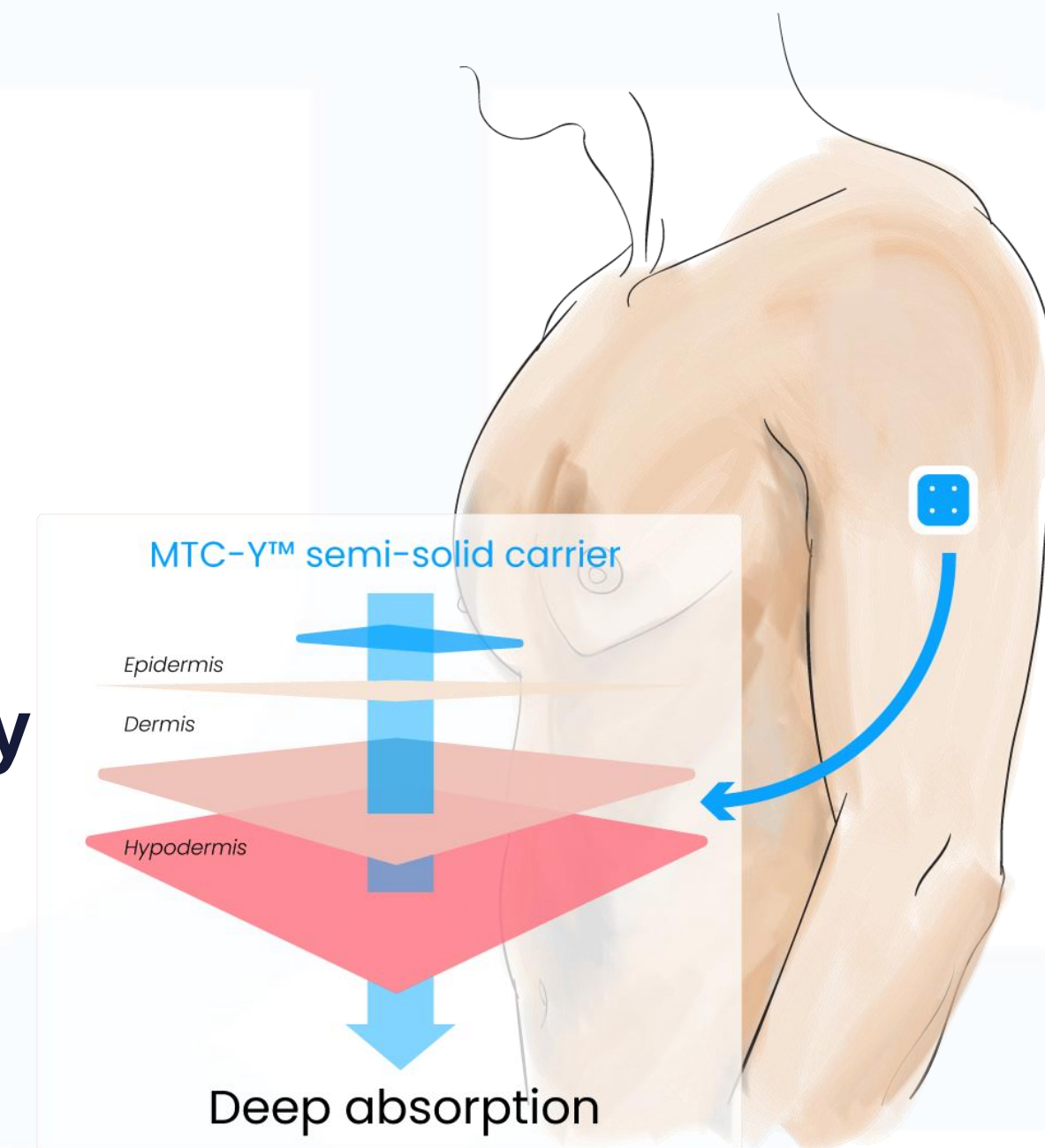
- Sub-market size: est. US\$ 30 billion by 2030
- Rapidly developing GLP-1 sub-market as a weight loss miracle drug; clinically proven up to 20% body weight loss, no side-effects
- Average consumer spend in the US for weight loss US\$ 1,000 per month, no insurance coverage

 **Insulin Patch: a patch for (basal long-acting) insulin needs**

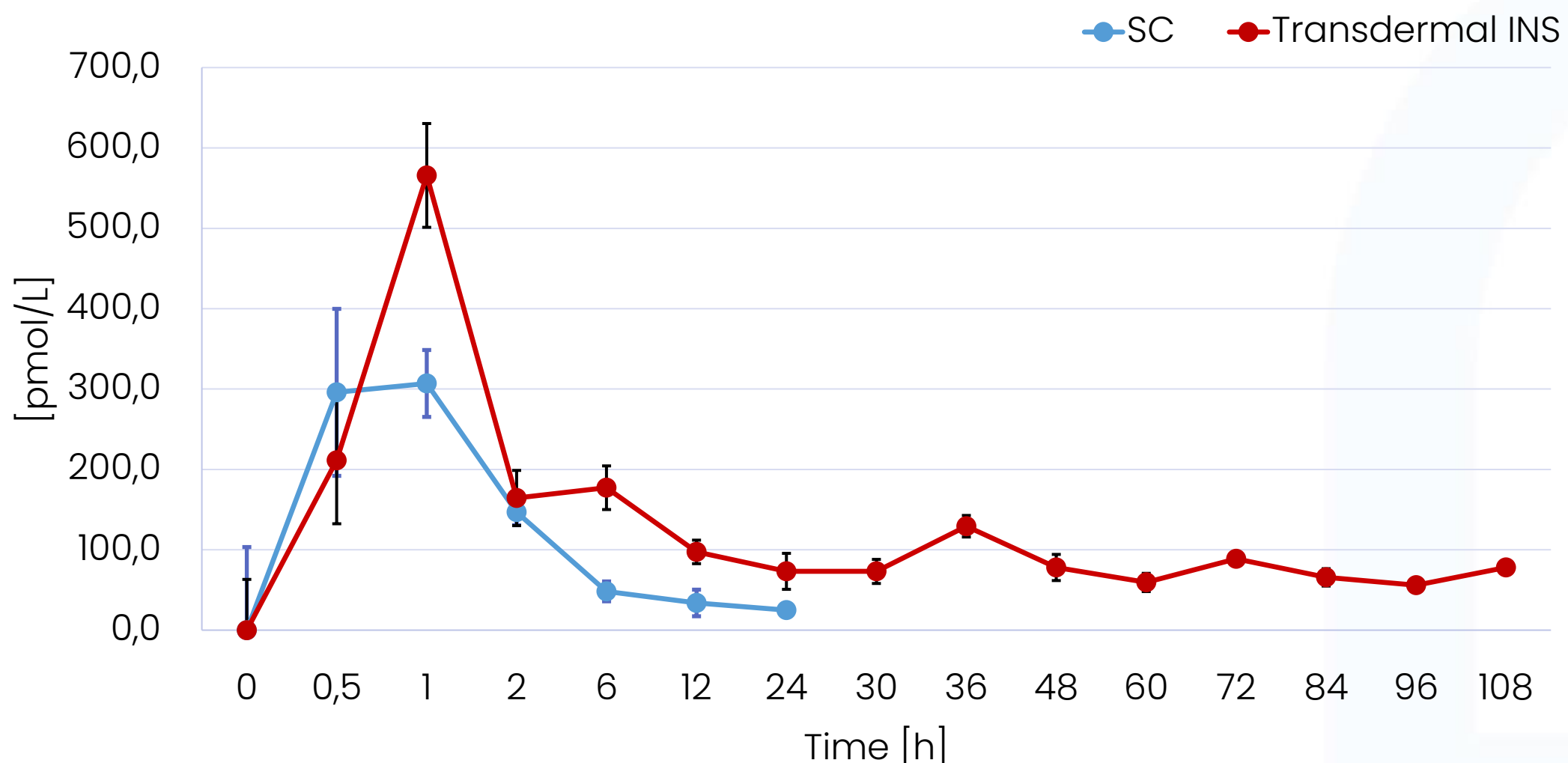
- Sustained 5 days activity; replacing 10 injections
- Reduced medical waste
- Improved hygiene

 **Semaglutide Patch: a weekly patch for Diabetes T2 & Obesity**

- Convenience; weekly patch vs. daily pill
- Cost; 10 times less API
- No side-effects



**Transdermal MTC carrier
Insulin Rat Plasma Concentration**



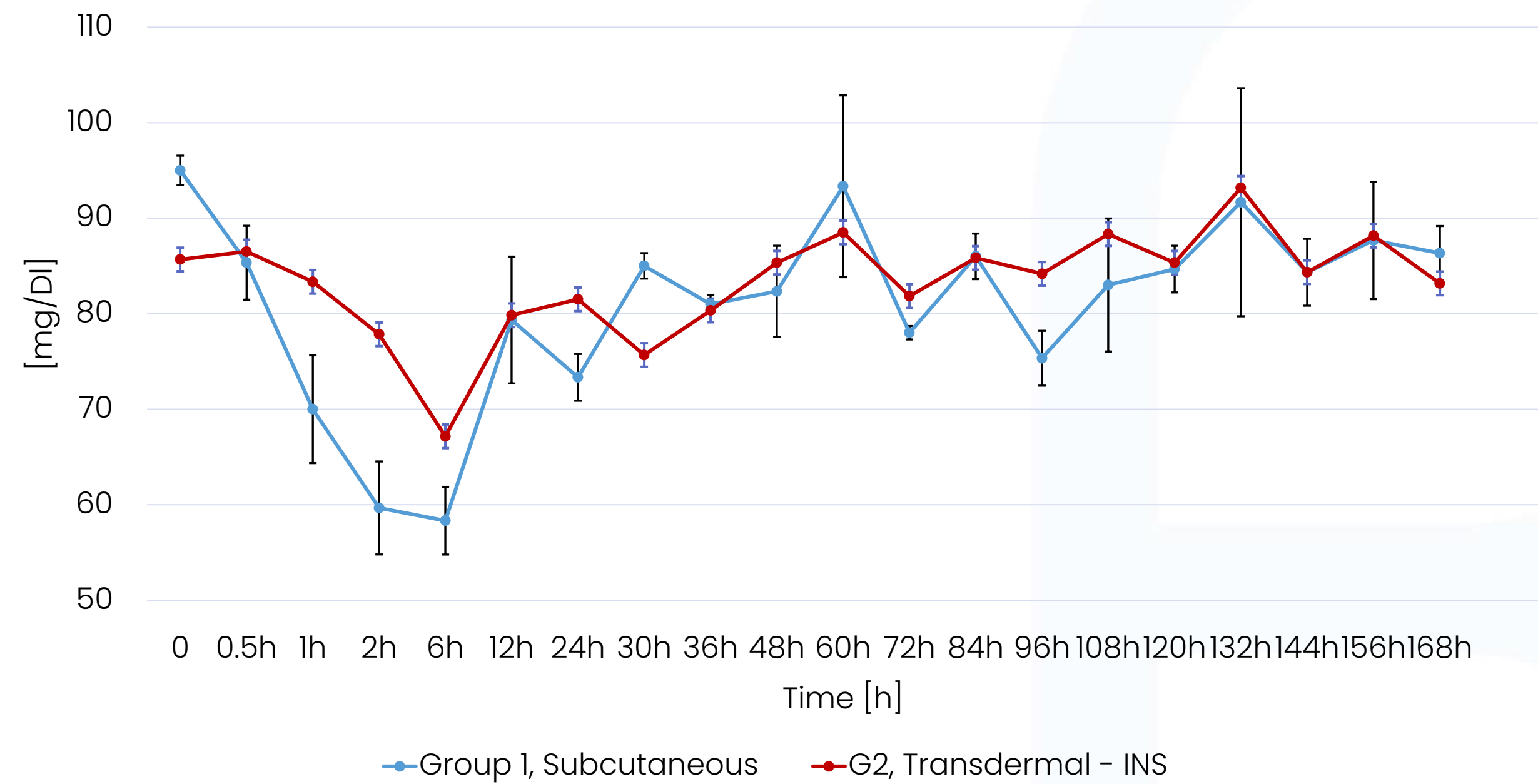
**Transdermal MTC carrier
Insulin Rat Pharmacokinetics**

Parameter	Group 1, Subcutaneous	Group 3, Dermal - F-INS
Dose D [mg/Rat] =	0,035	0,350
T _{1/2} [h] =	19,7	
C _{MAX} [pmol/L] =	306,94	565,81
T _{MAX} [h] =	1,0	1,0
MRT [h] =	21,8	62,3
AUC _{0→t=24} [pmol·h/L] =	1439,9	3142,4
AUC _{INF} [pmol·h/L] =	2146,4	11820,5
AUC _{INF_TTS} / AUC _{INF_SC} =	5,51	
AUC _{0→t=24_TTS} / AUC _{0→t=24_SC} =	2,18	
F _{REL_INF} [%] =	55,1	
F _{REL_0→t=24} [%] =	21,8	

Key Takeaways:
 Transdermal Bioavailability 55%; highest ever reported
 Sustained 5-day activity
 Improved therapeutics, convenience, cost base

Transdermal MTC- INS carrier Glucose Mini-Pig Plasma Concentration

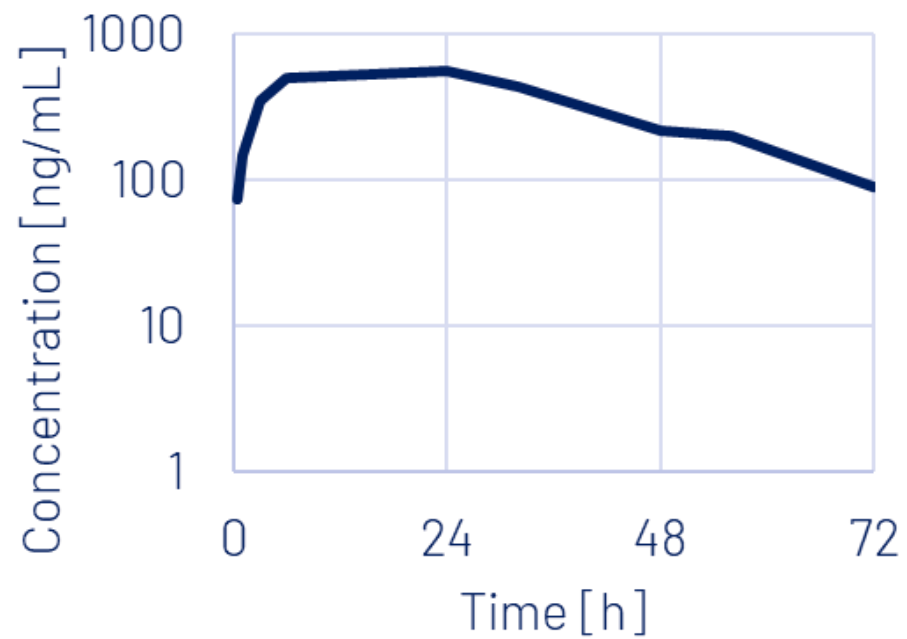
Blood Glucose concentration - Göttingen mini pigs



Key Takeaways:

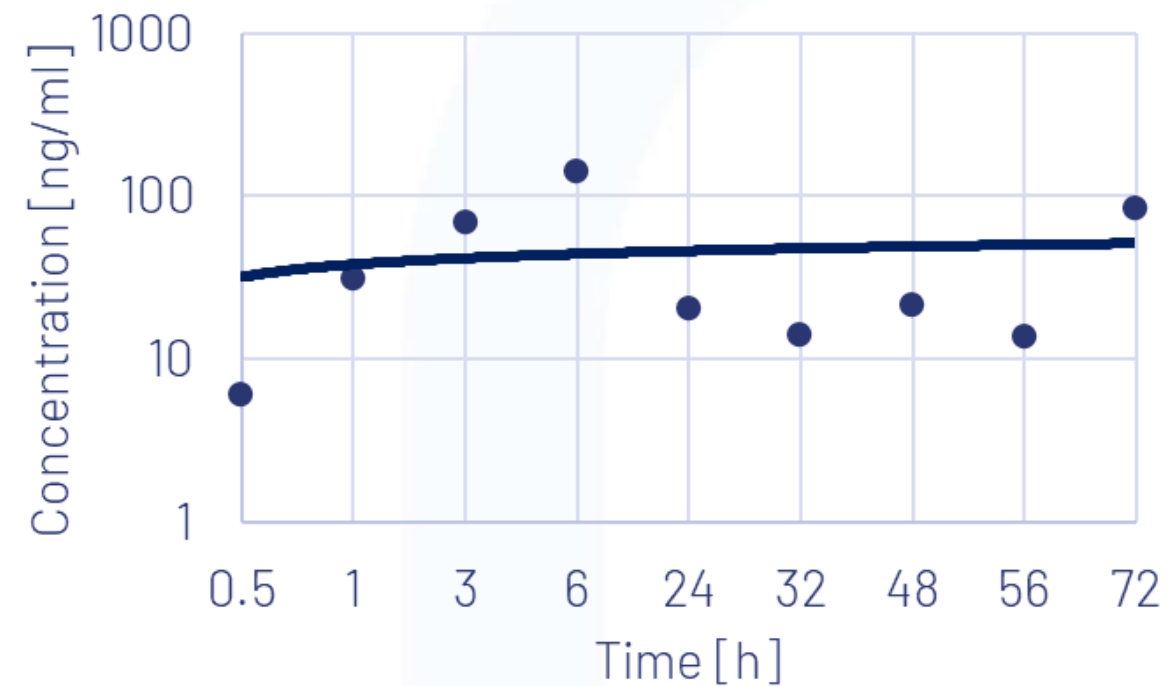
- Confirmed activity
- Transdermal effectiveness
- 70% of SC; after 6 hours in Cmax**
- C max in the same time point.

Subcutaneous GLP-1 Rat Plasma Concentration



	Subcutaneous
Dose [mg/kg]	0,3
C _{MAX} [ng/mL]	556,0
T _{MAX} [h]	24
AUC _{0→t} [ng·h/mL]	24276,26
AUC _{INF} [ng·h/mL]	26642,57
F _{ABC} [%]	80,5432

Transdermal MTC carrier GLP-1 Rat Plasma Concentration



	MTC-Y semi-solid carrier
Dose [mg]	2,0
C _{MAX} [ng/mL]	141,78
T _{MAX} [h]	6,0
AUC _{0→t} [ng·h/mL]	2723,58
AUC _{INF} [ng·h/mL]	5575,66
F _{ABC} [%]	4,1222

Key Takeaways:

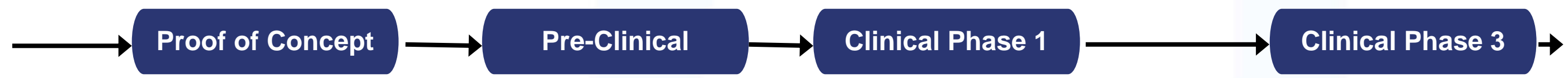
First time ever that a peptide like Semaglutide is administered through the skin

Bioavailability 10x higher than oral

Feasible alternative even when compared with injectables



INSULIN



SEMAGLUTIDE



Strategic Partnerships

- Bioton SA for Insulin and initial channel to market
- Bachem for Semaglutide
- LTS Lohmann and ProSolus for patch development, scale-up and manufacturing

BACHEM

LTS

BIOTON

PROSOLUS
Transforming Transdermal Delivery



Profit share

Profit share for Insulin



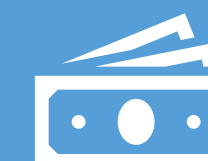
Revenues

Direct revenues from Semaglutide product through distribution network



Premium Pricing

Competitive premium pricing vs. Injectable; directly targeted at patients and consumers



Cost Benefit

Significant cost benefit for patients vs. any oral alternative



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THANK YOU!