A Leader in the Development of New and Innovative Biopharmaceuticals

This document has been prepared by ViroMed for the sole purpose of providing information through investigator relations presentation targeting institutional and general investors. The presented material contains future projection and forecasts of the business. The future projection and forecasts provided have been faithfully composed based on rationale and assumption. Such projection and forecasts, however, contain uncertainty and risks and may result different outcomes. The innate uncertainty and risks include changes in overall management, financial markets, related laws and regulations.

ViroMed

ViroMed Overview

- ✓ Develops innovative biologics
  - Pioneer and global leader in plasmid DNA-based gene therapy, developing therapeutics for cardiovascular and neurological diseases

- Established: Nov. 21, 1996
- IPO: Dec. 29, 2005 (KOSDAQ: 084990); latest market cap, $ >3 Billion
- No. of employees: + 90 (R&D >50)
- Locations: Seoul, Korea and San Diego, California, US
- Webpage: www.viromed21.com

Present

ViroMed (Magok, Seoul)
To be completed in 4Q. 2019

ViroMed (San Diego, California)
Genopis Inc.

Product Portfolio

Biologics

Gene Therapy

DNA

Phase III (US)

- Diabetic Peripheral Neuropathy
- Diabetic Non-Healing Foot Ulcer
- Hematological tumors
- Solid tumors
- Lou Gehrig's Disease — Phase II (US)
- Ischemic Heart Disease — Phase II (Korea)
- Neurovascular Diseases
- Neuromuscular Diseases

CAR-T

- 1E4

Protein

Antibody

- Thrombocytopenia

Phase III (China)

Cytokine

Phytotherapeutics

Prescription Drugs

Launched

- Osteoarthritis
- ADHD

Nutraceuticals with Heath Claim

Launched

- Allergic disease
- Memory improvement
- Joint Health
- Prostate health
- Respiratory health
- Insomnia

Leadership Highlights

Proprietary gene therapy platform technologies

Can lead to development of multiple products
for various human diseases with high unmet medical needs

Seungshin Yu, Ph.D.
Managing Director,
Research &
Business Development

William Schmidt, Ph.D.
Vice President,
Global Clinical Development

High level skills and expertise in clinical development

Capabilities of:

- Designing clinical protocols for first-in-class drugs
- Establishing clinical networks
- Conducting clinical studies in time- and cost-honored manners

Jun Tae Park, Ph.D.
Executive Vice President,
Licensing & Regulatory Affairs

Sunyoung Kim, D.Phil.
CEO and Founder

Manufacturing capability

Manufacturing capability
for go-to-market:
facility in San Diego

Keith Hall
COO
GENOPIS
in San Diego

Commercial potential

- VM202 with blockbuster potential with an aim to enter the market in 2021
- Targeting major human diseases with high unmet medical need

Cathy Carroll, Ph.D.
Director,
Market Access

Innovative botanical pipeline

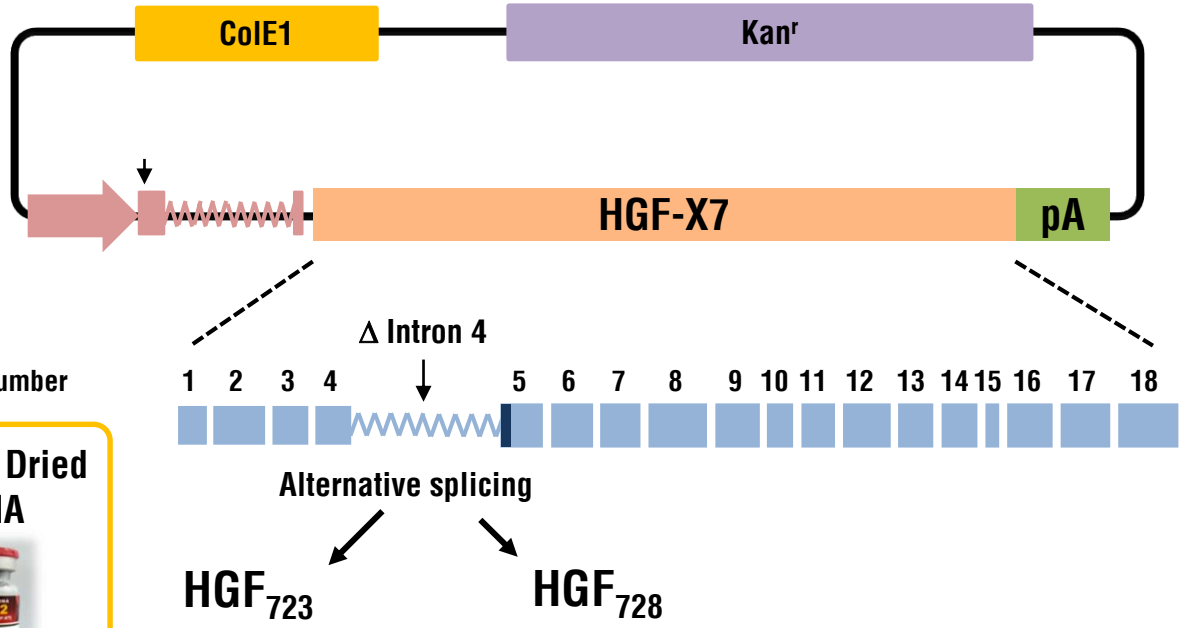
- Proven records in effective R & D and profitability
- Targeting diseases for which current small molecules and biologics are proved ineffective
- Aiming to enter global market

Miwon Son, Ph.D.
Senior Managing Director,
Phytotherapeutics

Flagship Product – VM202

Innovative DNA medicine that induces formation of new blood vessels and repair of damaged neurons through a simple series of IM injections

- Plasmid DNA designed to simultaneously express two isoforms of HGF -



Freeze Dried DNA

※ Special Features

□ Therapeutic Gene:
- HGF

□ Two isoforms:
- HGF$_{723}$ + HGF$_{728}$

□ Expression Level:
- Promoter
- UTR
- Intron

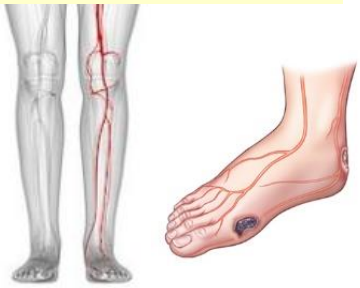
□ Formulation

ViroMed has a strong patent position with VM202.

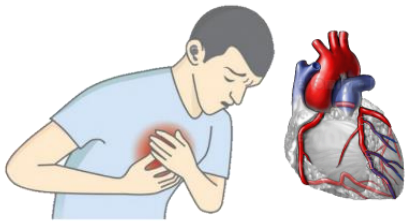
Simple intramuscular injections of VM202 can create new blood vessels and repair damaged neurons.

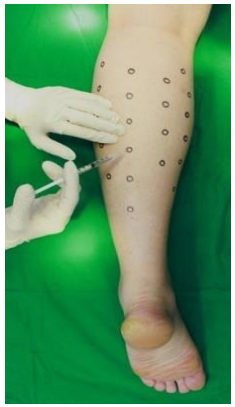
- **Neuropathic Pain**

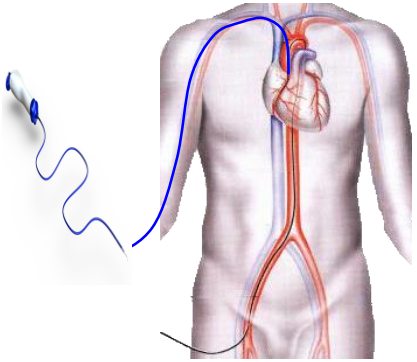
- **Peripheral Artery**



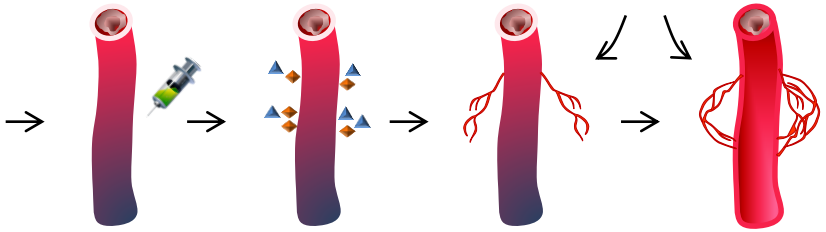
- **Coronary Artery**







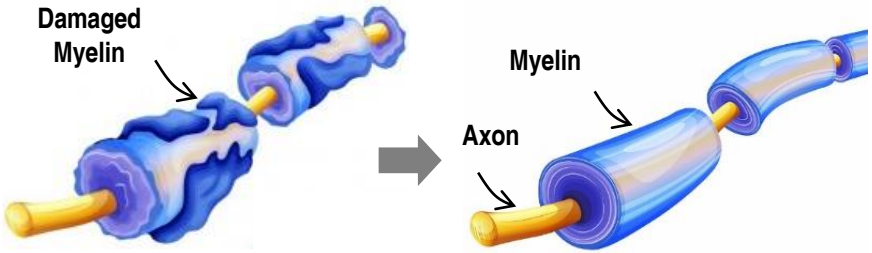
① Angiogenesis



② Reduction in the level of pain factors

(CSF-1, IL-6, α2δ1, 5-HTT, etc.)

③ Regeneration of damaged nerves



Damaged Nerve

Repaired Nerve

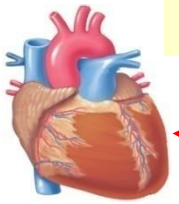
Clinical Development of VM202

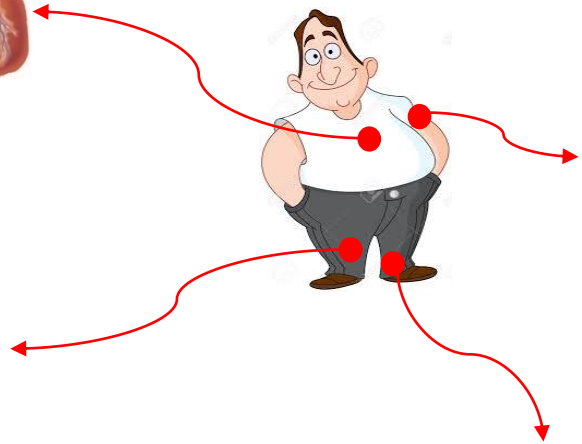
Cardiovascular

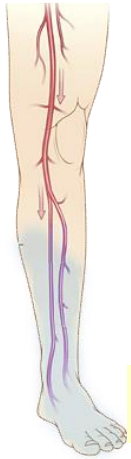
Coronary Artery Disease

Acute Myocardial Infarction

Phase II (Korea) planned







Peripheral Artery Disease

Diabetic Foot Ulcer

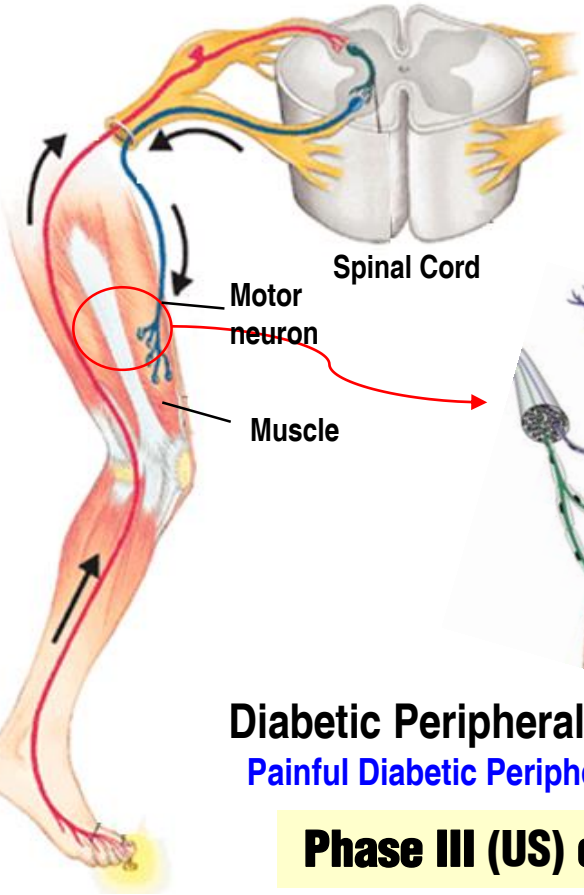
Phase III (US) ongoing

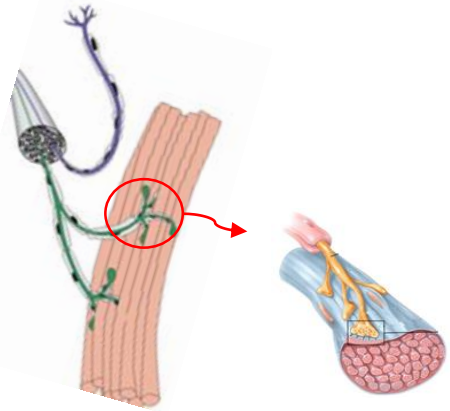
Neurological

Amyotrophic Lateral Sclerosis

Lou Gehrig's Disease

Phase II (US) planned





Diabetic Peripheral Neuropathy

Painful Diabetic Peripheral Neuropathy

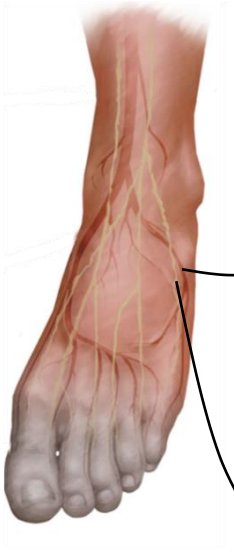
Phase III (US) ongoing

1st Target Disease of VM202

Painful Diabetic Peripheral Neuropathy (PDPN)

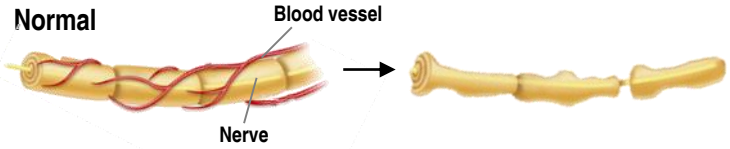
- One of the most frequently observed neuropathies associated with 30% of all diabetes patients
- Patients suffer from sensory loss, dysesthesia, and night time pain.

Hyperglycemia

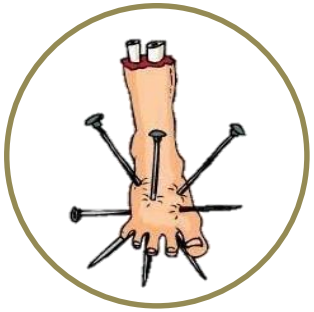


Blood vessel damage

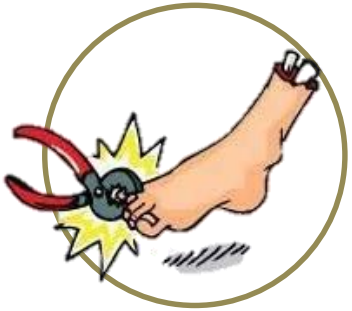
Nerves shrivel when blood vessels disappear

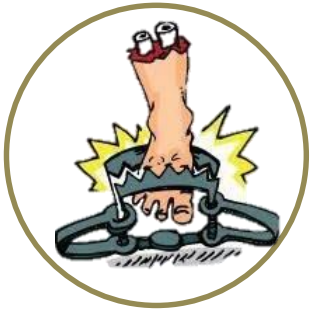


Painful diabetic peripheral neuropathy



Throbbing, Burning, Stabbing, Tingling





Currently Used Medicines for Painful DPN

- **There are 3 major drugs, generating $ 3 - 4 billion market.**

• Anticonvulsants:	**Pregabalin (Lyrica®, Pfizer)** $ ~5.1 B (2014), Neuropathic pain market: 30-50%
	Gabapentin (Neurontin®, Pfizer) $ ~ 210 M (2014)
• Antidepressants:	**Duloxetine (Cymbalta®, Eli Lilly)** $ 5 B (2013), Neuropathic pain market > $1 B
• NSAIDs	
• Opioids:	**Tapentadol (Nucynta® ER, Depomed)** $ 281 Million (US, 2016)

Improvement Needed in

- Safety and tolerability profile
- Efficacy profile
- Curative or disease-modifying capability

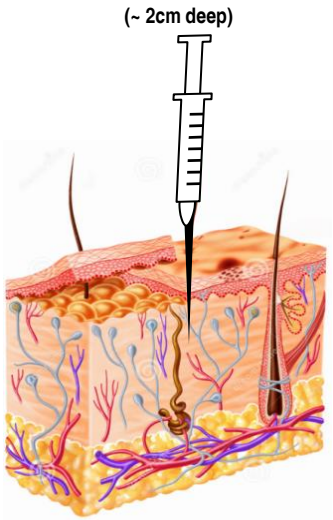
Limitations

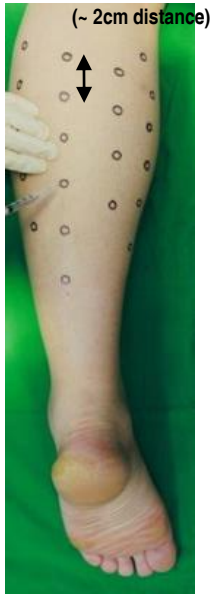
- Pain relief only → No disease-modifying capability
- Modest treatment benefit
- Tolerability issue and side effects minimize compliance
- 40% PDPN patients with no option to control or manage their pain

Study Outline of VM202-DPN Phase II

A Double-Blind, Randomized, Placebo-Controlled, Multicenter Study (US, Korea)

Principal Investigator
JOHN (JACK) A. KESSLER, M.D.
(Northwestern Medical School)

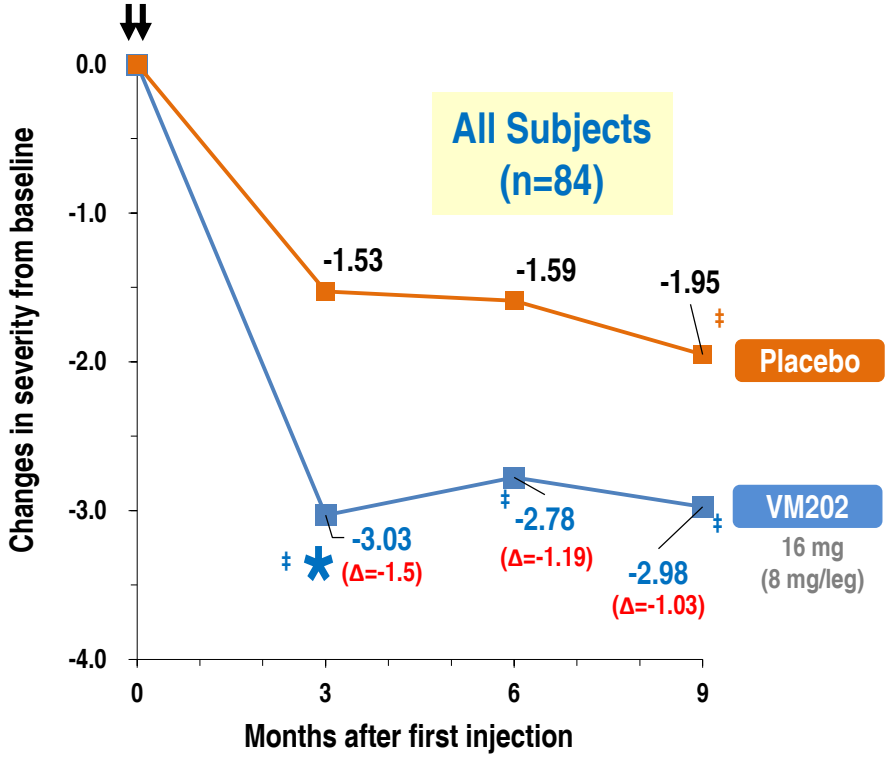




1. **Indication:** Painful Diabetic Peripheral Neuropathy
2. **Total administered subjects:** 103
3. **Injection scheme**
   Bilateral 2 injection cycles along the calf line (day 0 & 14)
4. **Follow-up period:** 9 months
5. **Efficacy**
   - Pain score (Daily Pain and Sleep Interference Diary)*
   - VAS*, BPI-DPN*, MNSI, PGIC*, etc.
6. **Safety**

Effect on Pain Severity (Daily Pain Diary)

2 Rounds of IM injection of VM202

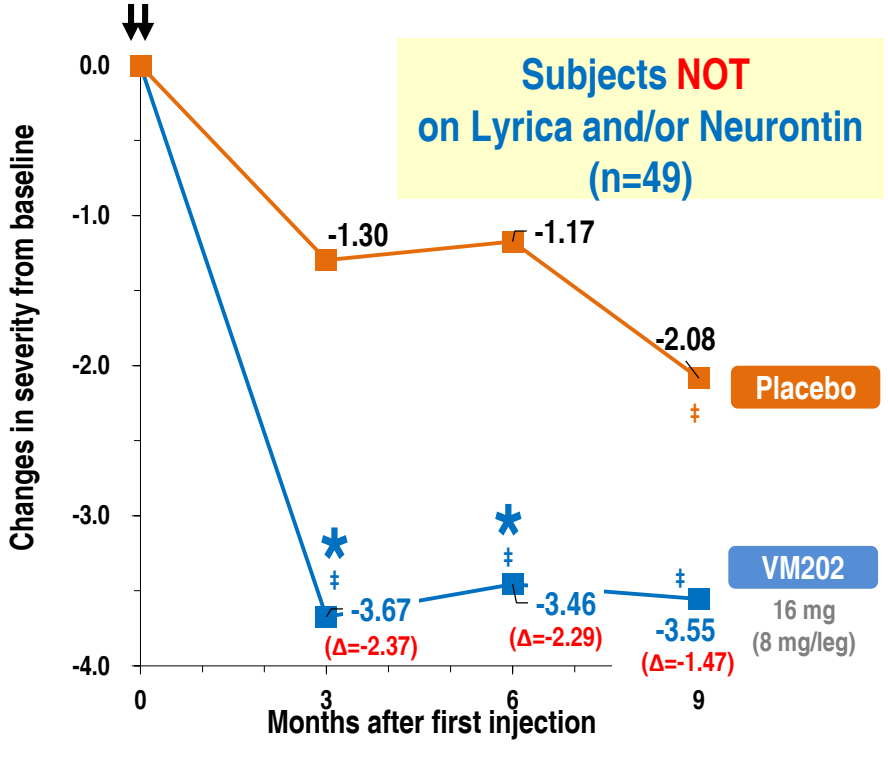


[*p<0.05, *vs.* placebo, ‡p<0.05, *vs.* baseline, Δ VM202 16mg – Placebo]

High long-term pain-relieving effects

Simplified from Kessler et al.
Annals of Clinical and Translational Neurology, 2: 465-478 (2015)

2 Rounds of IM injection of VM202

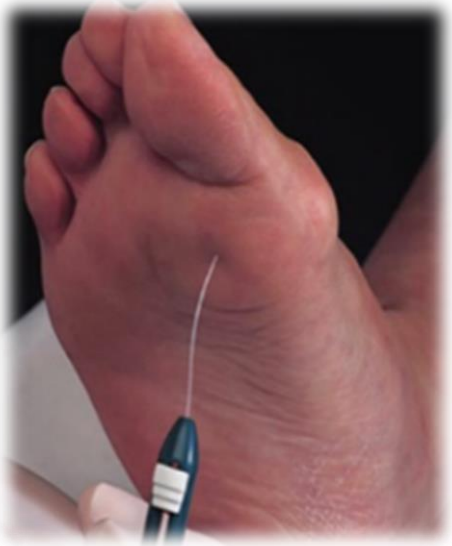


[*p<0.05, *vs.* placebo , ‡p<0.05, *vs.* baseline, Δ VM202 16mg – Placebo]

Higher pain-relieving effects in subjects NOT on gabapentin and/or pregabalin

Key Discoveries of DPN Phase II Trial

1. An excellent safety profile compared to current prescription drugs. (No antibody to HGF, No change in HGF serum level).
2. Significant improvements in all pain measurements for a long period of time. (Daily pain diary, BPI-DPN, VAS, PGIC)
3. Pain relieving effects were more pronounced in patients not taking Lyrica and/or Neurontin.
4. Data from monofilament tests suggested that VM202 might aid recovery of sensory functions and have the potential to be a disease-modifying drug.



Current Phase III Clinical Trial

- Enrollment Goal:
  - 477 subjects randomized in a 2:1 ratio of VM202 to placebo
- Enrollment as of 31 Jul, 2018:
  - 494 randomized (103%)
  - 230 completed study to full 9 months
- Dropouts: 37 discontinued study (7.5% = much lower than other trials)
- Concomitant DPN medications as of Jul 31, 2018 (N = 487):
  - Receiving Lyrica (35) or Neurontin (203) or Both (4) = 242 total
  - Not receiving Lyrica and Neurontin = 245

Phase III Clinical Trial Sites

- 25 geographically-distributed sites in the USA

RMAT Designation
(Regenerative Medicine Advanced Therapy)

VM202 for PDPN was granted RMAT by FDA on 21 May 2018, the first and only RMAT for a gene therapy targeting a prevalent disease.

Eligibility

- A regenerative medicine therapy in cell and gene therapy
- Drugs intended to treat, modify, reverse, or cure a serious or life-threatening disease or condition
- Preliminary clinical evidence indicates potential to address unmet medical needs.

Benefits

- Include all of the benefits of *Fast track* and *Breakthrough* designation programs
- Allows shorter timeline for BLA approval including early interactions with FDA

RMAT Status

- 20 designations granted (as of Jun, 2018)
- Among them, 15 also have orphan designation (cancer: 2, inherited disease: 6)
  5 are in gene therapy (cancer: 1, inherited disease: 3)
  - ✓ Autologous hematopoietic stem cell transplantation in beta-thalassemia (LentiGlobin)
  - ✓ CD19 activity of modified T cells (CAR-T) in large B cell NHL (JCAR017)
  - ✓ Autologous gene-corrected cell therapeutics in recessive RDEB (EB-101)
  - ✓ AAV delivery of SGSH gene in MPS IIIA (ABO-102)
  - ✓ Plasmid delivery of HGF gene in painful diabetic peripheral neuropathy (VM202)

New PDPN Drug Candidates in Late Stage Clinical Studies

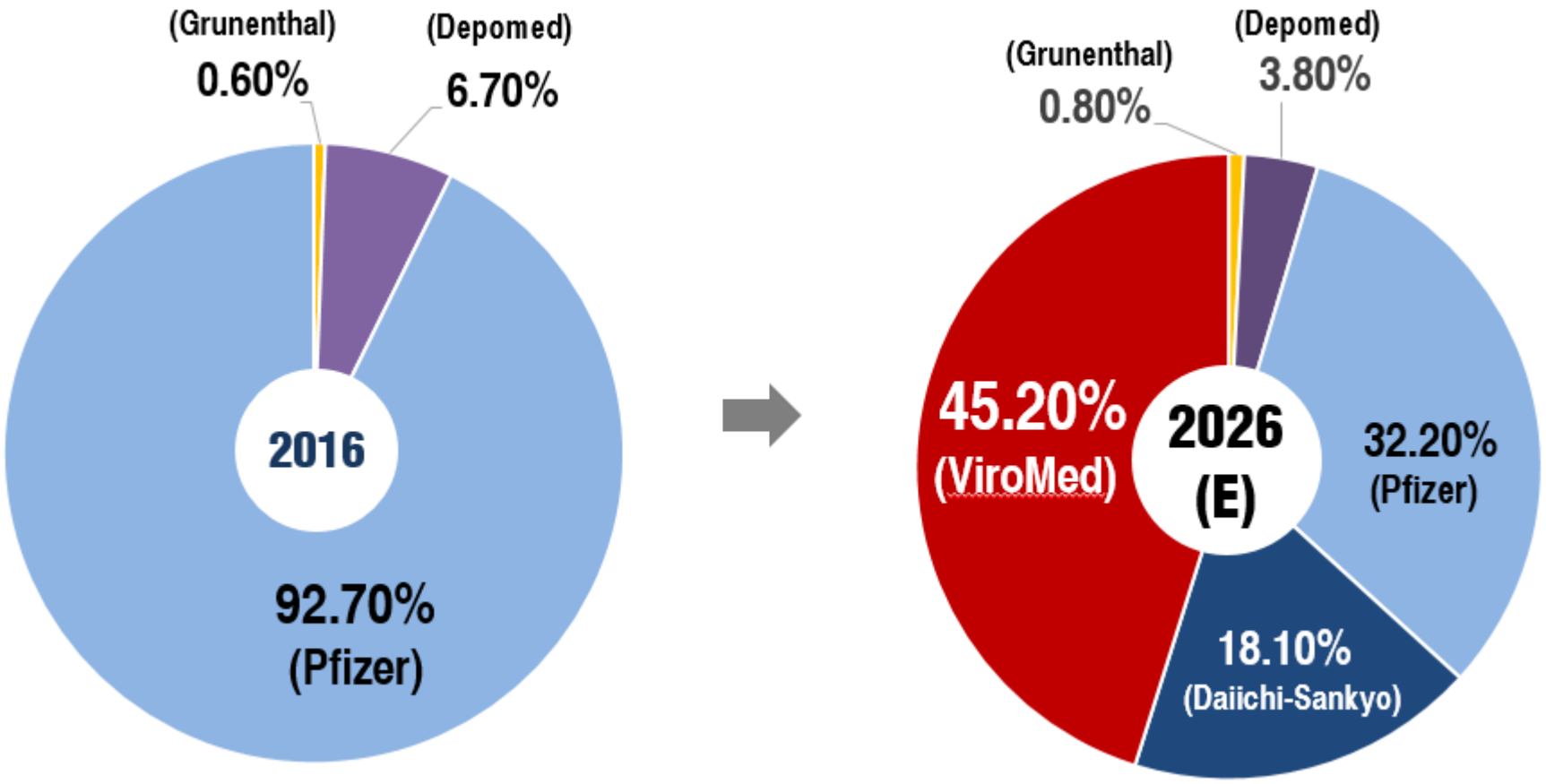
(as of Dec 2017)

	Therapeutic class	Pipeline name	Status	Features
	Gene therapy	**VM202** (ViroMed)	**Phase III**	• 1st gene therapy • Excellent safety & efficacy profile • Long-term therapeutic effect • Disease-modifying potential
Small molecule	α2δ-1 inhibitor	**Mirogabalin Besylate** (Daiichi-Sankyo)	**Phase III**	• Improved safety, tolerability and efficacy than pregabalin • Favorable safety profile • Expected to be used as 1st line therapy anticonvulsant
	Mu opioid + NOP opioid	**Cebranopadol** (Grünenthal/ Depomed)	**Phase II**	• Favorable efficacy • Associated with potential abuse and serious AE • Expected to be used as 3rd line therapy
	NMDA	**NYX-2925** (Apitinyx)	**Phase II**	• NMDA antagonist • PDPN, fibromyalgia • Expected to be used as 3rd line therapy
	$Sigma_1$	**S1A (MR309, E-52862)** (Mundipharma/ Purdue Pharma/ Esteve)	**Phase II**	• Sigma 1 antagonist • Neuropathic pain (diabetic neuropathy; post-surgical; nerve injury); acute post-operative pain
	TCA/NMDA antagonist combination	**AmiKet** (EpiCept/ Immune Pharmaceuticals / Maxim Pharmaceuticals)	**Phase II**	• Amitriptyline & Ketamine • Blocks the ability of peripheral nerve receptors to transmit pain messages • Dual MoA leads to increase in pain relief

VM202, potential to become the FIRST disease-modifying drug to enter the PDPN market

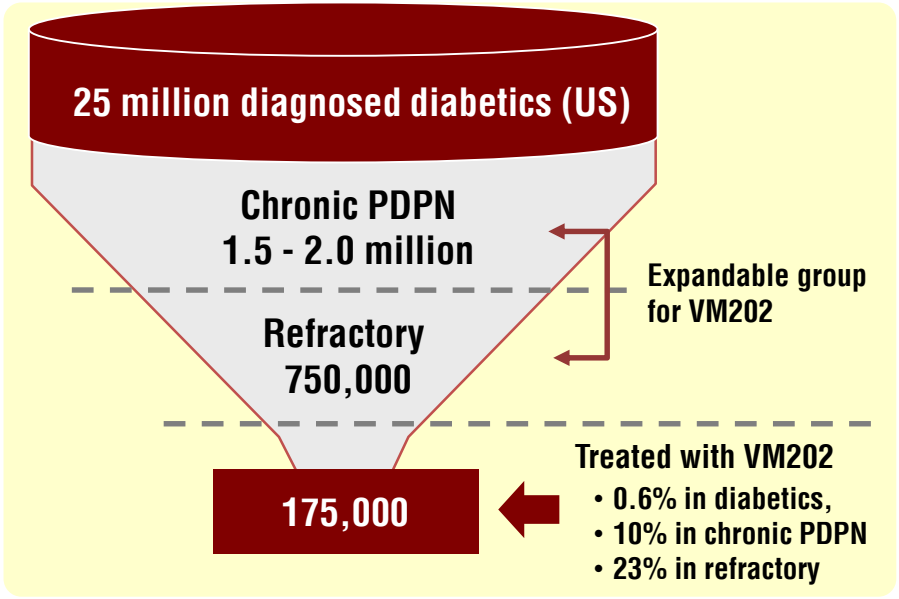
Geographical distribution of global PDPN sales

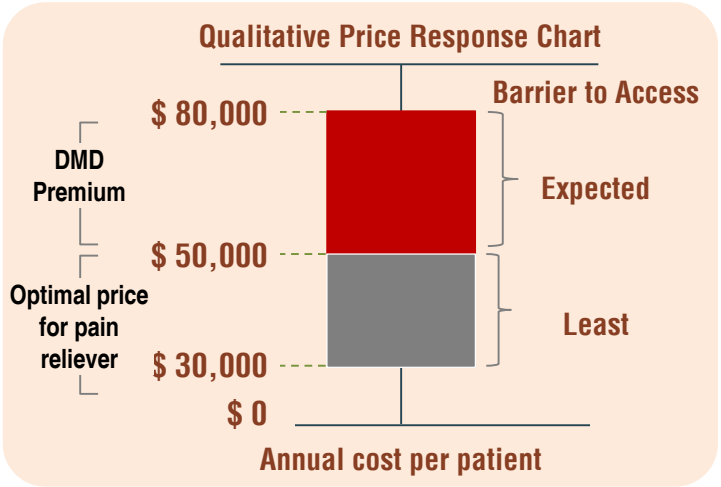
(by GlobalData PDPN market forecast, 2018)

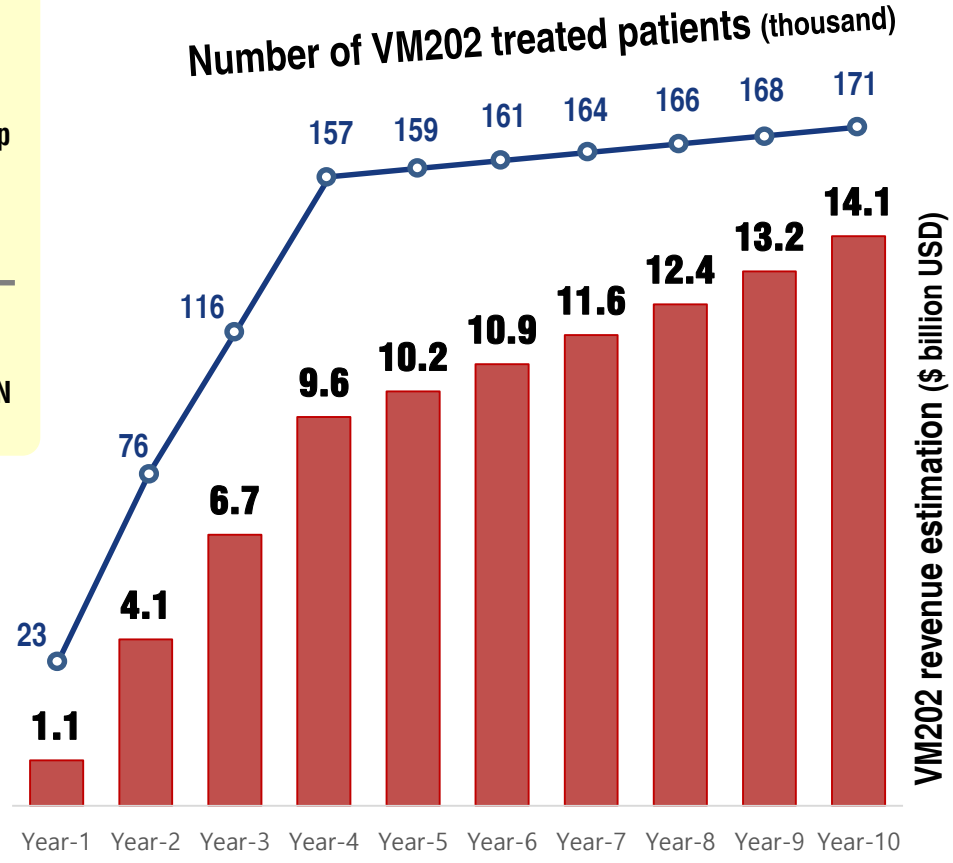


PDPN & VM202 Market Estimation

(by Viewpoint (NYC, US), Nov. 2017)



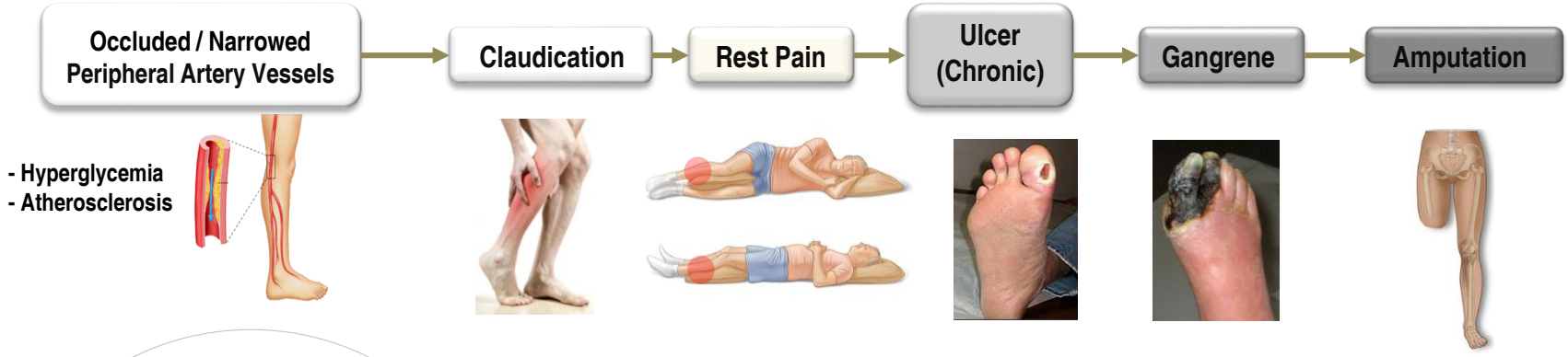


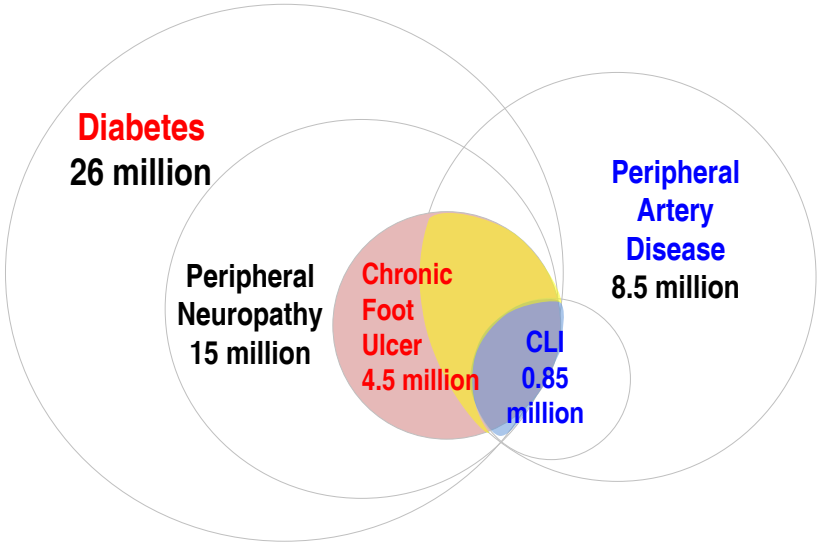


Drug price at market launch : $50,000 (5~8% increase annually)

2nd Target Disease of VM202
Chronic Diabetic Foot Ulcers with Peripheral Artery Problems

- Foot ulcers with PAD result from narrowing or blockage of peripheral arteries in the legs.
- Many diabetes patients suffer from chronic, non-healing foot ulcer.



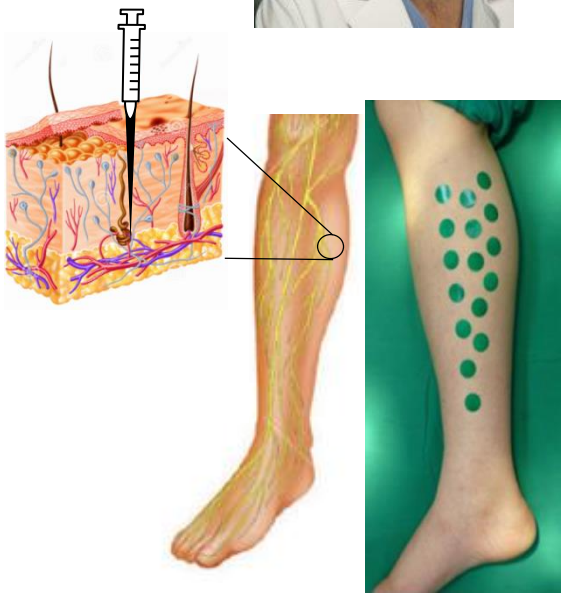


	Chronic Foot Ulcer	CLI Critical Limb Ischemia
Total Number	~ 4.5 Million	~ 0.85 Million
Amputation	82,000	200,000
Medical Costs	$ 9-13 Billion	~ $ 8 Billion

Phase II Trial for CLI as a POC model

A Double-Blind, Randomized, Placebo-Controlled, Multicenter Study (US, Korea)

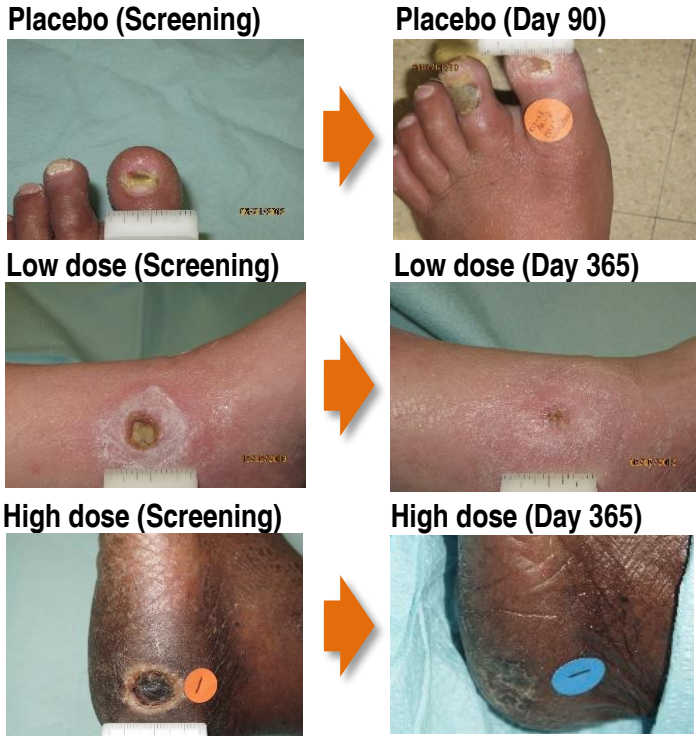
Principal Investigator
EMERSON C. PERIN, M.D.
(Texas Heart Institute)



1. **Indication:** Critical Limb Ischemia (Rutherford class 4 and 5)
2. **Total administered subjects:** 52
   - Placebo (0.9% normal saline): 11 subjects
   - Low dose of VM202 (2 mg/visit): 21 subjects
   - High dose of VM202 (4 mg/visit): 20 subjects

   ※ 30/52 (57.6%) subjects had diabetes.
3. **Injection scheme:** 4 injection cycles along the calf line (days 0, 14, 28, & 42), unilateral IM injection
4. **Follow-up period:** 12 months
5. **Efficacy**
6. **Safety**

Substantial Healing Effects Observed in Ulcers



Group (Number of ulcers)	Completely healed	Improved [1)]
Placebo (n = 9)	11% (1/9)	11% (1/9)
Low dose (n = 27)	52% (14/27)	70%* (19/27)
High dose (n = 13)	62%* (8/13)	69%* (9/13)

(Kibbe *et al.*, *Gene Therapy* (2016) 1-7)

[1)] Reduction of ulcer area > 50%

[* $p < 0.05$, *vs.* placebo (Fischer Exact Test)]

- >60% of ulcers were completely healed in the high dose group during 12-month follow-up period.
- Improvements ABI, Tcpo2 and VAS for pain were also observed.

Study Outline of Phase III for DFU

Double-Blind, Randomized, Placebo-Controlled, Multicenter

1. **Indication:** Chronic non-healing foot ulcers in diabetic patients with concomitant PAD
   - Ulcer(s) on or around the foot area that are unresponsive to standard therapies and persist despite 4 weeks of appropriate care

2. **Total administered subjects:** 300
   - 16 mg VM202 + Standard Care: 200 subjects
   - Placebo (VM202 vehicle) + Standard Care: 100 subjects
   - 78 subjects enrolled, 16 subjects randomized (as of 18 Jul, 2018)

3. **Injection scheme:**
   - 4 unilateral injection cycles in the ipsilateral calf of the affected foot (day 0, 14, 28, and 42)

4. **Follow-up:** 7 months

5. **Efficacy endpoints:**
   - Primary: Complete wound closure, 4 months

6. **Safety endpoints**

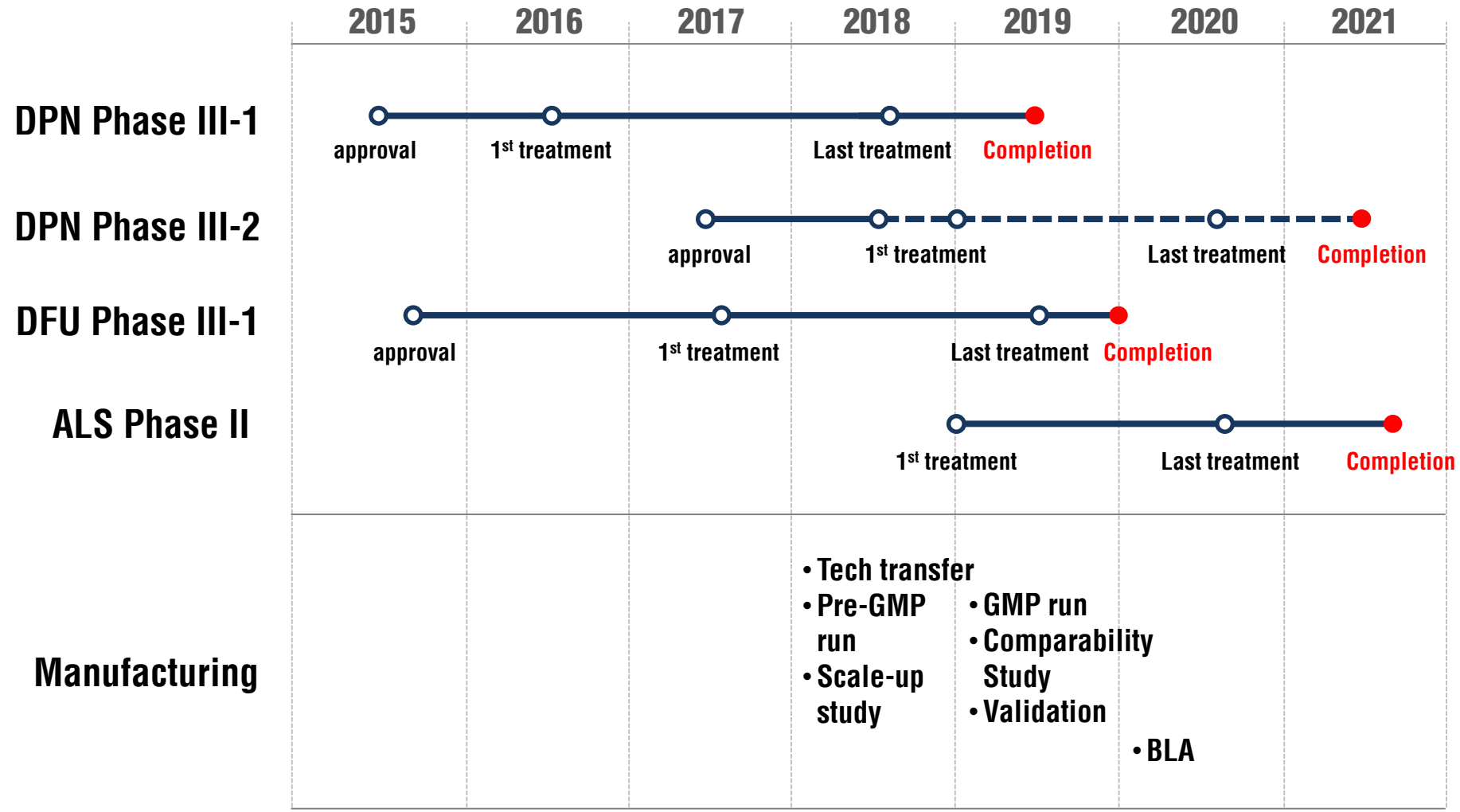
▲ SilhouetteStar
Ulcer size is measured using 3D camera to determine ulcer depth or volume

Manufacturing Facility in San Diego

- **Acquisition of a plasmid DNA production facility** (July 2018) in the form of a JV *(GENOPIS)* in partnership with a private equity investment firm
  - 68,400 square foot plant, research laboratory and office space
  - 500 L fermenter, cell culture lab and QC test lab, etc.
  - Extra space for future expansion (> 174,000 ft^2)

- **Strategic benefits for ViroMed**
  - High quality, reliable in-house production capability for both clinical and commercial drug supply
  - Likely the first commercial plasmid DNA manufacturing facility
  - Less reliance on third-party manufacturers

VM202 5-Year Timeline

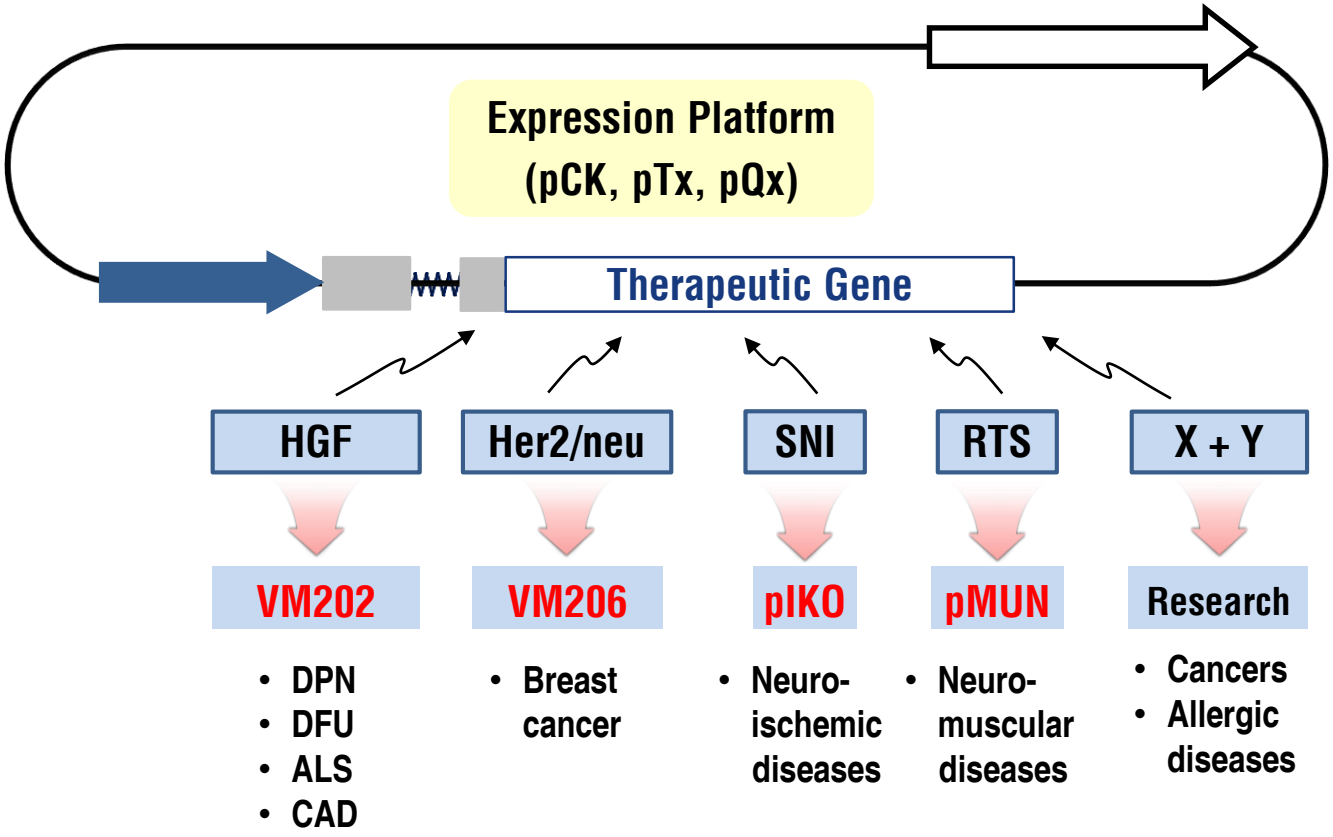


ViroMed's Position in Gene Therapy

1. FIRST gene therapy in phase III for neuropathic pain
   - Potential to be the first disease modifying drug for pain
2. FIRST gene therapy in phase III for diabetic foot ulcer
   - Potential to be the first regenerative medicine in foot ulcer
3. Potential to be the FIRST in commercializing DNA as a drug for humans ☞ Opening up a new era in drug development
4. Targeting highly prevalent diseases with high unmet medical needs
   ☞ Great commercial potential
5. Aiming to be THE global leader in plasmid DNA gene therapy

ViroMed's DNA Platform Technology

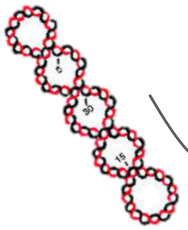
※ By inserting different genes, a variety of drugs are developed.



Other Gene Therapy Products:
Plasmid DNA- and CART-Based Gene Medicines

Plasmid DNA

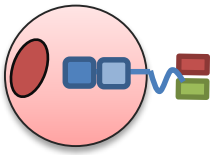
- New expression platform
  - pTx, pQx
- Disease platform (Muscle/Vascular/Neurological)
- Gene discovery & optimization
- Efficacy research technology



- pIKO
- pMUN

CAR-T

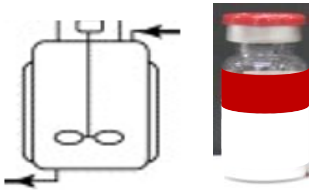
- CAR optimization
- Vector production
- Cell processing



- VM 801
- VM 802
- VM 803
- VM 804

GMP

- Cell processing



- DNA production (GENOPIS) in San Diego

Clinical trial
PI→PII→PIII

- US
- Korea

Armed with hands-on experience and extensive global network
for Muscle / Vascular / Neurological disorders

ViroMed's Goal through 2025
in the Area of Gene Therapy

1. To be the biotech company with world's largest revenue from gene therapy products.
   (Basis: list of current phase IIIs)

2. To maintain a global leader position in plasmid DNA-based gene therapy.

3. To be conducting phase IIIs for 2-3 additional gene medicines with blockbuster potential similar to VM202.

   (Current status: Prototypes of 2 new candidate products are 90 percent ready for consideration of clinical trials in the US.)