

The logo features the letters 'TTV' in a bold, red, italicized sans-serif font, followed by the word 'BIOPHARM' in a black, italicized sans-serif font. A small registered trademark symbol (®) is located at the top right of the word 'BIOPHARM'.

**TTV<sup>®</sup>BIOPHARM**

台灣東洋藥品

**WELCOME TO JOIN US**

December, 2017

# Safe Harbor Statement

## This presentation contains certain forward-looking statements.

These forward-looking statements may be identified by words such as 'believes', 'expects', 'anticipates', 'projects', 'intends', 'should', 'seeks', 'estimates', 'future' or similar expressions or by discussion of, among other things, strategy, goals, plans or intentions. Various factors may cause actual results to differ materially in the future from those reflected in forward-looking statements contained in this presentation, among others:

1. pricing and product initiatives of competitors;
2. legislative and regulatory developments and economic conditions;
3. delay or inability in obtaining regulatory approvals or bringing products to market;
4. fluctuations in currency exchange rates and general financial market conditions;
5. uncertainties in the discovery, development or marketing of new products or new uses of existing products, including without limitation negative results of clinical trials or research projects, unexpected side-effects of pipeline or marketed products;

6. increased government pricing pressures;
7. interruptions in production
8. loss of or inability to obtain adequate protection for intellectual property rights;
9. litigation;
10. loss of key executives or other employees; and
11. adverse publicity and news coverage.

TTY Biopharm cautions that this foregoing list of factors is not exhaustive. There may also be other risks that management is unable to predict at this time that may cause actual results to differ materially from those in forward-looking statements.

**You are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date on which they are made. TTY Biopharm undertakes no obligation to update publicly or revise any forward-looking statements.** Any statements regarding earnings growth is not a profit forecast and should not be interpreted to mean that TTY Biopharm's earnings or earnings per share for this year or any subsequent period will necessarily match or exceed published earnings or earnings per share forecasts of TTY Biopharm Company Limited.

# Our Mission

We have been striving to extend liposomal & microsphere depot platform technologies for treatment of various diseases.

**Our Target is to improve health and quality of life through innovative, cost-effective therapeutics and specialty drugs.**

Our focus is on the **"Unmet Medical Needs"** in challenging diseases throughout the world, such as Cancer, CNS, Autoimmune, Diabetes Mellitus & Infectious Diseases.



# Agenda

## Company Overview

Product Strategy

Product Pipeline

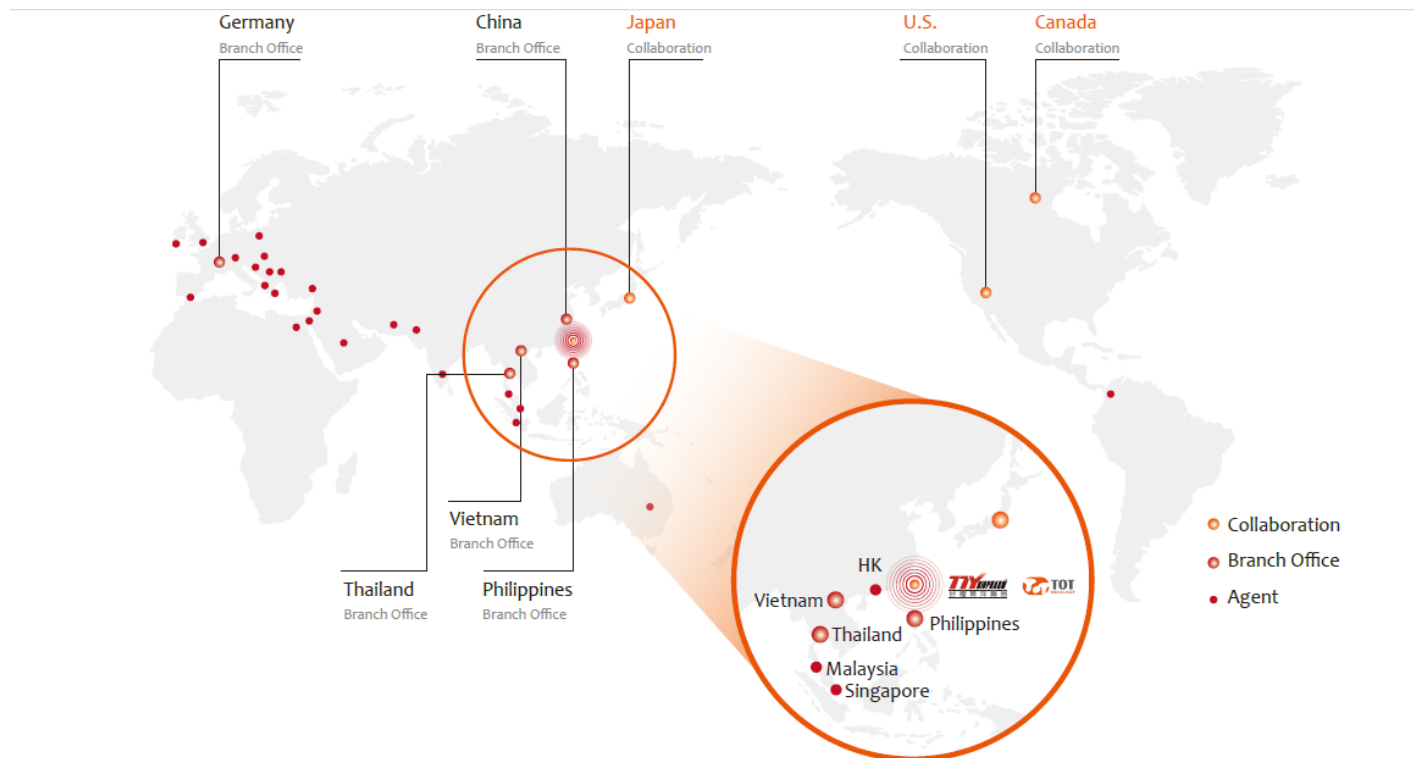
Manufacture Facilities

Successful Product Categories

In Progress Status

Biotech Success

# Company Overview



- **Founded in 1960, restructured in 1996**
- **Traded in the Taiwan TPEx**  
(2001, Code: 4105);  
**Shares outstanding: 248 Million Shares**  
(March, 2017)

- **TTY Biopharm consolidated sales as of**  
2016- NTD 3.80 Billion, USD 117 Million
- **Headquarters: Taipei, Taiwan**  
**Number of employees: 508**

- TTY Biopharm is a global leader in Super-Generic Drugs and novel specialty/ bio-drug development with strong growth potentials (targeting for 20% sales CAGR in 2014-19).
- TTY is Taiwan's largest biotechnology conglomerate with the most completed biotechnology products pipeline including oncology drugs, new formulations, ... etc.
- Market cap US\$825mn. As of 6/30/2017
- Currently has three major subsidiaries (base on 6/30/2017):  
PharmaEngine (listed), Market cap US\$804mn, 19.30% ;  
TSH Biopharm (listed), Market cap US\$103mn, 56.48%;  
CY Biotech, 27.54%
- Shareholder value creation-
  - TTY's ROE 19.5% in 2011-2016, ROE 21.4% in 2016 (above industry average 7.35%).
  - TTY targets for 28%-35% ROE in 2017-2020.
  - TTY aims to be a world-class biotechnology public listed company with multi-bn market capitalization in coming years.



## Major Investments

轉投資主要架構

Global  
Taiwan  
China  
Asia

殷漢

EnhanX (67%)

- R&D / New Drug Development
- Clinical Trials & Marketing

東生華製藥  
TSH (56.48%)

- New Drug Development & Marketing of Chronic Diseases (CV/GI/Immune)

智擎生技  
PharmaEngine (19.30%)

- New Drug Development

創益生技  
CY Biotech (27.54%)

- Probiotics & Obesity Diseases

榮港生技  
WorldCo (100%)

- New Drug Development (liver/ID/CNS)
- Marketing

ATB泰/ATB菲/越辦事處  
40%/87%/100%

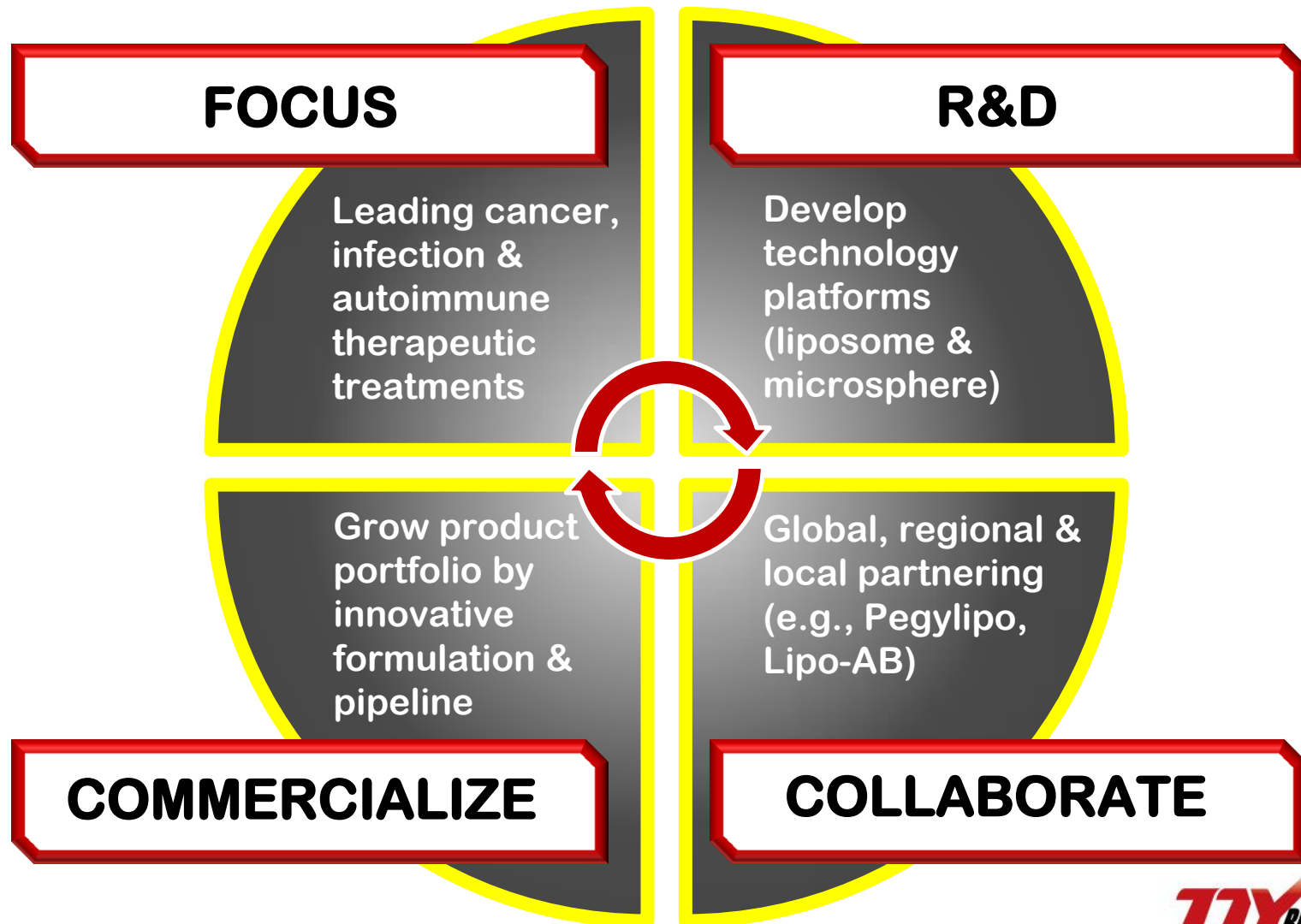
- New Drug Development & Marketing

# TTY Core Competences





# Corporate Strategy



# Agenda

**Company Overview**

**Product Strategy**

**Product Pipeline**

**Manufacture Facilities**

**Successful Product Categories**

**In Progress Status**

**Biotech Success**

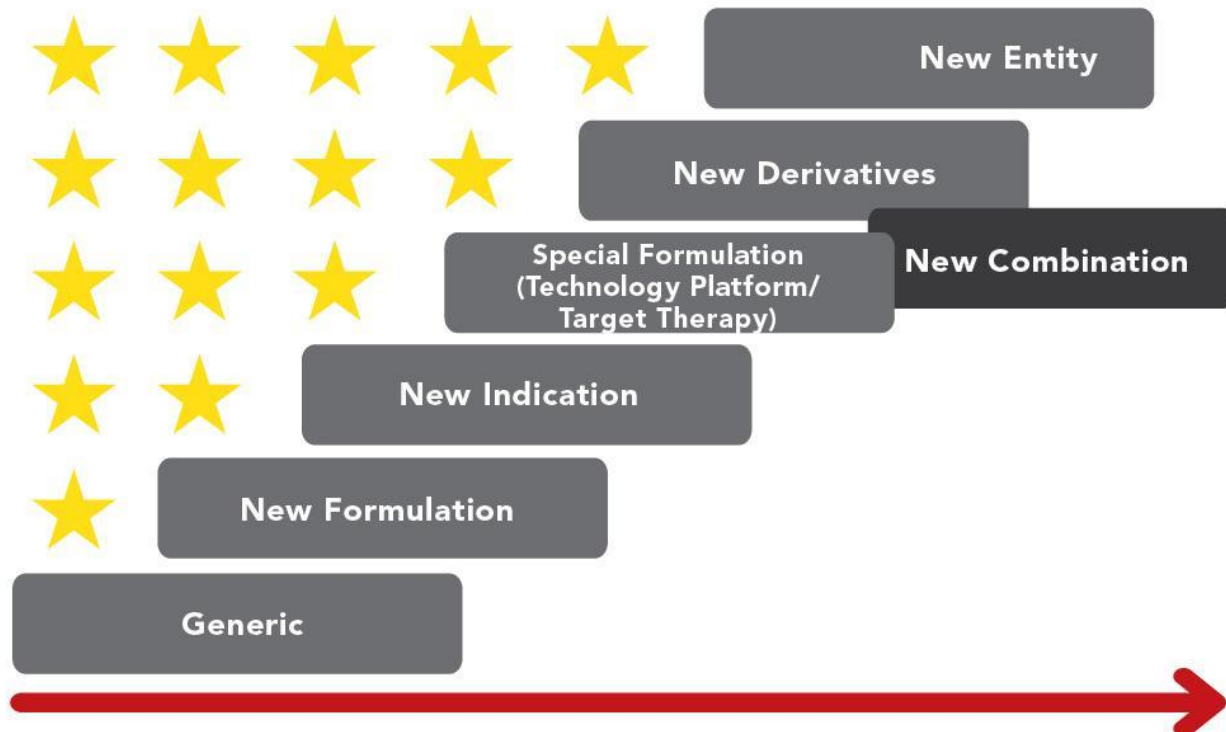
# Product Strategy

## Trends for Pharmaceutical Industry

Market Scope  
(Risk)

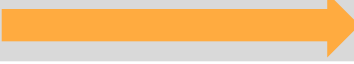


Entry Barrier  
(Profit)



# TTY Super Generics Pipeline

\* Current CDMO price for partner equals to 2016.

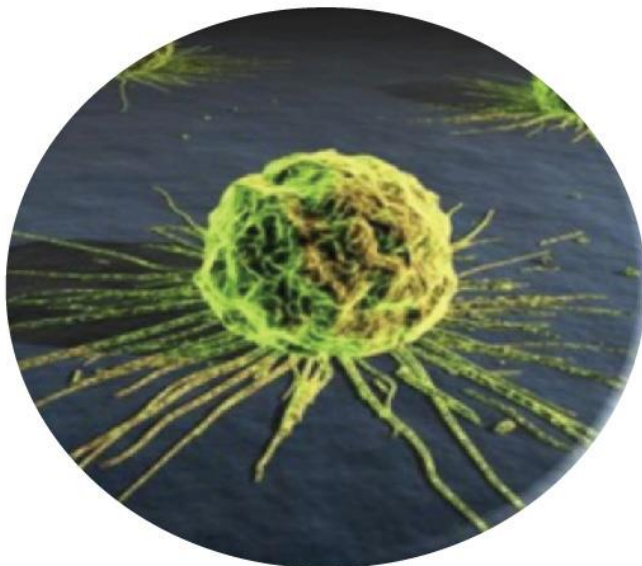
| Products                        | Indication(s)                                                                                                                                         | R&D (BE;BA+CT)                                                                       | ANDA (EU/USA) |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------|
| Caelyx/Doxil*<br>(Lipo-Dox)     | Metastatic breast cancer BC,<br>AIDS-related Kaposi's sarcoma,<br>Multiple myeloma,<br>Ovarian cancer                                                 |    | Approved      |
| Pegylipo                        |                                                                                                                                                       |    |               |
| Lipo-AB                         | Leishmaniasis, Concurrent renal<br>toxicity invasive bacterial infection,<br>The infected bursa meningitis HIV<br>patients, Systemic Fungal Infection |    | TW Approved   |
|                                 |                                                                                                                                                       |    |               |
| Leuprolide<br>Acetate Injection | Prostate cancer,<br>Management of Endometriosis,<br>Uterine Fibroids,<br>Central Precocious Puberty                                                   |    |               |
| Risperidone<br>Injection        | Schizophrenia                                                                                                                                         |    |               |
| SPL206                          | Functional gastric, intestinal,<br>Pancreatic endocrine tumors                                                                                        |   |               |
| LGIA10                          | Type II Diabetes Mellitus                                                                                                                             |  | 505(b)2       |
| Col103                          | Multidrug-resistant Gram-negative<br>Bacteria Serious Infection                                                                                       |  | TW Approved   |
|                                 |                                                                                                                                                       |  |               |



# TTY Super Generics Pipeline

| Programs<br>產品組合                        | Indication(s)<br>適應症                                                                                      | World Market<br>(USD/M est.) | Core Technology<br>核心技術                    | Advantages<br>產品優勢                                               |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------|------------------------------------------------------------------|
| <b>Caelyx/Doxil<br/>(Lipo-Dox)</b>      | Metastatic breast cancer BC、<br>AIDS-related Kaposi's sarcoma、<br>Multiple myeloma, MM、<br>Ovarian cancer | 600                          | Pegylated<br>Liposome<br>Technology        | Worldwide manufacturing<br>patent                                |
| <b>Lipo-AB</b>                          | Systemic Fungal Infection                                                                                 | 440                          | Liposome<br>Technology                     | Worldwide manufacturing<br>patent                                |
| <b>Leuprolide<br/>Acetate Injection</b> | Prostate Cancer、<br>Management of Endometriosis、<br>Uterine Fibroids、<br>Central Precocious Puberty       | 1,240                        | Lupron Depot<br>Microsphere<br>Formulation | Worldwide manufacturing<br>patent                                |
| <b>Risperidone<br/>Injection</b>        | Schizophrenia                                                                                             | 960                          | Microsphere<br>Formulation                 | Worldwide manufacturing<br>patent                                |
| <b>SPL206</b>                           | Functional gastric, intestinal,<br>pancreatic endocrine tumors                                            | 1,500                        | Microsphere<br>Formulation                 | PLGA used for particular<br>star polymers synthesized<br>by TTY. |
| <b>LGIA10</b>                           | Type II Diabetes Mellitus                                                                                 | 910                          | Microsphere<br>Formulation                 | Worldwide manufacturing<br>patent<br>Microsphere Depot Platform  |
| <b>Col103</b>                           | Multidrug-resistant Gram-negative<br>Bacteria Serious Infection                                           | 150                          | Formulation                                | First Choice<br>Irreplaceable Option, TWNIH                      |

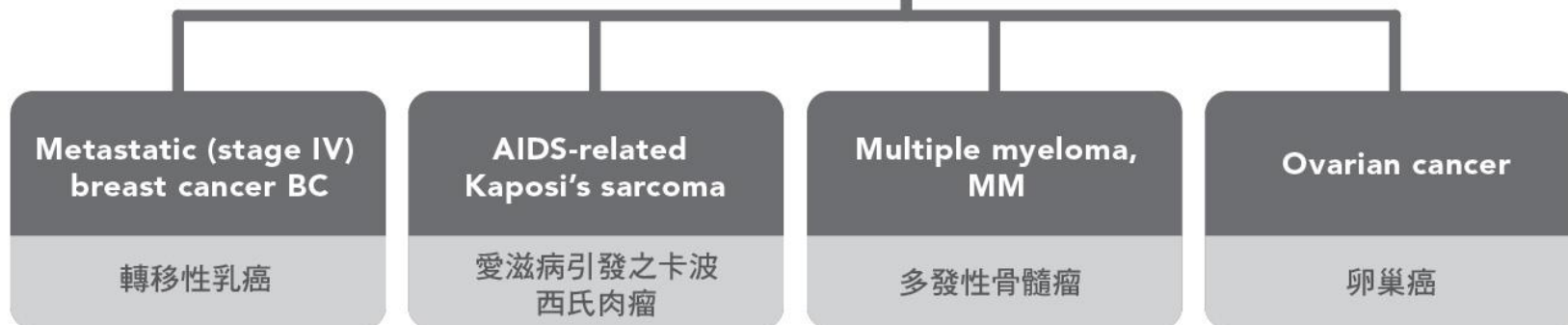
台灣東洋藥品



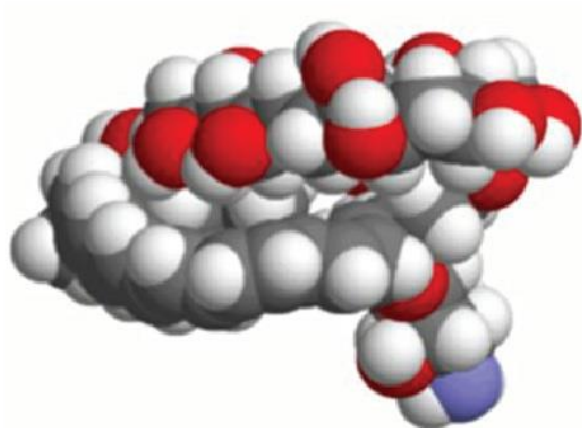
**Caelyx®/Doxil®/Pegylipo®**

**Global market: USD\$600 Million**

**Taiwan: NTD\$200 Million**



Source : Thomson Reuters Mar./2017



## Lipo-AB

Global Market: USD\$440 Million

Target: Worldwide 35~50%

### Leishmaniasis

利時曼氏病  
又稱 Kala-azar 黑熱病

### Concurrent renal toxicity invasive bacterial infection

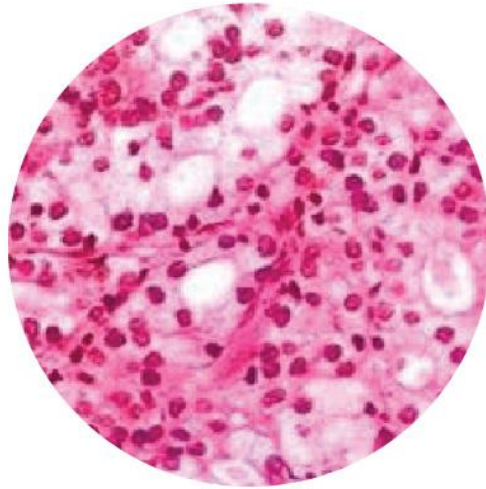
骨髓移植併發腎毒侵入性  
細菌感染

### The infected bursa meningitis HIV patients

愛滋病患者腦膜炎

### Systemic fungal infection

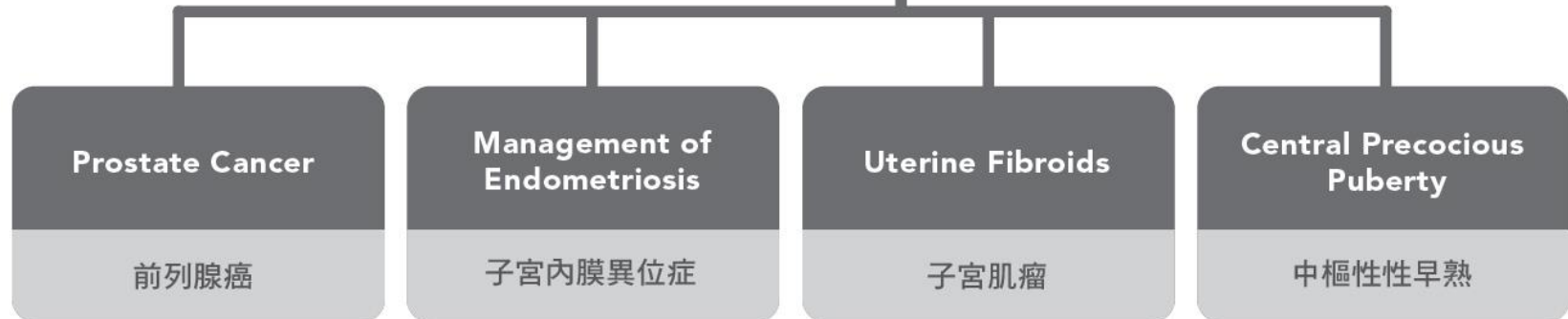
腎功能不全之菌種感染病患



## Specialty- Leuprolide Acetate Injection

Global 2014 Lupron/Leuprolide  
Market: USD\$1.24 Billion

Target: Worldwide 20~35%

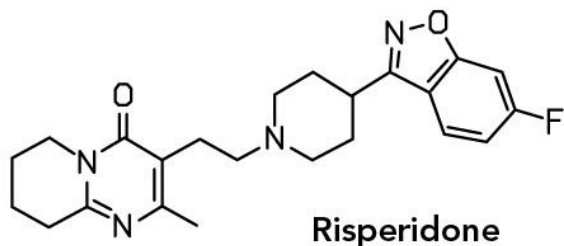




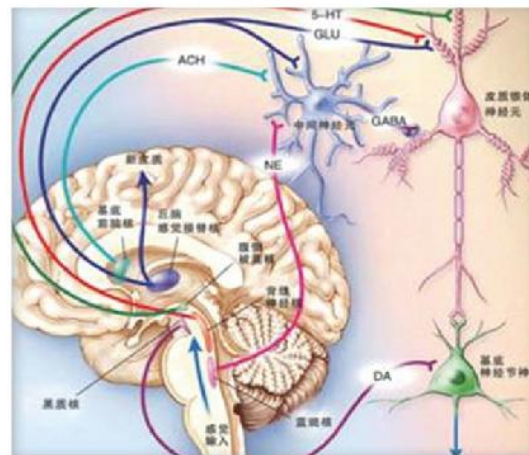
# Specialty- Risperidone Injection

**Indication: Schizophrenia**

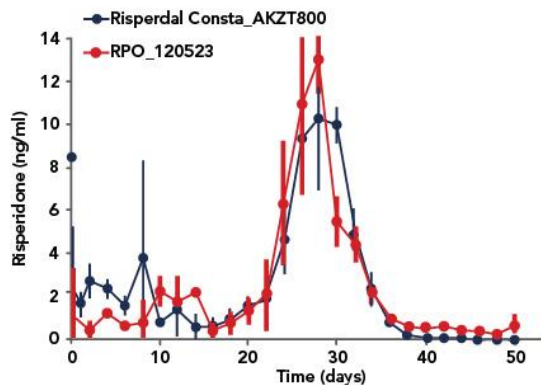
**Global market: USD\$960 Million**



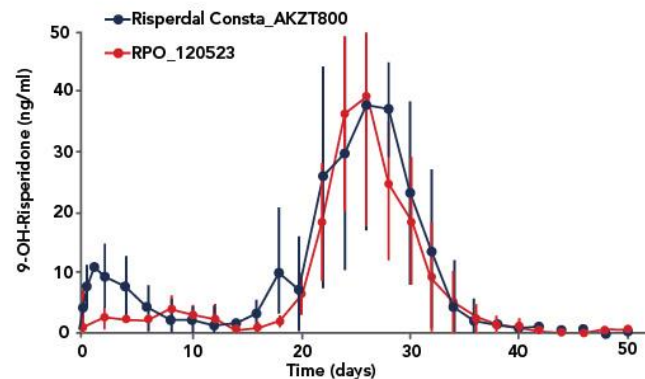
Beagle in vivo release



**Risperidone**



**9-OH-Risperidone**



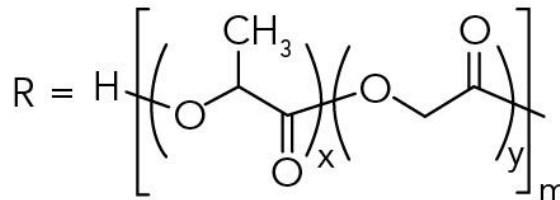
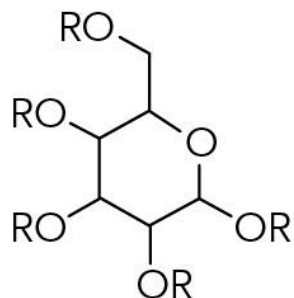


## Indications:

- Acromegaly
- Severe diarrhea/flushing episodes associated with metastatic carcinoid tumors
- Profuse watery diarrhea associated with VIP-secreting tumors

Synthesized by TTY

**TTY synthetic star polymers as a carrier!!**



| Polymer                                                    | Lot        | MW(K Da) | PI   |
|------------------------------------------------------------|------------|----------|------|
| Poly(lactide-co-glycolide) star,<br>glucose core LA:GA=1:1 | TTY#783053 | 53       | 1.67 |

# Introduction of SPL-206

## Symptoms-

- Acromegaly
- Metastatic Carcinoid tumors
- VIP-secreting tumors

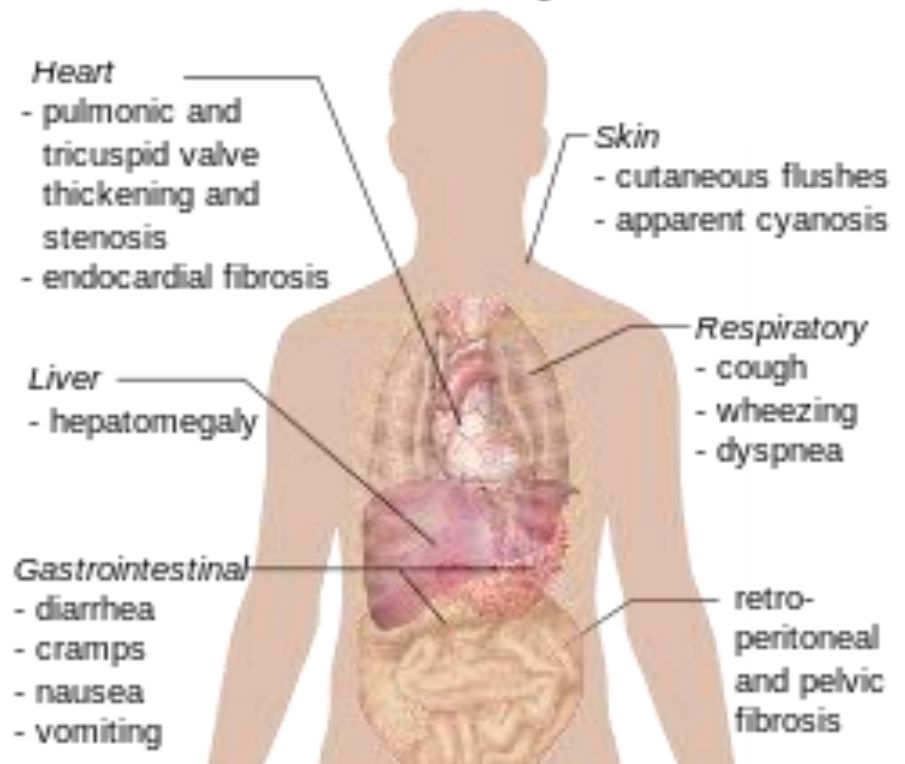


Pre-treatment

Day 4

Day 21

## Carcinoid syndrome

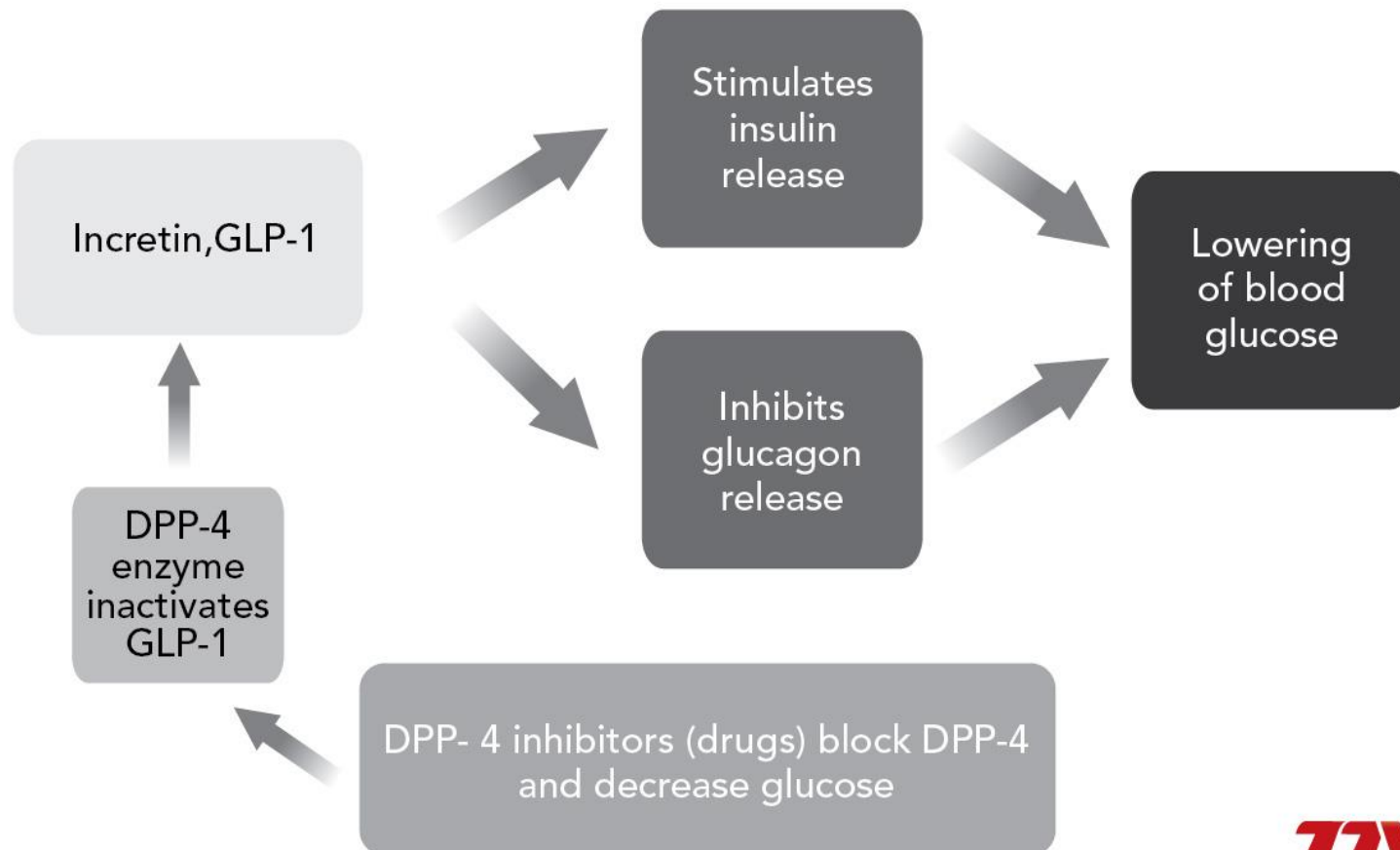


# Mechanism of LGIA10



## GLP-1 and Diabetes

Indication: Type II Diabetes Mellitus





# Introduction of LGIA-10

## Symptoms-

- Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger

### Two Main Types of Diabetes



**Type 1 Diabetes**

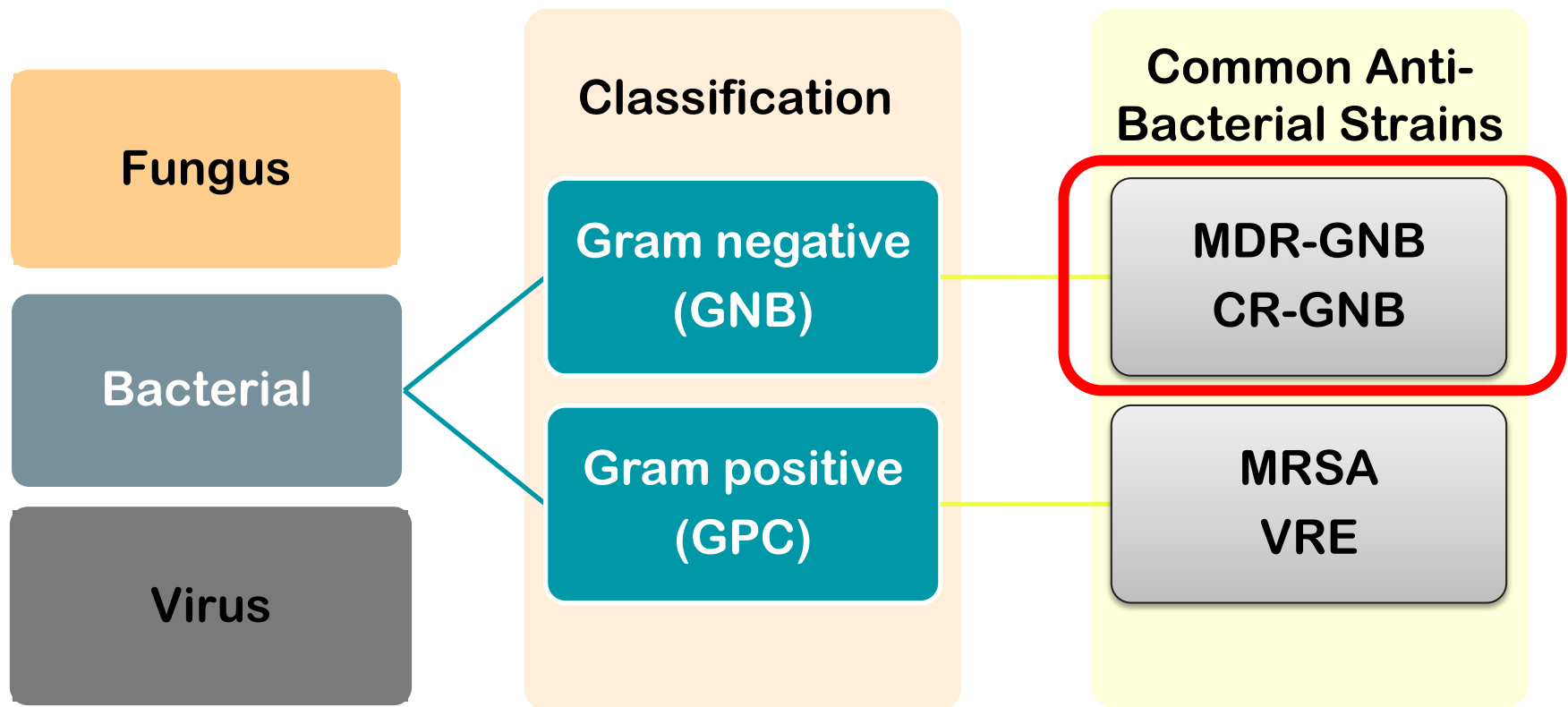
- **Insulindependent** (or "juvenile-onset diabetes", "juvenile diabetes," and "ketosis-prone diabetes")
- **Autoimmune**
- **Genetics** (HLA-B8, B15)
- **More common in younger than 35 years or children**
- **Treatment: diet, insulin**

**Type 2 Diabetes**

- ✓ **Insulinindependent** (adult-onset diabetes)
- ✓ **Heredity**
- ✓ **Inactivity**
- ✓ **Obesity**
- ✓ **Insulin resistance**
- ✓ **More common in adults after 35 years**
- ✓ **Treatment: diet, sugar lowering drugs**



# Specialty – Col103

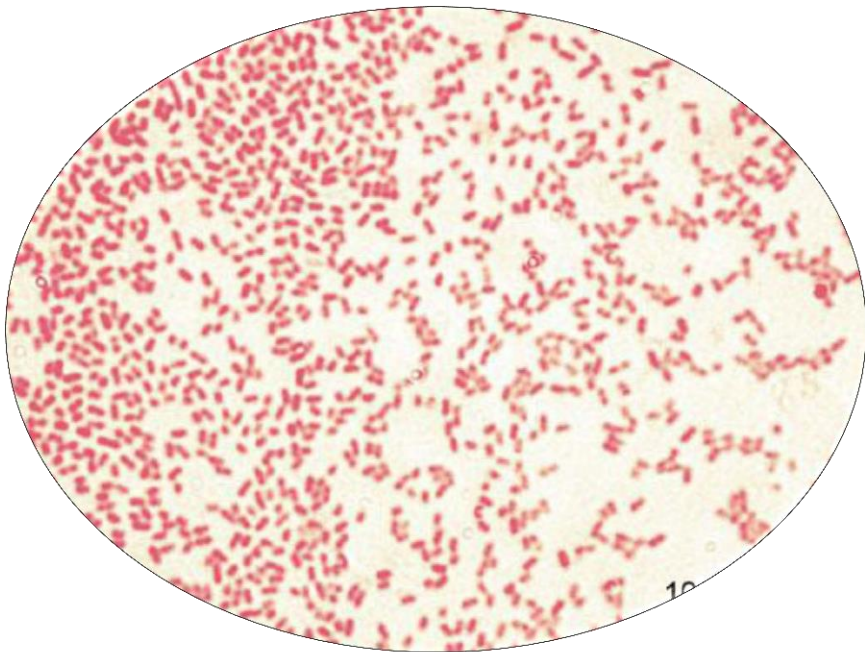


MDR-: multi-drug resistant  
CR-: carbapenem resistant

MRSA: methicillin resistant *Staphylococcus aureus*  
VRE: vancomycin resistant *Enterococcus*

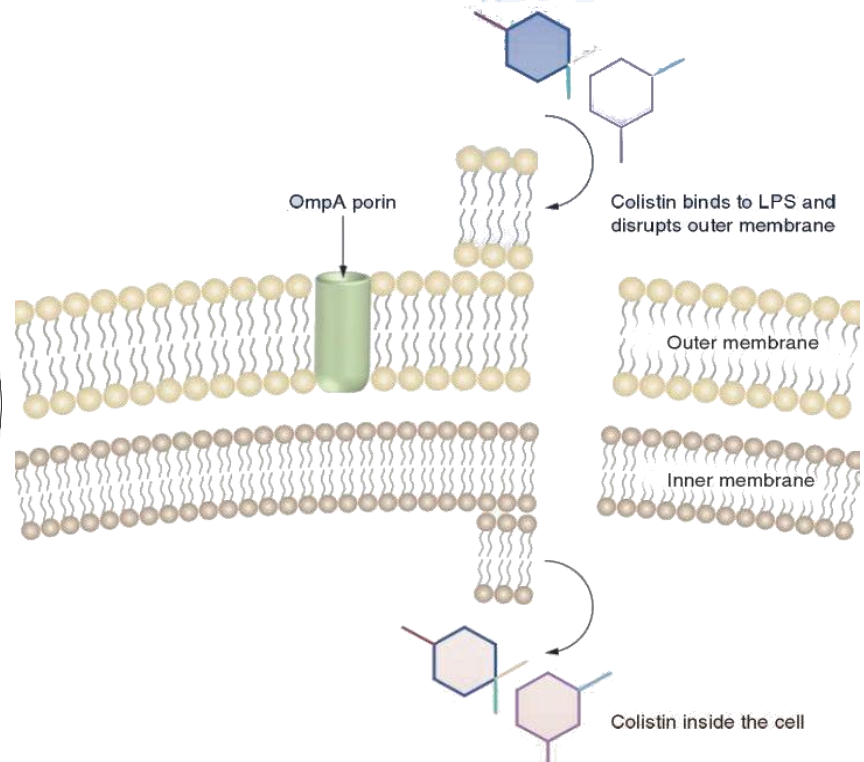
## Col103

Global Market: 150M



Multidrug-resistant  
Gram-negative Bacteria  
Serious Infection

Medscape



Source: Expert Rev Anti Infect Ther. 2012;10(8):917-

By Y\_tambe - Y\_tambe's file, CC BY-SA 3.0,  
<https://commons.wikimedia.org/w/index.php?curid=49535>

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# Agenda

**Company Overview**

**Product Strategy**

**Product Pipeline**

**Manufacture Facilities**

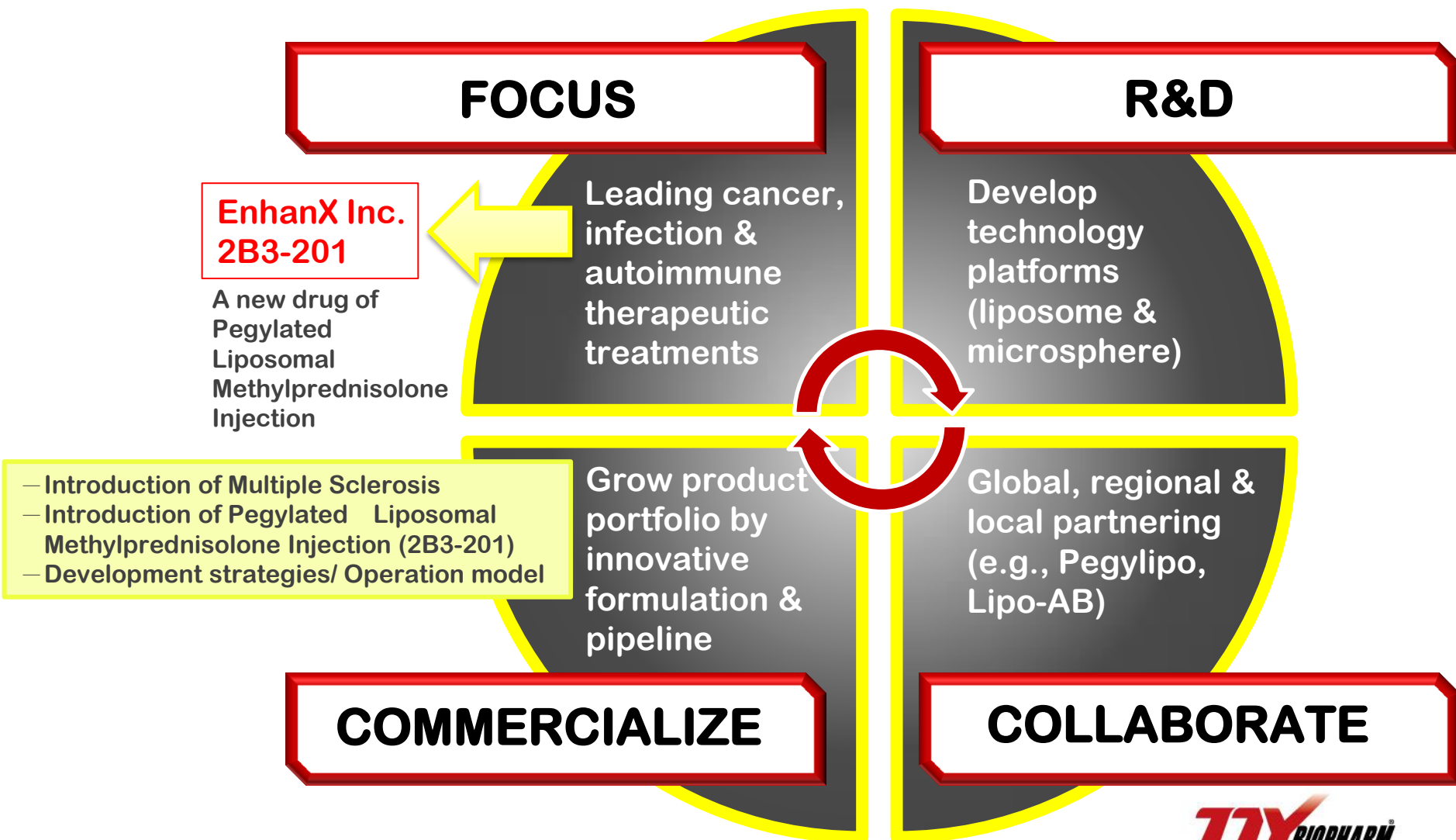
**Successful Product Categories**

**In Progress Status**

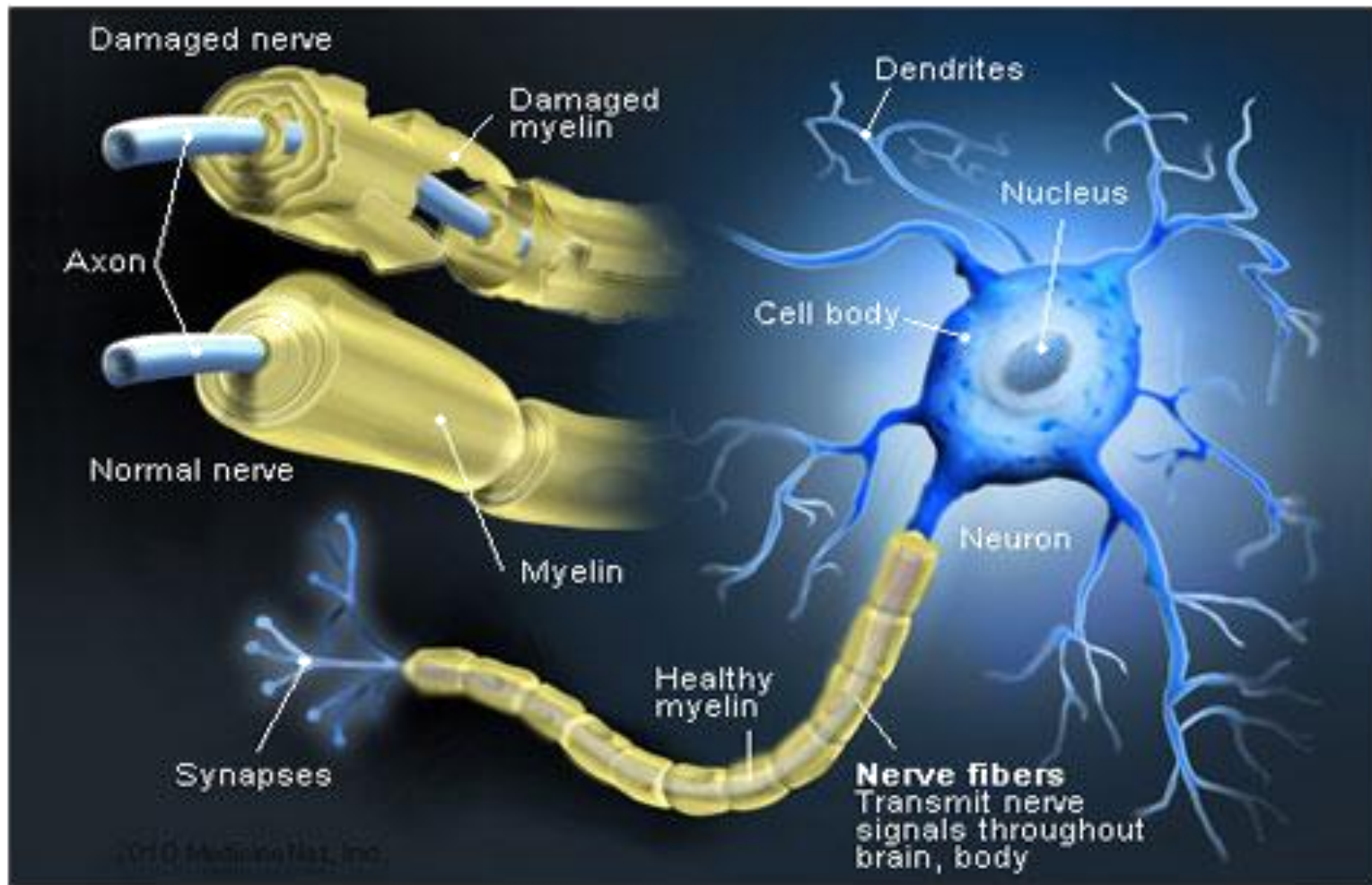
**Biotech Success**



# Corporate Strategy



# Introduction of MS's MoA

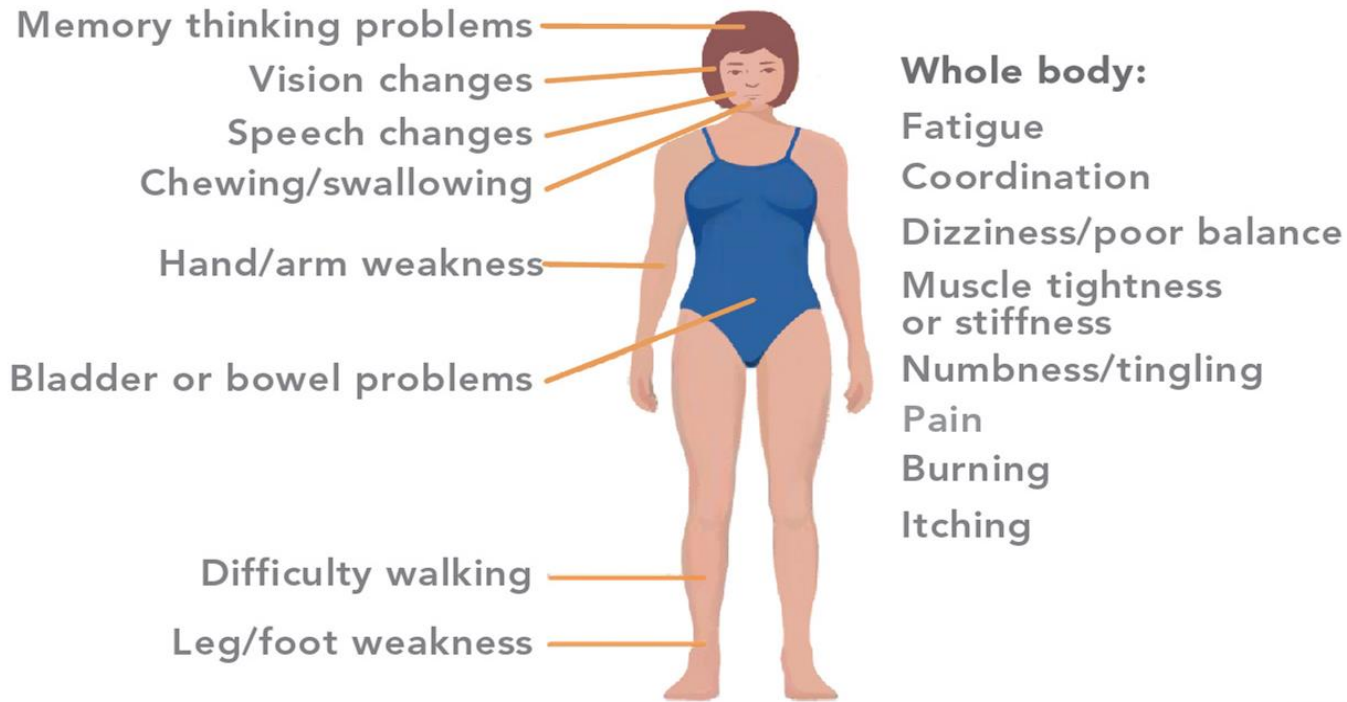


# Introduction of MS

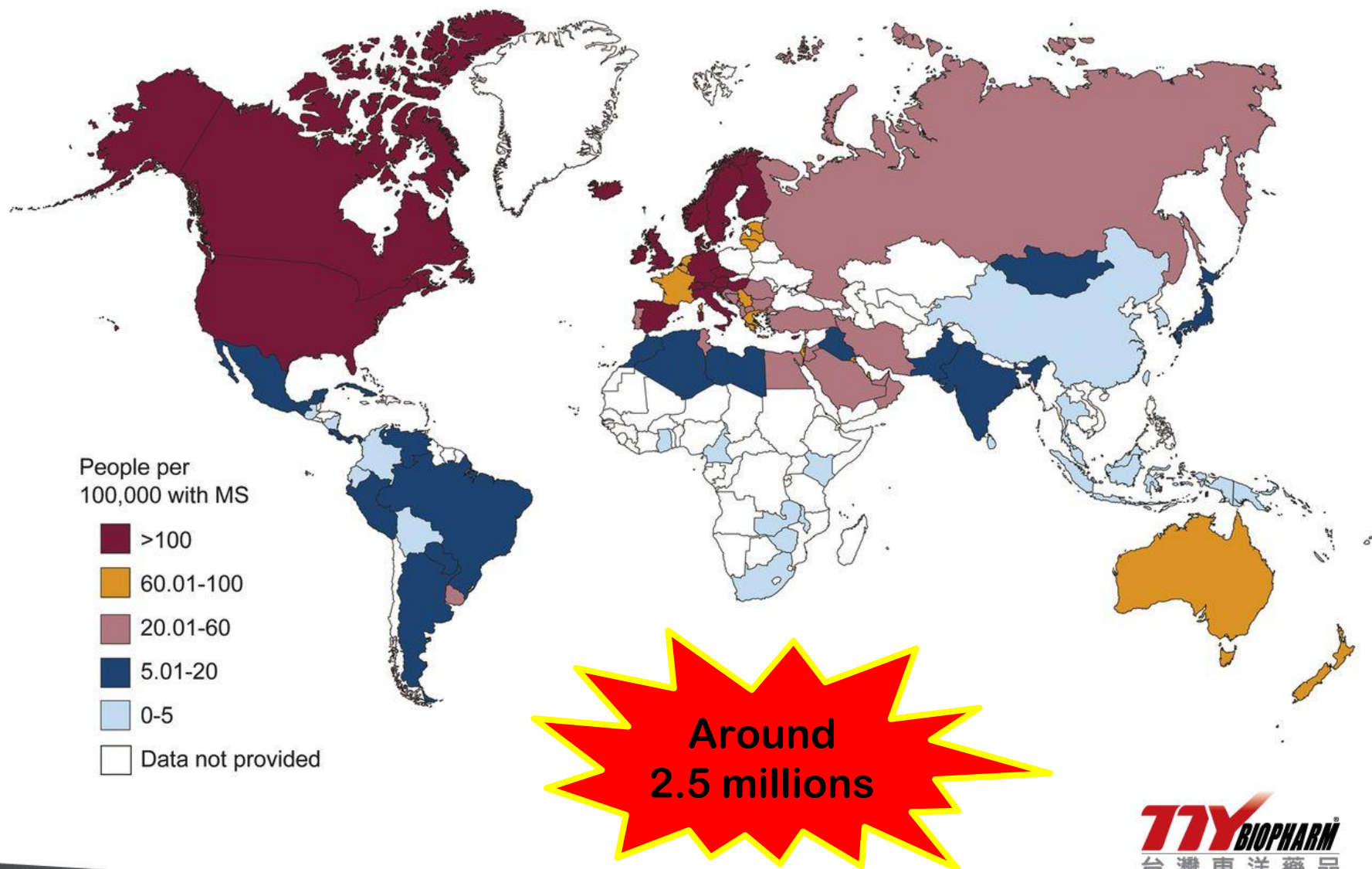
## MS: a chronic, autoimmune & neurodegenerative disorder

### Body's own defensive system attacks myelin

- Inflammatory damage in the brain and spinal cord
- Loss of myelin and axons (scars at multiple sites)
- Neurologic disability



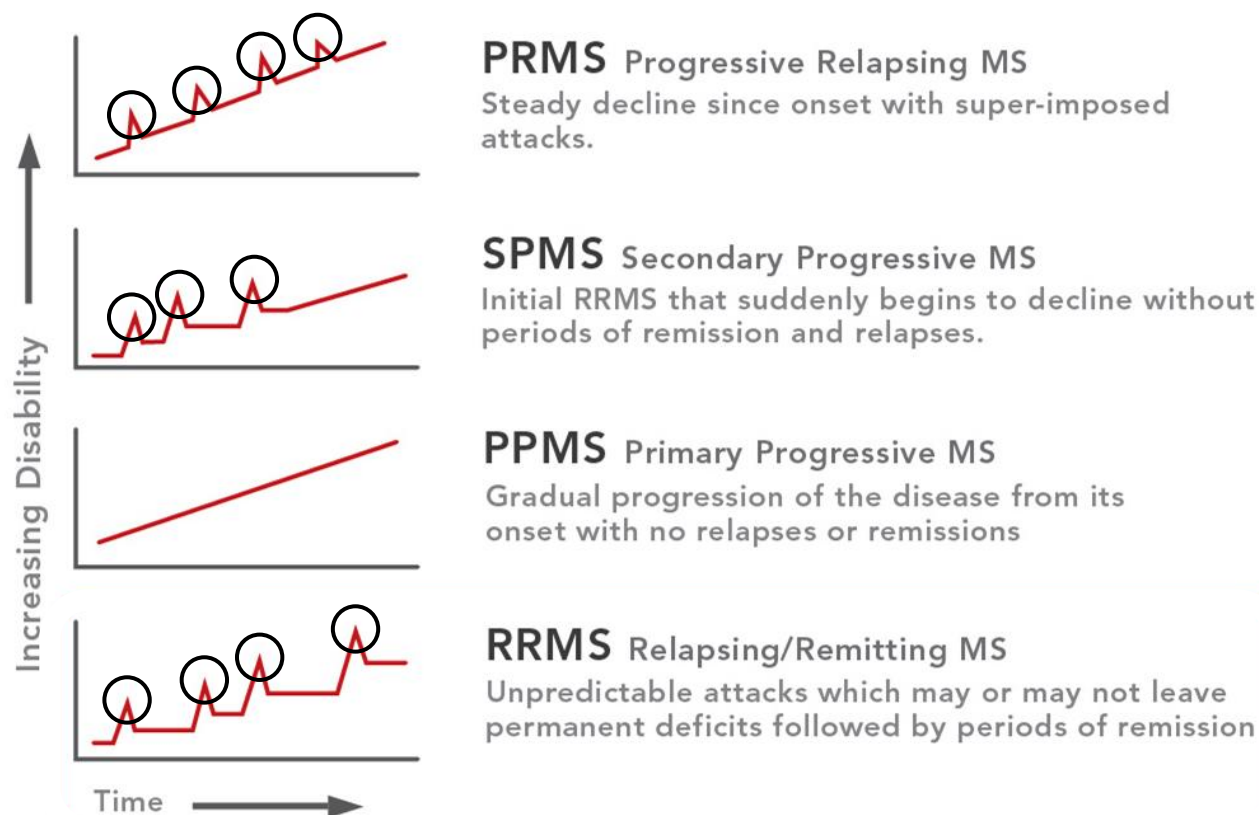
# Introduction of MS





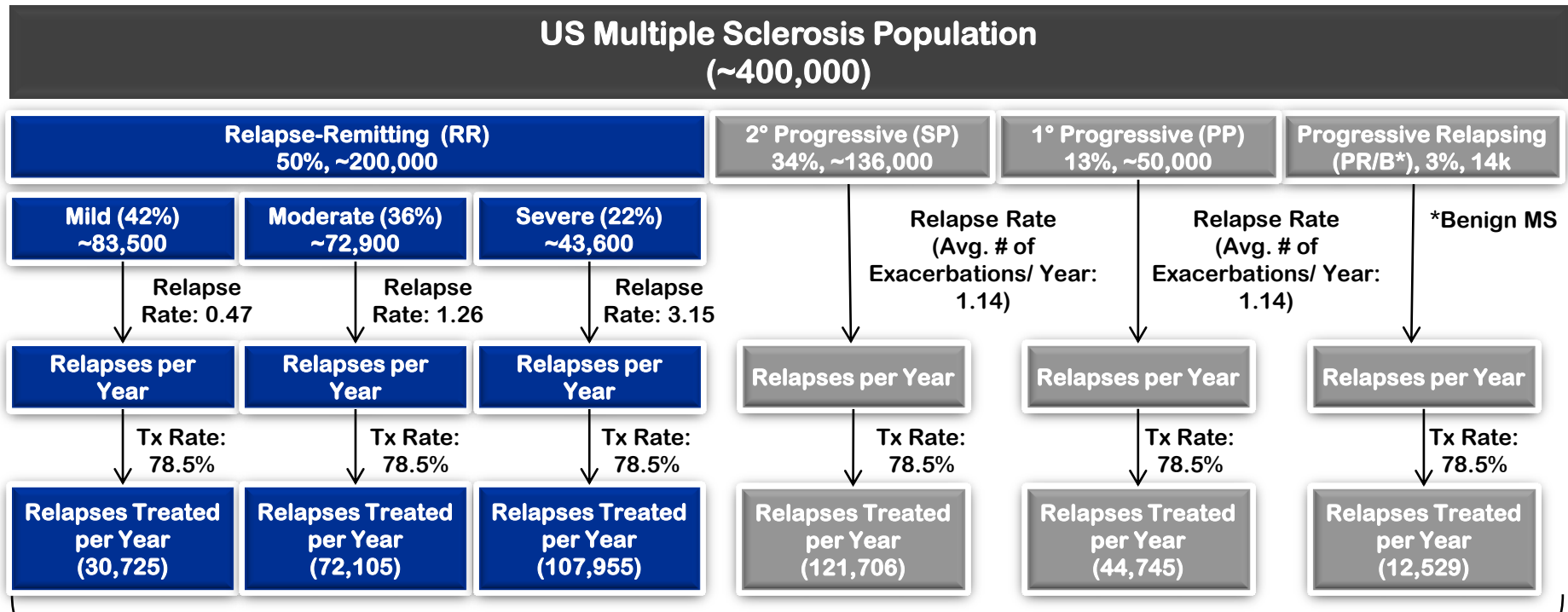
# Introduction of MS

## Four Classifications of MS



**Either one of the four classifications occurs in acute is the target patient pool of 2B3-201.**  
不管屬於哪一個發病類型，只要是急性復發，就是2B3-201的target 病患。

# Patients Distribution in US Market

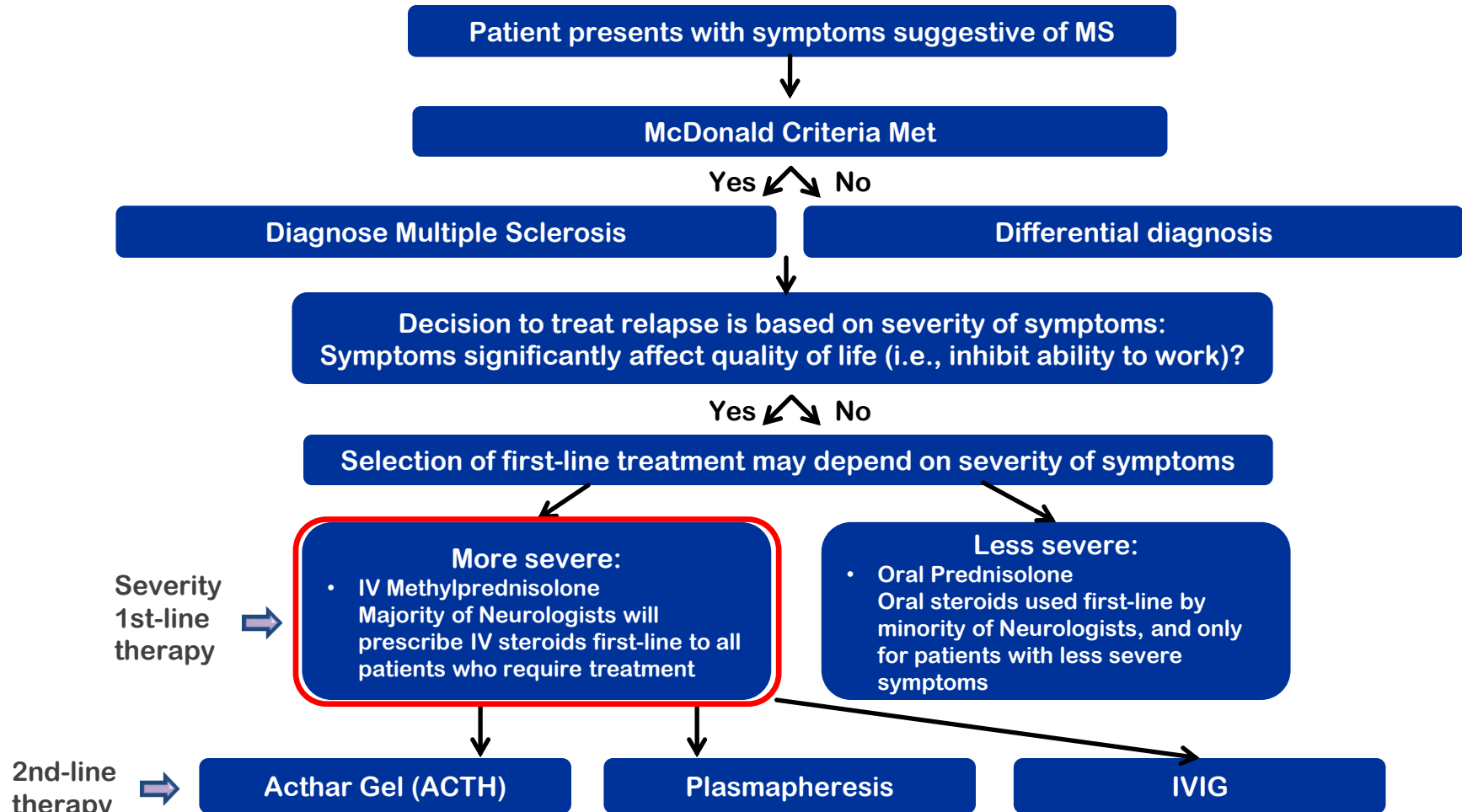


Minimum, Target, and Ideal Penetration Rates based on Use as First-Line or Second-Line Treatment from Physician Survey



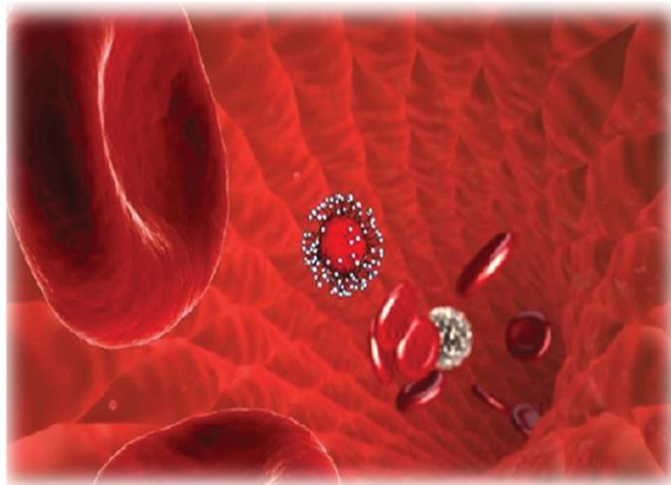
Relapses Treated with 2B3-201 at Peak Under Minimum, Target, and Ideal 1st-Line/ 2nd-Line Penetration Scenarios

# Introduction of MS

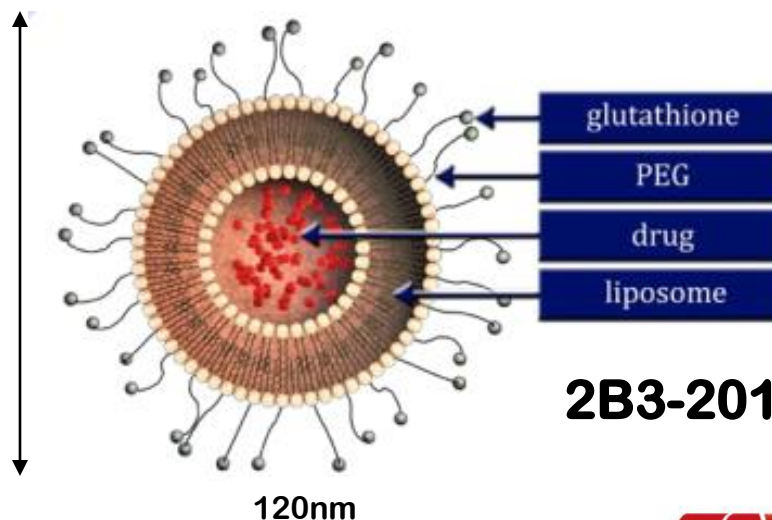


DH Primary Research, Ann Indian Acad Neurol. 2011 Jul.;14(Supp1 1):S65-9

# Introduction of the Product



Targeting Liposomal Methylprednisolone Injection (glutathione PEGylated liposomal methylprednisolone) is being developed for patients suffering from acute and chronic neuro-inflammatory diseases, with an initial focus on patients with acute MS relapses.



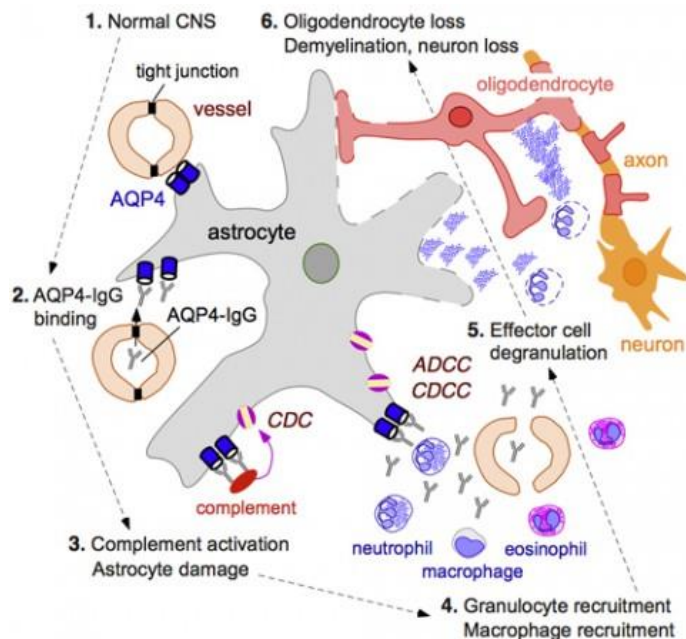
**2B3-201**



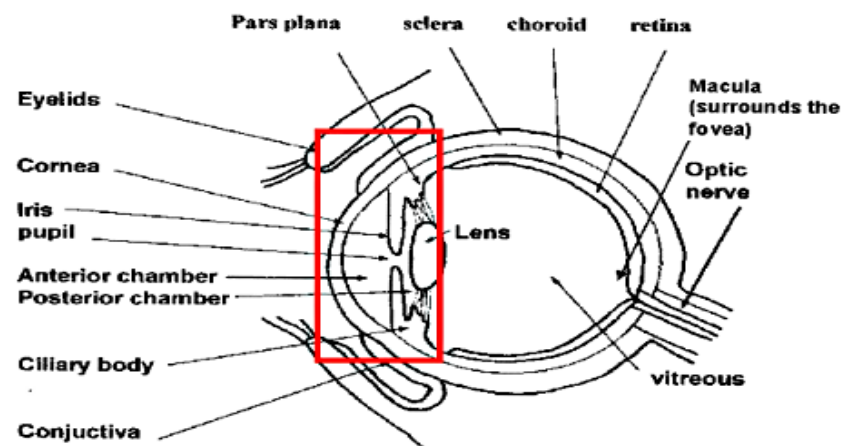
# Introduction of the Product

## 2B3-201's potential indications

### Neuromyelitis Optica



### Uveitis



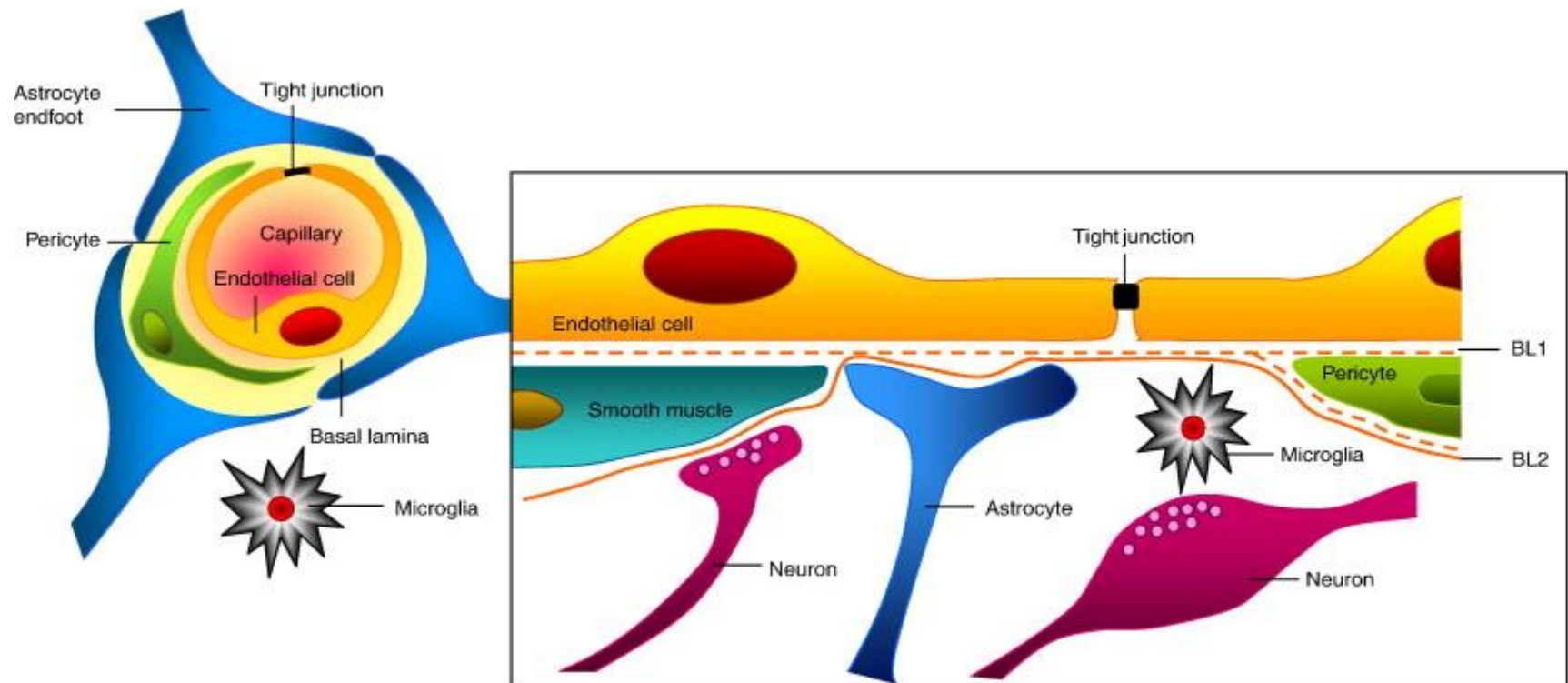
Neuro-inflammation is associated with a wide range of CNS diseases, including multiple sclerosis (MS), optic neuritis, non-infectious uveitis, acute disseminated encephalomyelitis (ADEM), neuromyelitis optica (NMO), as well as neuropathic pain, amyotrophic lateral sclerosis (ALS) and Parkinson's disease.

Source: [http://www.msdiscovery.org/news/news\\_synthesis/](http://www.msdiscovery.org/news/news_synthesis/)

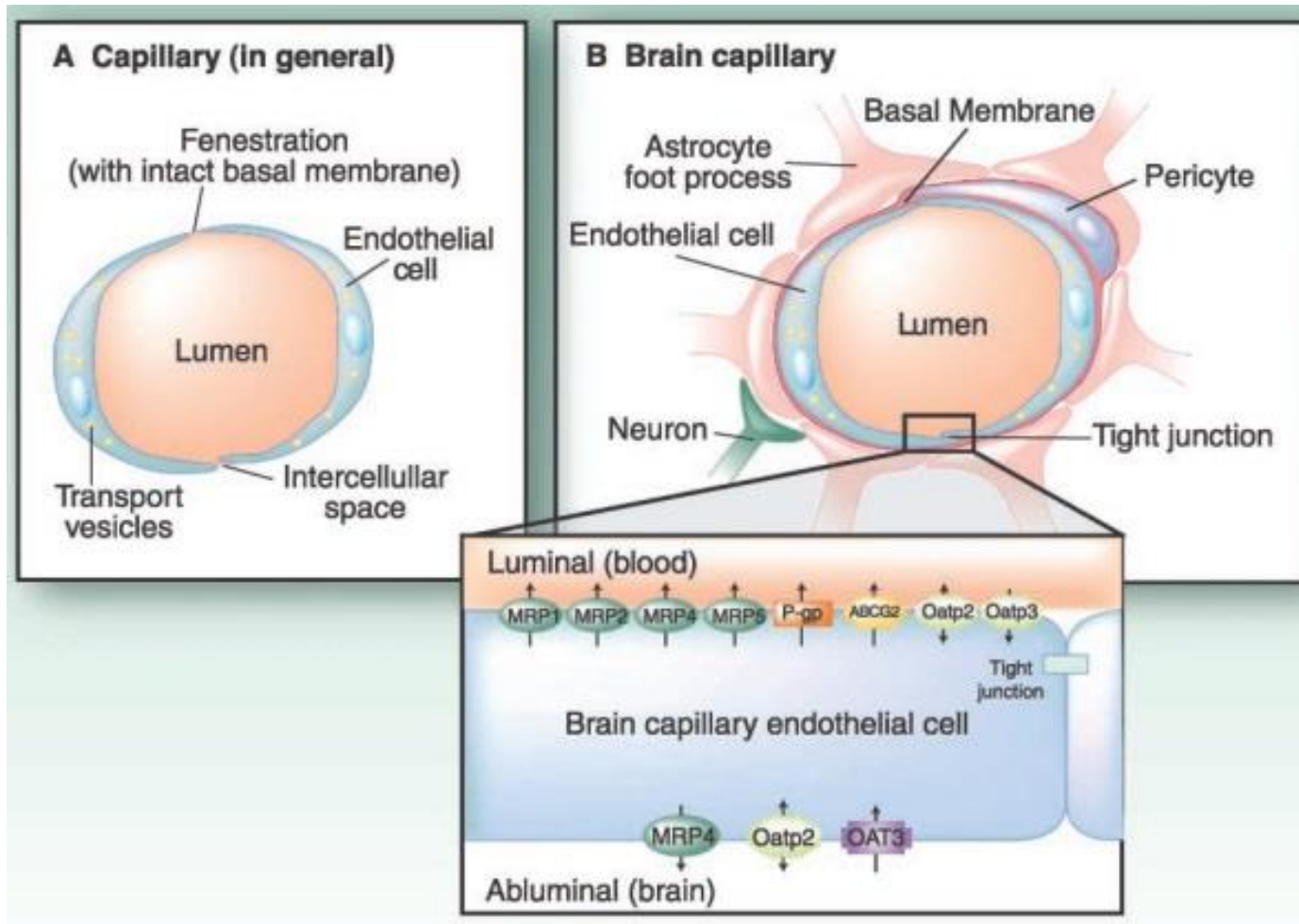
8147-neuromyelitis-optica-part-2-pathogenesis

Source: <https://www.uveitis.net/patient/anterior.php>

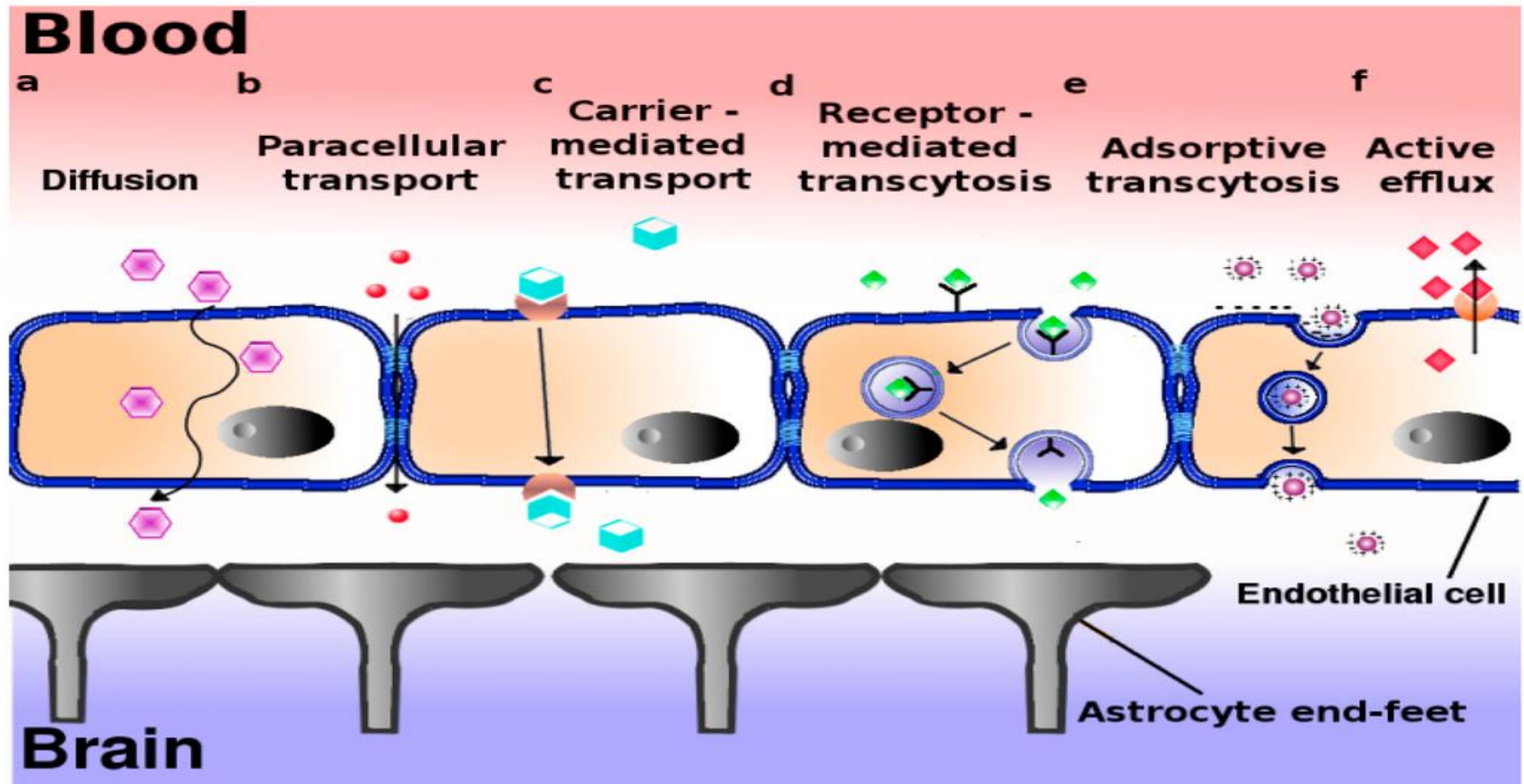
# Introduction of BBB



# Introduction of BBB



# Introduction of BBB



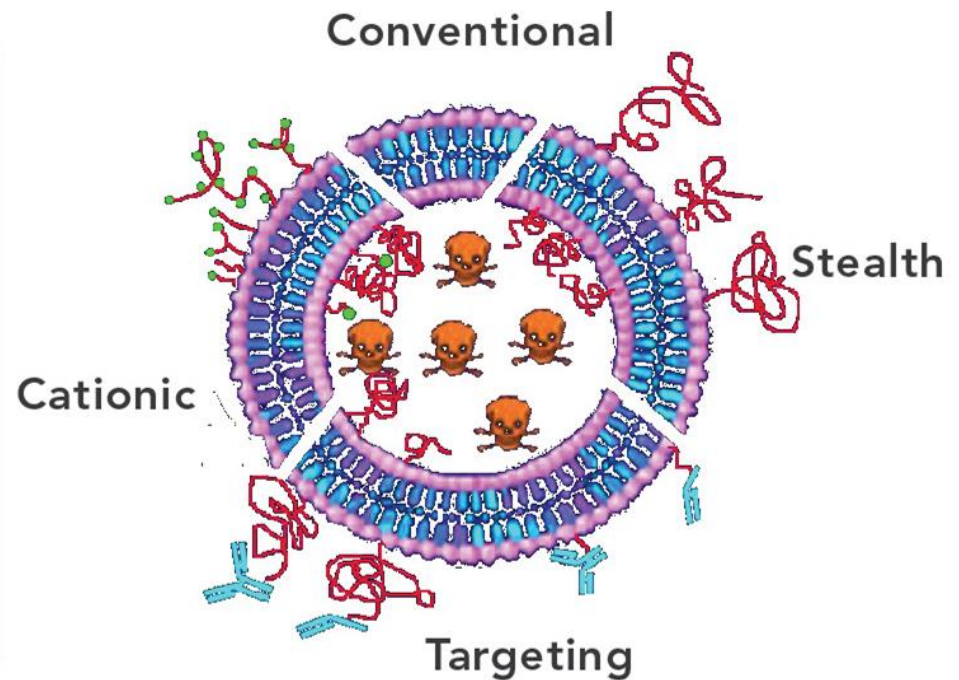
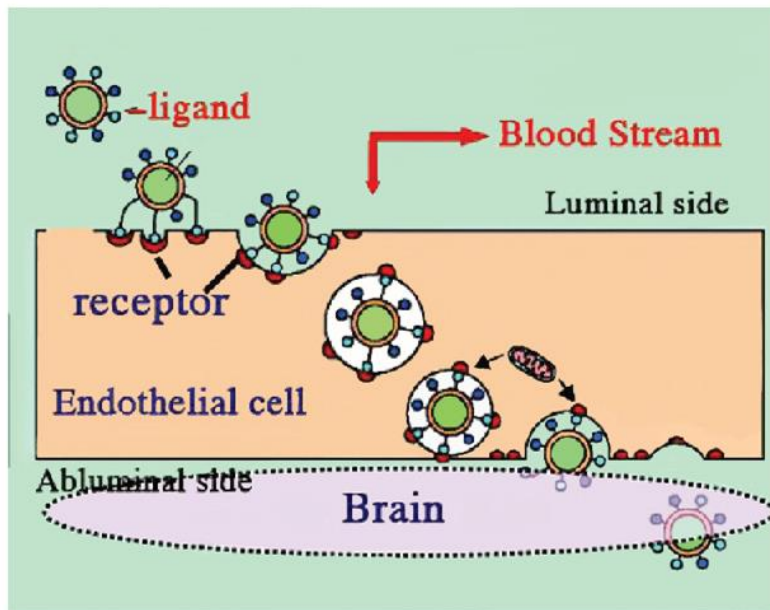


# Introduction of BBB

| NO. | TARGETING LIGANDS           | NOTE              |
|-----|-----------------------------|-------------------|
| 1   | Transferrin                 | MBP-426, MBP-Y003 |
| 2   | Melanotransferrin           |                   |
| 3   | Insulin                     |                   |
| 4   | LDL                         |                   |
| 5   | Angiopeps                   |                   |
| 6   | Leptin                      |                   |
| 7   | Thiamine                    |                   |
| 8   | Glutathione                 | 2B3-101, 2B3-201  |
| 9   | Synthetic Opioid Peptides   |                   |
| 10  | RVG Peptide                 |                   |
| 11  | Tetanus Toxin, Tet1 and G23 |                   |
| 12  | Diphtheria Toxin            |                   |
| 13  | TAT peptide                 |                   |

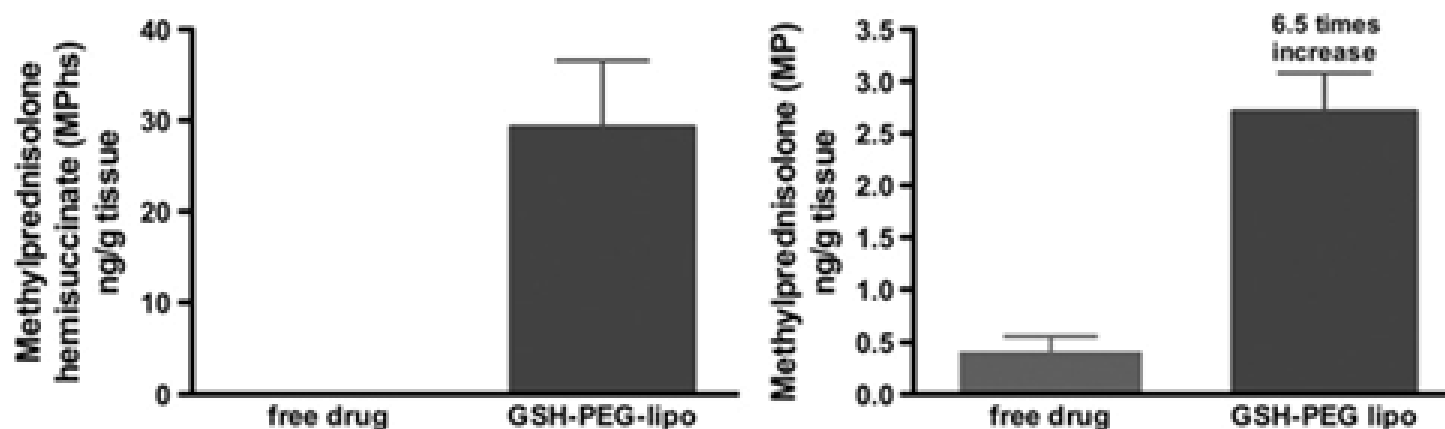
# Introduction of 2B3-201

## Effective drug delivery to across the blood-brain barrier (BBB)



# Preclinical Study

在大鼠實驗的結果顯示，在注射8小時後，在腦中MP的量，2B3-201超過非微脂體的MP6倍以上。

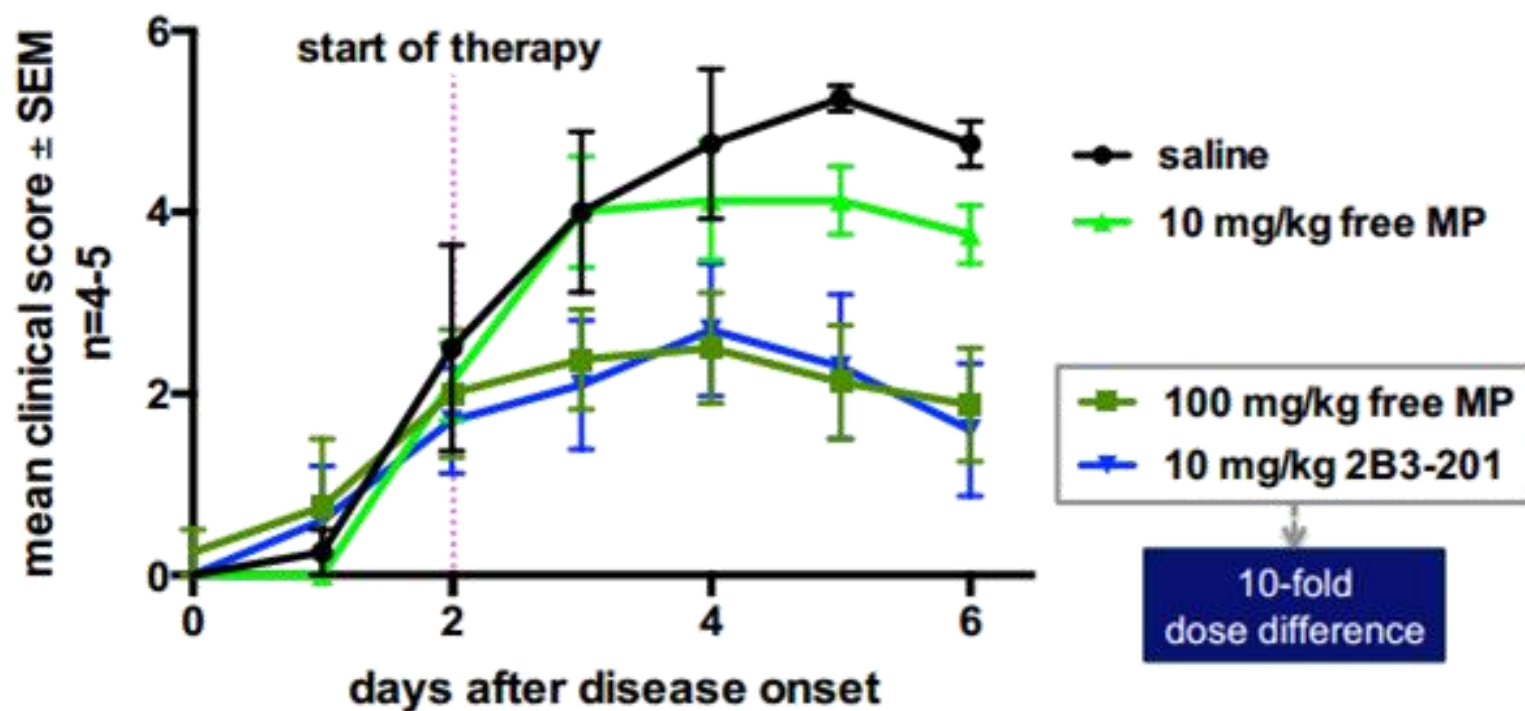


**Fig. 3.** Brain uptake of methylprednisolone hemisuccinate (left) and methylprednisolone (right). Rats (n=4/group) received 1 bolus i.v. administration of 10mg/kg glutathione pegylated liposomal methylprednisolone (GSH-PEG lipo) or free methylprednisolone (free MPHs, 10mg/kg). Brain uptake was determined 8h after administration.

# Preclinical Study

2B3-201: 藥效驗證試驗

EAE-MOG mouse model of MS

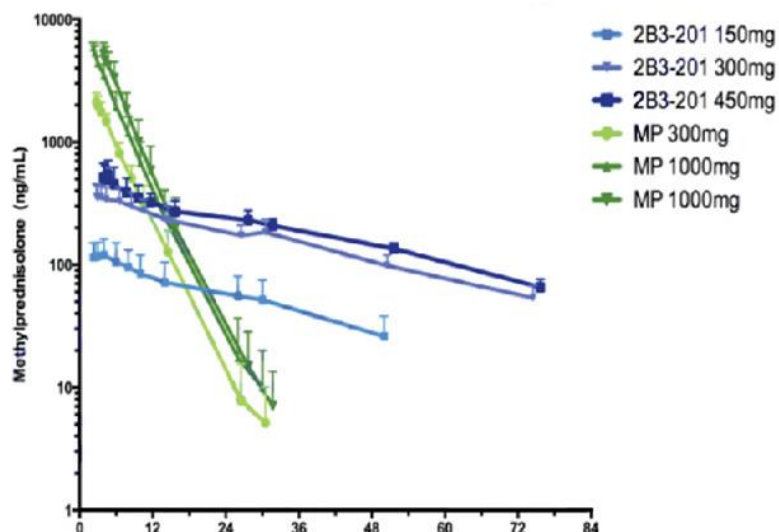




# Phase I Study (Solution)

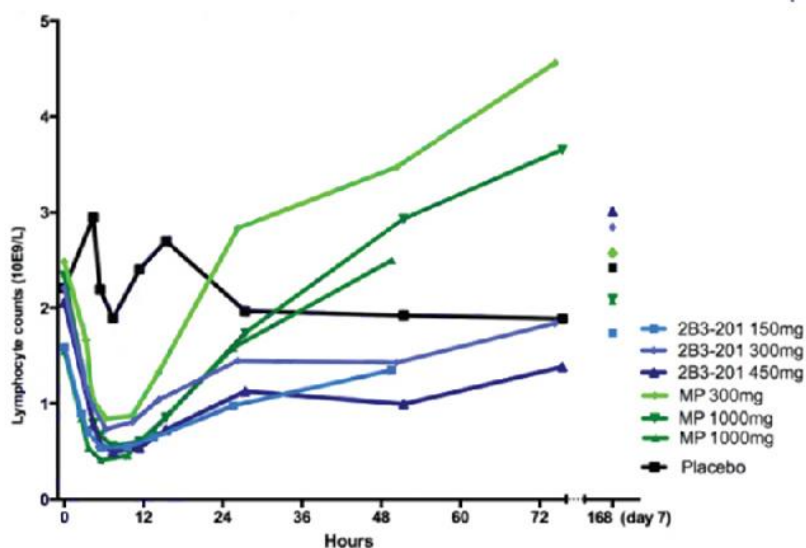
## Phase I dose-escalation results Pharmacokinetics

- Long circulation half-life of 2B3-201 (23~28 hrs) vs. MP (2.5 hrs)
- Reduced high peak exposure



## Phase I dose-escalation results Effect on lymphocytes

- Rapid and sustained immunosuppressive effect
- Lymphocyte count crossed baseline within 7 days in all groups



# Introduction of MS

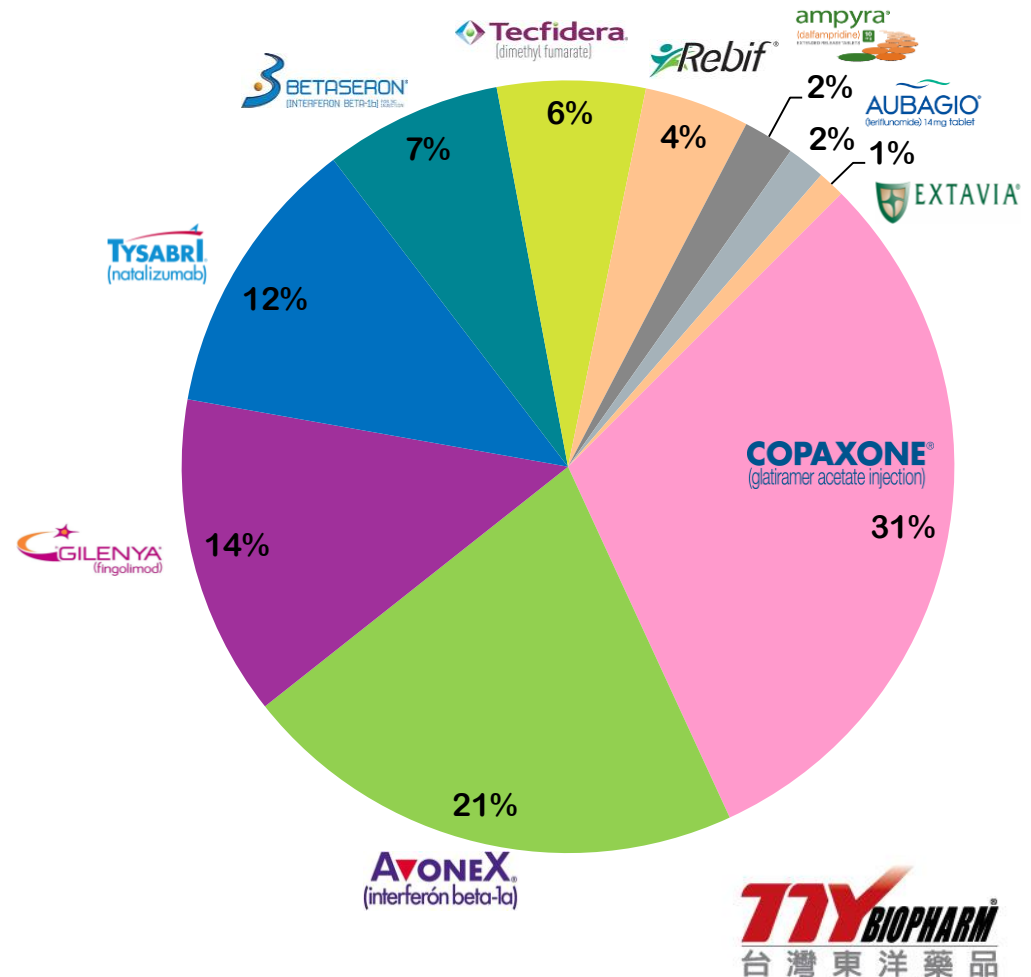
## Major existing choices for MS treatments (2014 Sales & Market Share in Value)

### MS Therapies

- “ABCRE” products represented 64% of the global MS market in value in 2014
  - Moderate efficacy and patients continue to relapse on therapy
  - Require frequent injections
- Latest entrants represent treatment alternatives
  - Drives the benefit vs. risk discussion

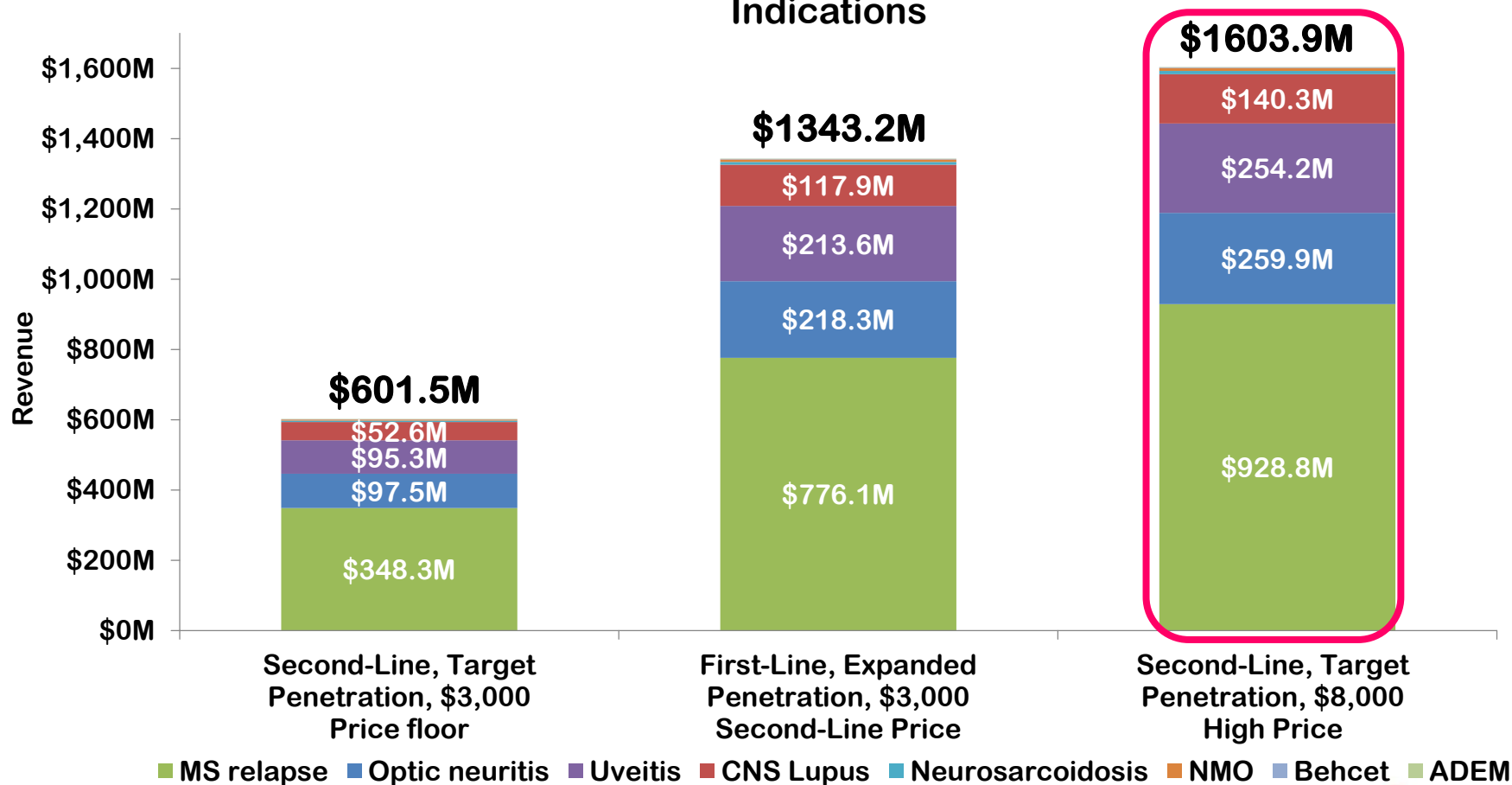
Unit: USD

|        |                 |
|--------|-----------------|
| 4.328B | Copaxone        |
| 3.0B   | Avonex          |
| 1.9B   | Gilenya         |
| 1.67B  | Tysabri         |
| 1.05B  | Betaseron       |
| 876M   | Tecfidera       |
| 622M   | Rebif           |
| 302M   | Ampyra/ Fampyra |
| 266M   | Aubagio         |
| 159M   | Extavia         |



# Potential Market Size

## 2B3-201 US Peak Year Revenue – MS & Other Inflammatory Indications



# Potential Market Size Globally

## Global estimation

MS treatment market rising from \$17.2 billion to \$20 billion (YoY) from 2014 to 2024 (approx.), at a Compound Annual Growth Rate (CAGR) of 1.5%.

Global existing MS treatment market value

| 2014   | 2015   | 2016   | 2017   | 2018   | 2019   | 2020   | 2021   | 2022   | 2023   | 2024   |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 17.20B | 17.46B | 17.72B | 17.99B | 18.26B | 18.53B | 18.81B | 19.09B | 19.38B | 19.67B | 19.96B |

# Development Strategies

## ■ 2B3-201's strengths

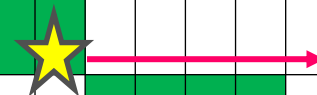
- *2B3-201 is a pegylated liposome which glutathione is attached on its lipid, while methylprednisolone as the main substance is encapsulated inside.*
- *Compared with the standard of care, i.e., a free methylprednisolone, 2B3-201 is an **one-shot** intravenous injection which brings **home-care convenience** and **better tolerance** to patients suffering acute multiple sclerosis relapses.*



# 2B3-201 Pipeline

## 2B3-201 : Liposomal Methylprednisolone Injection (glutathione PEGylated liposomal methylprednisolone)

|                                                   | 2014 - 2016 |  |  |  | 2017 |  |  | 2018 |  |  |  | 2019 |  |  | 2020 |  |  |  | 2021 |  |  | 2022 |  |  |  |
|---------------------------------------------------|-------------|--|--|--|------|--|--|------|--|--|--|------|--|--|------|--|--|--|------|--|--|------|--|--|--|
| Phase I                                           |             |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |
| Phase I bridging study<br>(lyophilized injection) |             |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |
| Scientific advice from<br>FDA & EMA               |             |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |
| Phase II/III in MS<br>relapses (vs placebo)       |             |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |
| Phase II/III in MS<br>relapses (vs MP)            |             |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |
| US NDA indication #1                              |             |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |
| EU MAA indication #1                              |             |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |      |  |  |      |  |  |  |



# Multiple Indications (Pipeline)

|   | Indications to Develop                               | Market Potential Size            | Competitors                                                                                                         |
|---|------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 1 | <b>Multiple Sclerosis (多發性硬化症)</b>                   | >21.5B                           | Teva (2014)<br>Biogen<br>EMDSerono<br>Novartis                                                                      |
| 2 | <b>Uveitis (葡萄膜炎) (眼睛發炎)</b>                         | >0.531B                          | Humira (2016)                                                                                                       |
| 3 | <b>Neuropathic Pain (神經性疼痛)</b>                      | >5.7B                            | Pfizer (2011)                                                                                                       |
| 4 | <b>Osteoarthritis (骨關節炎)</b>                         | >5.335B                          | Anika (2014)                                                                                                        |
| 5 | <b>ALS (漸凍人—肌萎縮性脊髓側索硬化症)</b>                         | >25M (a negative CAGR of 16.10%) | Biogen Idec Inc.<br>Avanir Pharmaceuticals Inc.<br>Isis Pharmaceuticals Inc.<br>Sanofi<br>Bristol-Meyers Squibb Co. |
| 6 | <b>Mucopolysaccharidoses (MPS, 黏多醣症)</b>             | >300M                            | Vimizim                                                                                                             |
| 7 | <b>Metachromatic leukodystrophy (MLD, 異染性腦白質失養症)</b> | 1B                               | Shire Plc<br>Nuo Therapeutics<br>GlaxoSmithKline Plc<br>Zymenex A/S<br>RegenxBio Inc.<br>Novartis AG                |

Unit: USD/Billion

# Management Team



Yu-Fang Hu



Pieter J. Gaillard



Yuan-Yi Chou



# Scientific Advisory Board

蔡清標

Taipei, Taiwan



THE UNIVERSITY OF  
SYDNEY



臺北榮民總醫院  
Taipei Veterans General Hospital



台灣神經學學會  
Taiwan Neurological Society



Olaf Stuve

(Texas, USA)

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RUHR-UNIVERSITÄT BOCHUM



Frederik Barkhof  
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UCL



VU University  
Medical Center  
Amsterdam



**TTV BIOPHARM**  
台灣東洋藥品

# Agenda

**Company Overview**

**Product Strategy**

**Product Pipeline**

**Manufacture Facilities**

**Successful Product Categories**

**In Progress Status**

**Biotech Success**



# Manufacture Facilities

- The only PIC/S GMP certified manufacture sites for high potency oncology, 2008/2013/2016 EMA, 2010/2014 Japan, 2013/2016 US FDA, 2013 Brazil, Australia
- High standard Validation of
  - Equipment qualification/ Laboratory instruments qualification/ HVAC system/ Water system/ Compressed air system/ Nitrogen system/ Cleaning/ Analytical method/ Process/ Computer/ Logistic
- Individual flow management
  - Air flow/ Man flow/ Material flow/ Product flow/ Waste flow
  - To prevent cross contamination and environmental pollution

HVAC System



Work Safety



Environmental Protection



# Chungli Factory



**2008**  
**EMA**  
**Arabian**  
**Official**



**2009**  
**EMA**  
**Official**



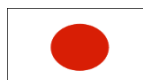
**2010**  
**Jordan**  
**Official**



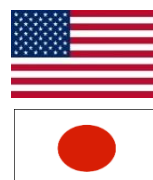
**2011**  
**Germany**  
**Official**  
**Brazil**  
**Official**



**2012**  
**Japan**  
**Official**



**2013**  
**US FDA**  
**Japan**  
**Official**



**2014**  
**EMA**  
**Turkey**  
**MOH**



**2015**  
**Korea**  
**Kazakhstan**  
**EMA**



**2016**  
**US FDA**



# Lioudu Factory



- Comply with PIC/S GMP and Taiwan FDA inspection for  
**non-cytotoxic or non-hormone**







# Agenda

**Company Overview**

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# Successful Products (Oncology, Taiwan & Segment Market)

| Products 產品名稱                                                                                                     | Indications 適應症                                                                                                                                                                                                                                                                                                                                                                                | Market(s) 行銷地區                                    |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Asadin (伸定注射劑)<br>               | Acute promyelocytic leukemia, APL (急性前骨髓細胞白血病)                                                                                                                                                                                                                                                                                                                                                 | Taiwan、Thailand、<br>Malaysia、Singapore<br>Vietnam |
| Gemis (健仕注射液)<br>                | inoperable, locally-advanced (stage IIIa or IIIb) or Metastatic (stage IV)<br>Non-small cell lung cancer (非小細胞肺癌)<br>Inoperable (stage II or III) or metastatic (stage IV) Pancreatic cancer, PC (胰臟癌)<br>Metastatic (stage IV) Urinary bladder cancer, UBC (膀胱癌)<br>Metastatic (stage IV) Breast cancer, BC (轉移性乳癌)<br>Recurrent (stage IV) Ovarian cancer, OC (卵巢癌)                          | Taiwan、Hong Kong                                  |
| Lipo-Dox (力得微脂體注射劑)<br>          | AIDS-related Kaposi's sarcoma in patients with low CD4 counts and extensive mucocutaneous or visceral disease. (愛滋病引發之卡波西氏肉瘤)<br>Metastasis carcinoma of the ovary with recurrent to both first line platinum- and paclitaxel-based chemotherapy regimens (復發性卵巢癌)<br>Metastatic (stage IV) Breast cancer, BC (轉移性乳癌)<br>Combination with bortezomib in 2nd line multiple myeloma, MM (多發性骨髓瘤) | Taiwan、Thailand、<br>Philippines                   |
| TS-1 (愛斯萬膠囊)                     | Gastric cancer, GC (胃癌): Stage II & III gastric cancer adjuvant treatment;<br>Advanced gastric cancer (stage IV); Pancreatic cancer, PC (胰臟癌)                                                                                                                                                                                                                                                  | Taiwan                                            |
| Zobonic (抑骨凍晶靜脈注射劑)                                                                                               | Multiple myeloma, MM (多發性骨髓瘤)<br>Hypercalcemia of malignancy (惡性腫瘤之高血鈣併發症)                                                                                                                                                                                                                                                                                                                     | Taiwan                                            |
| Painkyl Fentanyl(平舒疼口<br>類溶片)  | Breakthrough Pain (癌症突發性疼痛)                                                                                                                                                                                                                                                                                                                                                                    | Taiwan<br>Restricted Drug                         |
| Epicin                         | Breast Cancer 乳腺癌、Lymphoma 惡性淋巴瘤、Soft tissue Sarcoma 軟組織肉瘤、<br>Gastric cancer, GC 胃癌、Lung cancer LC 肺癌、Ovarian Cancer, OC 卵巢癌                                                                                                                                                                                                                                                                  | Taiwan                                            |
| Ivic® (癌微可)                    | CML (慢性骨髓性白血病)                                                                                                                                                                                                                                                                                                                                                                                 | Taiwan                                            |

# Successful Products (Oncology, Taiwan & Segment Market)

| Products 產品名稱                                                                                                  | Indications 適應症                                                                                                                                                                                                                                                                                                                                                                                                                                         | Market(s) 行銷地區                                                     |
|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>Oxalip</b><br>(歐力普注射劑)<br> | Colorectal cancer, CRC (結腸直腸癌): stage III colon cancer adjuvant treatment;<br>Metastatic colorectal cancer (stage IV)<br>Gastric cancer, GC (胃癌): Advanced gastric cancer (stage IV)                                                                                                                                                                                                                                                                    | Taiwan、Thailand、                                                   |
| <b>Tynen</b><br>(汰能注射劑)<br>   | Adjuvant & metastatic (lymph node positive) (stage II~IV)<br>Breast cancer, BC (乳癌)<br>Metastatic (stage IV) Non-small cell lung cancer (非小細胞肺癌)<br>Hormone refractory metastatic prostate cancer, PC (前列腺癌)<br>Locally advanced(stage III~stage IVB) squamous cell carcinoma of the head and neck (局部晚期頭頸部癌)<br>Metastatic (stage IV) Gastric gland cancer (胃腺癌)                                                                                       | Taiwan                                                             |
| <b>UFUR</b> (友復膠囊)<br>        | Gastric cancer, GC (胃癌)– Adjuvant Treatment for stage IB, II, III patients after curative surgery; advanced gastric cancer (Stage IV)<br>Colorectal cancer, CRC (大腸結腸直腸癌)– Stage II & III colorectal cancer; metastatic colorectal cancer (stage IV)<br>Breast cancer, BC (乳癌), stage II breast cancer; Metastatic breast cancer (stage IV) Lung cancer, LC (肺癌) stage IB; Metastatic lung cancer (stage IV)<br>Head & Neck cancer (頭頸癌), stage I to IV | Taiwan、Thailand、<br>Vietnam、Malaysia、<br>India、Pakistan<br>Nigeria |
| <b>Thado</b> (賽得膠囊)<br>     | Newly diagnosed multiple myeloma, MM (多發性骨髓瘤)<br>Erythema Nodosum Leprosus, ENL (癩瘋性結節性紅斑)                                                                                                                                                                                                                                                                                                                                                              | Taiwan、Philippines、<br>Malaysia、Vietnam、<br>Singapore              |

# Successful Products (Oncology, Taiwan & Segment Market)

| Products 產品名稱                                                                                                       | Indications 適應症                                                                                                                                                                                                                                             | Market(s) 行銷地區        |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Anazo</b><br>(安納柔膜衣錠)<br>       | Treatment of advanced breast cancer in postmenopausal women. (治療停經後婦女晚期乳癌)<br>Adjuvant treatment of early breast cancer in hormone receptor positive post-menopausal women who have received 2 to 3 years of adjuvant tamoxifen. (輔助治療停經後婦女且荷爾蒙接受器為陽性的早期乳癌) | Taiwan、Philippines    |
| <b>Pexeda Inj.</b><br>(派癌休注射劑)<br> | Nonsquamous Non-Small Cell Lung Cancer (治療局部晚期或轉移性非小細胞癌); Mesothelioma (治療惡性肋膜間質細胞瘤)                                                                                                                                                                        | Taiwan                |
| <b>Irino</b><br>(派癌休注射劑)<br>       | Treatment of patients with advanced colorectal cancer (轉移性大腸直腸癌患者的第一線治療藥物)                                                                                                                                                                                  | Taiwan、Thailand、Japan |
| <b>Megest</b><br>(麥格斯口服懸液劑)<br>    | Significant weight loss caused by cachexia in patients with a diagnosis of acquired immunodeficiency syndrome (AIDS) or cancer, and also the treatment of anorexia in patients. 後天免疫缺乏症候群患者及癌症患者之惡病體質引起的體重明顯減輕及厭食症。                                         | Taiwan                |
| <b>Otril</b><br>(嘔速停靜脈注射劑)<br>   | Prevention and treatment of nausea and/or vomiting associated with cancer chemotherapy. 預防及治療抗腫瘤化學療法、和治療手術後引起的噁心、嘔吐。                                                                                                                                        | Taiwan                |
| <b>Lonsurf</b><br>               | Treatment of patients who have failed standard treatment of metastatic colorectal cancer. 治療晚期大腸直腸癌已接受標準治療失敗的病人。                                                                                                                                            | Taiwan                |

# Oncology/Successful Products for Global

TTY has successfully registered **47(+2)** oncology product licenses in **12** countries.

|      | Country     | UFur | Oxalip | Lipo-Dox                  | Irino | Asadin | Gemmis | Tynen | Epicin | Thado | Anazo | Folina | Sulfina | Total  |
|------|-------------|------|--------|---------------------------|-------|--------|--------|-------|--------|-------|-------|--------|---------|--------|
| EU   | Austria     |      |        | 1<br>(Caelyx in whole EU) |       |        |        | 2     |        |       |       |        |         | 2(+1)  |
|      | Thailand    | 1    | 1      | 1                         | 1     | 1      |        |       |        |       |       | 1      | 1       | 7      |
| Asia | Philippines |      |        | 1                         |       |        |        |       |        |       | 1     |        | 1       | 3      |
|      | Vietnam     | 1    | 1      | 1                         | 2     | 1      |        | 2     |        | 1     |       |        |         | 9      |
|      | Hong Kong   | 1    | 1      |                           | 1     |        | 2      | 2     | 3      |       |       |        |         | 10     |
|      | Malaysia    | 1    | 1      |                           |       | 1      |        | 1     |        | 1     |       | 1      |         | 6      |
|      | Singapore   |      |        |                           | 1     |        |        |       |        |       |       |        |         | 1      |
|      | India       | 1    |        |                           |       |        |        |       |        |       |       |        |         | 1      |
|      | Sri Lanka   |      |        | 1                         | 1     |        | 1      |       |        |       | 1     |        |         | 4      |
|      | Pakistan    | 1    |        |                           |       |        |        |       |        |       |       |        |         | 1      |
|      | Jordan      |      |        |                           | 1     |        |        |       |        |       |       |        |         | 1      |
| US   | Costa Rica  |      |        | 1<br>(Doxil in whole US)  |       |        | 1      |       | 1      |       |       |        |         | 2(+1)  |
|      | Total       | 6    | 4      | 4(+2)                     | 7     | 3      | 4      | 7     | 4      | 2     | 2     | 2      | 2       | 47(+2) |

TTY's CMO partner holds the licenses of TTY brand drug- Lipo-Dox/ Doxil in US and Lipo-Dox/Caelyx in EU.

國際代工合作廠商擁有Lipo-Dox在美國(Doxil)及歐洲(Caelyx)之藥證。

# Successful Products (Anti-Infectives, Taiwan & Segment Market)

| Products 產品名稱                                                                                                      | Indications 適應症                                                                                                                                                                                                                                                                                                                                                                                        | Market(s) 行銷地區 |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Brosym C+S</b><br>(博益欣)<br>    | 適用於治療由感受性細菌所引起的下列感染：上、下呼吸道感染、上、下泌尿道感染、腹膜炎、膽囊炎、膽管炎及其他腹腔內感染、骨盆發炎、子宮內膜炎及其他生殖道感染、以及創傷燙傷、手術後之二次感染。<br>唯一抗感染新療效付芳心要對鮑氏不動桿菌( <b>AB</b> 菌)治療效果佳。                                                                                                                                                                                                                                                               | Taiwan         |
| <b>Cubicin</b><br>(救必辛注射劑)<br>    | 1. 治療下列感受性革蘭氏陽性菌引起的複雜皮膚和皮膚組織感染(cSSSI)：<br><i>Staphylococcus aureus</i> (包括methicillin-resistant isolates),<br><i>Streptococcus pyogenes</i> , <i>Streptococcus agalactiae</i> , <i>Streptococcus dysgalactiae</i> subsp. <i>Equisimilis</i> 與 <i>Enterococcus faecalis</i> (vancomycin-susceptible isolates only)<br>2. <i>Staphylococcus aureus</i> 引起之血液感染(菌血症)包括由具methicillin感受性及抗藥性菌株造成之右側感染性心內膜炎。 | Taiwan         |
| <b>Colimycin</b><br>(克痢黴素注射劑)<br> | 限用於一般抗生素無效，且具多重抗藥性之革蘭氏陰性菌之嚴重感染。                                                                                                                                                                                                                                                                                                                                                                        | Taiwan         |
| <b>Lipo-AB</b><br>               | 1. 骨髓移植後併發腎毒性出現侵入性黴菌感染。<br>2. 腎功能不全之麴菌屬、念珠菌屬或囊球菌屬類的菌種感染病患。<br>3. 治療感染囊球菌腦膜炎的HIV患者。<br>4. 治療麴菌屬、念珠菌屬或是囊球菌屬類的菌種感染，或是無法用Amphotericin B deoxycholate治療的病患，或是腎功能不全或無法耐受Amphotericin B deoxycholate所產生的毒性之病患。<br>5. 治療臟器的利時曼氏病。在免疫不全且患有臟器的利時曼氏病之患者使用Amphotericin B Liposome for Injection治療，在初期寄生蟲清除後仍有高復發率。<br>6. 對發燒的重度嗜中性白血球缺乏症患者可能罹患黴菌感染症之經驗療法。                                                          | Taiwan         |



# R&D Investment 研究及臨床

| Year                                        |                          | 2007      | 2008      | 2009      | 2010      | 2011      | 2012      | 2013      | 2014      | 2015      | 2016      |
|---------------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Subject                                     |                          |           |           |           |           |           |           |           |           |           |           |
| *D&C<br>Resource<br><br>營收為<br>總公司 +<br>分公司 | Revenue<br>(NTD,000)     | 1,519,680 | 1,773,420 | 2,067,360 | 1,786,500 | 2,098,500 | 2,158,500 | 2,307,540 | 2,384,220 | 2,738,956 | 3,344,262 |
|                                             | R&D Expense<br>(NTD,000) | 197,550   | 200,040   | 238,650   | 290,040   | 384,360   | 366,750   | 289,530   | 283,470   | 236,398   | 230,192   |
|                                             | Total Staff              | 319       | 339       | 400       | 338       | 374       | 404       | 484       | 494       | 450       | 508       |
|                                             | R&D<br>Manpower          | 82        | 92        | 90        | 94        | 97        | 104       | 111       | 105       | 97        | 105       |
|                                             | R&D Expense/<br>Revenue  | 13.00%    | 11.30%    | 11.50%    | 16.20%    | 18.30%    | 16.90%    | 12.55%    | 11.89%    | 8.63%     | 6.88%     |
|                                             | R&D<br>Total Staff       | 25.70%    | 27.10%    | 22.50%    | 27.80%    | 25.90%    | 25.70%    | 22.93%    | 21.26%    | 21.56%    | 20.67%    |

● Continuous investment in development & clinical research:

- Strong product portfolio
- Long product life cycle
- Abundant Asian clinical data

# Agenda

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**Product Pipeline**

**Manufacture Facilities**

**Successful Product Categories**

**In Progress Status**

**Biotech Success**

# Registration Approval Status

|   | 送件日期<br>Apply Date | 預估領證日期<br>Approval Date (Est.) | 核可類別 Category                     | NPD Code |
|---|--------------------|--------------------------------|-----------------------------------|----------|
| 1 | 2016/6/1           | <b>2016/12/13</b>              | 第二等級醫材<br>Class II Medical Device | ES0013   |
| 2 | 2017/1/1           | 2018                           | 新成分新藥 NCE                         | TT7016   |
| 3 | 2016/7/1           | 2018                           | 新成分新藥 NCE                         | PT2014   |

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# Biotech Success Strategy (2017-2021)

## ● Marketing Development

- TS-1 、Painkyl 、Brosym(C+S) 、Episil 、Lonsurf 、Aplidin into peak sale
  - Liposome Doxorubicin into global peak sale
  - Liposome Amphotericin B
  - Risperidone PLGA
  - Leuprolide Depot
  - Colimycin
- } Complete listing for global  
(Including China market)
- 2B3-201 MS clinical trials Completed & NDA
  - Regional markets integration
  - Thailand ABT IPO

## ● R&D

- CMO/CDMO
- PLGA(Microsphere) Development
- 1-2 NCE/NBE Projects
- Dual Chamber-Filling System ready



# Financial Performance (Parent Company Only)

NTD in Thousands

| Item                              | 2013       |      | 2014       |      | 2015       |      | 2016       |      |
|-----------------------------------|------------|------|------------|------|------------|------|------------|------|
|                                   | Amount     | %    | Amount     | %    | Amount     | %    | Amount     | %    |
| Net Sales                         | 2,292,163  | 100% | 2,384,207  | 100% | 2,738,956  | 100% | 3,344,262  | 100% |
| Gross Profit                      | 1,404,003  | 61%  | 1,411,875  | 59%  | 1,777,941  | 65%  | 2,217,286  | 66%  |
| Operating Expenses                | -1,121,548 | -49% | -1,144,400 | -48% | -1,035,412 | -38% | -1,063,104 | -32% |
| Operating Profit                  | 282,455    | 12%  | 267,475    | 11%  | 742,529    | 27%  | 1,154,182  | 34%  |
| Non-Operating Income and Expenses | 413,685    | 18%  | 596,585    | 25%  | 705,211    | 26%  | 277,855    | 9%   |
| Income before Tax                 | 696,140    | 30%  | 864,060    | 36%  | 1,447,740  | 53%  | 1,432,037  | 43%  |
| Net Income                        | 587,440    | 26%  | 779,645    | 33%  | 1,211,018  | 44%  | 1,193,324  | 36%  |
| EPS                               | 2.52       |      | 3.14       |      | 4.87       |      | 4.80       |      |

# Financial Performance (Consolidated)

NTD in Thousands

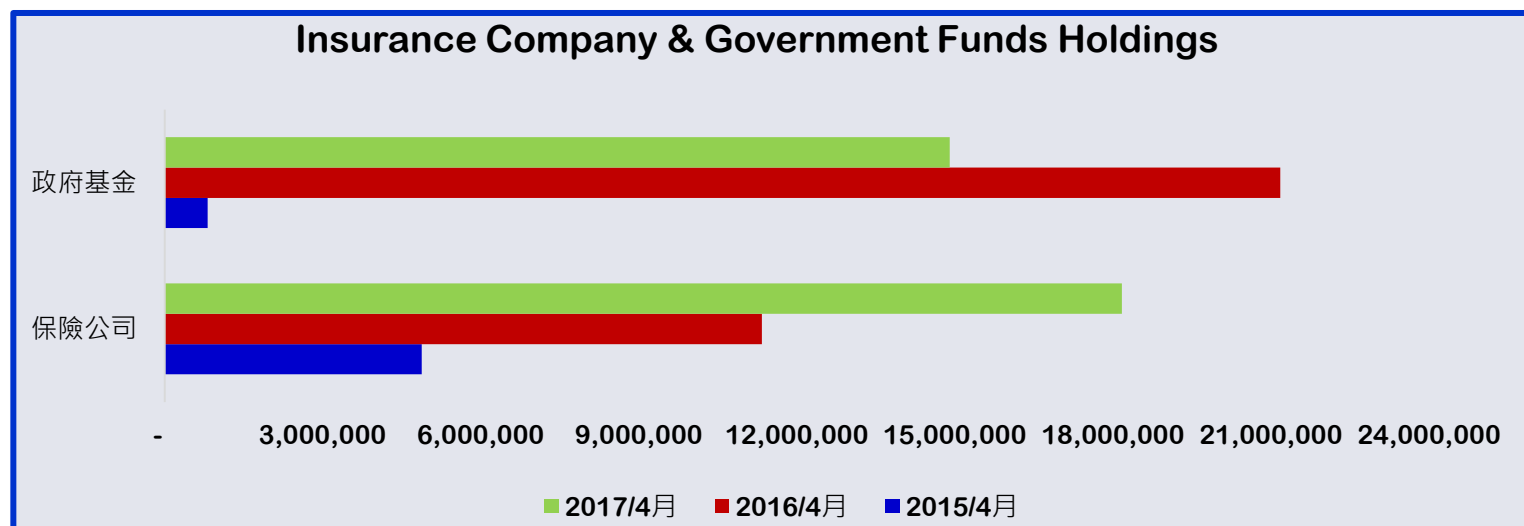
| Item                              | 2014       |      | 2015       |      | 2016       |      | 1-3Q/2017  |      |
|-----------------------------------|------------|------|------------|------|------------|------|------------|------|
|                                   | Amount     | %    | Amount     | %    | Amount     | %    | Amount     | %    |
| Net Sales                         | 2,979,902  | 100% | 3,195,218  | 100% | 3,760,717  | 100% | 2,921,535  | 100% |
| Gross Profit                      | 1,898,936  | 64%  | 2,183,144  | 68%  | 2,559,220  | 68%  | 1,986,437  | 68%  |
| Operating Expenses                | -1,560,841 | -53% | -1,393,357 | -44% | -1,379,533 | -36% | -1,043,585 | 36%  |
| Operating Profit                  | 338,095    | 11%  | 789,787    | 24%  | 1,179,687  | 32%  | 942,852    | 32%  |
| Non-Operating Income and Expenses | 571,745    | 19%  | 735,808    | 23%  | 332,372    | 8%   | -2,864     | 0%   |
| Income before Tax                 | 909,840    | 30%  | 1,525,595  | 47%  | 1,512,059  | 40%  | 939,988    | 32%  |
| Net Income (Consolidated)         | 811,695    | 27%  | 1,246,592  | 38%  | 1,254,724  | 33%  | 763,279    | 26%  |
| Net Income (TTY)                  | 779,645    | 26%  | 1,211,018  | 37%  | 1,193,324  | 31%  | 742,823    | 25%  |
| EPS                               | 3.14       |      | 4.87       |      | 4.80       |      | 2.99       |      |

# Dividend Payout

| Item \ Year    | Year  |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|
|                | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  |
| Yield Rate (%) | 0.22  | 1.25  | 1.91  | 2.39  | 3.86  | 3.42  |
| P/E            | 45.00 | 44.24 | 41.65 | 33.23 | 18.61 | 23.16 |
| Cash Dividend  | 0.30  | 1.40  | 2.00  | 2.50  | 3.50  | 3.80  |
| Stock Dividend | 2.40  | 0.89  | 0.67  | -     | -     | -     |
| Total Dividend | 2.70  | 2.29  | 2.67  | 2.50  | 3.50  | 3.80  |

# Gov't Funds & Ins. Co.'s Holdings

| Holdings<br>Institution | April/2015 |              | April/2016 |              | April/2017 |              |
|-------------------------|------------|--------------|------------|--------------|------------|--------------|
|                         | Shares     | Holdings (%) | Shares     | Holdings (%) | Shares     | Holdings (%) |
| Insurance Company       | 4,880,800  | 1.96%        | 11,339,000 | 4.56%        | 18,169,000 | 7.31%        |
| Government Funds        | 817,021    | 0.33%        | 21,177,843 | 8.52%        | 14,904,000 | 5.99%        |
| Total                   | 5,697,821  | 2.29%        | 32,516,843 | 13.08%       | 33,073,000 | 13.30%       |





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