巨生生醫 biomedical MEGAPRO

Stock Code:
MPB (6827)

MegaPro Biomedical Co., Ltd.

-505(b)(1) and (2) new drug development company

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Future Two Pivotal Pipeline of MegaPro

- **505(b)(1) New Drug MPB-1523**
  - submit a pre-IND for Phase III by the end of 2025
  - product licensing agreements hopefully 2026
  - NDA submission expect 2028
- **505(b)(2) New Formulation Drug MPB-1734**
  - mCRPC:
    - a Tween80 free formulation targeting the original indication
    - After the fundraising 2025, MegaPro plans to conduct CMC optimizations & scale up&one BE clinical study.
    - NDA submission expected at 2028
    - The licensing collaborator will be searched during the process
  - HNSCC, the anti-PD-1 combination phase II clinical trials is expected to collaborate with partners.

MPB-1523 MRI Contrast Agent – HCC

Nanoparticles 505(b)(1) Platform

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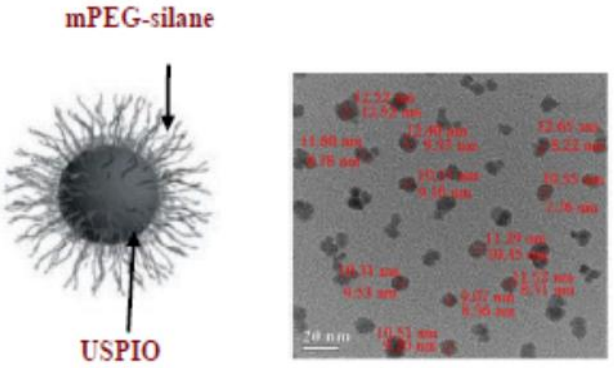
- **PEGylated iron oxide nanoparticle**
- **Key Features of the IOP Injection**
  - Higher r2 relaxivity
  - High macrophage uptake efficiency
  - Low free iron release
  - Low oxidative stress generated
  - Non-sugar base formulation, Low risk for hypersensitivity,

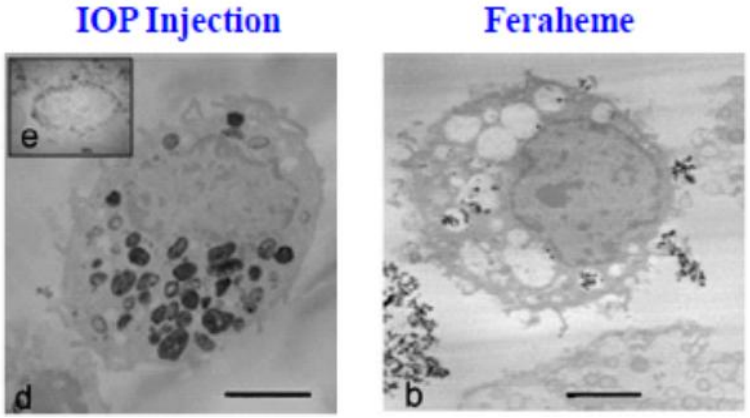
	IOP Injection	Feraheme
Size (TEM)	10-12 nm	4.2 nm
r2 $(mM \cdot s)^{-1}$*	170	70

* Measured with 0.47T minispec

MegaPro: IOP Injection



Macrophages uptake efficiency



Current HCC Diagnostic Workflow and Standards

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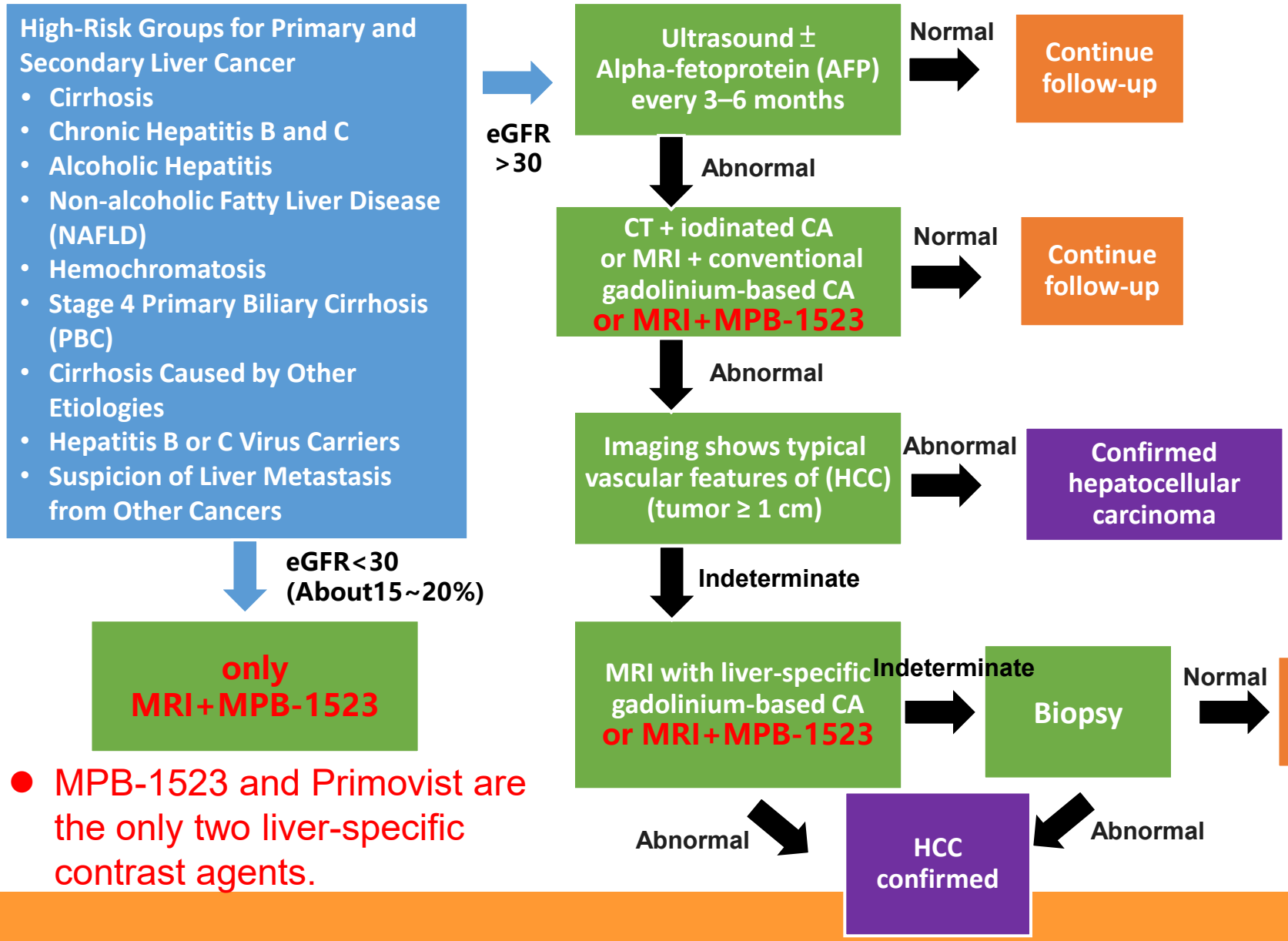

- MPB-1523 and Primovist are the only two liver-specific contrast agents.

MPB-1523 How to Enter the Market

	Ultrasound + AFP	CT with iodinated CA	MRI	MRI with gadolinium-based CA	MRI+ MPB-1523
Radiation dose	None	High	None	None	None
Heavy metal residue	None	None	None	Present	None
Others	Ultrasound imaging has low resolution & AFP lacks sufficient sensitivity for early diagnosis.。	Iodinated contrast agents are prone to causing allergic reactions.	Unable to determine whether it is a malignant tumor or a hemangioma.	• Nephrogenic Systemic Fibrosis (NFS) • Brain deposition • Not suitable for patients with eGFR < 30	Able to distinguish between malignant tumor and hemangioma.

MPB-1523 vs Primovist

	MPB1523	Primovist
Phase 1 Benchmark	SNR 80%	SNR 50%
Phase 2 Benchmark	C/N 50%	C/N 5%
Product analysis	• With Kupffer cell specific function, MPB1523 image can differentiate benign and malignant liver lesions at hepatophase. • Applicable to patients with eGFR <30 or bilirubin malfunction. • The portal vein imaging is clear, thus, to judge the portal vein invasion easier. • Iron is an endogenous element so that there will be no NSF and brain deposition issues.	• Due to the modification, 50% of Primovist is metabolized by liver so that it can provide both arterial and hepatophase imaging. • Around 20% HCC patients usually have liver and kidney dysfunction&Primovist cannot be used for those patients. • Around 15% patients who use Primovist have transient severe motion. It will affect the image quality of arterial phase.
Proposal of Phase 3 trial	Phase 3 of MPB1523 will target to patients with known or suspected focal liver lesion.	

MPB-1523 Updated Progress

1. The conclusion from End-of-Phase 2 (EOP2) meeting with the U.S. FDA :
   - ✓ Clinical protocol: suggest MegaPro to conduct a retrospective analyses and phase 3 design to compare pre and post-IOP
   - ✓ CMC: The method validate should completed before IND phase 3. MegaPro plans to complete the manufacturing specifications for MPB-1523 by 2025.
   - ✓ A pre-IND submission for the Phase III clinical trial is targeted 2025.
2. The GMP-compliant CDMO who certified U.S., EU&China regulatory is identified.
3. MegaPro also conducted a consultation meeting with the Center for Drug Evaluation (CDE) in China&get their response that only animal bridging study would be required to support the tech transfer.
4. Licensing negotiation with several Chinese pharmaceutical companies are underway.

Applications Beyond HCC Diagnosis

In addition to primary HCC diagnosis, MPB-1523 has broader potential applications.

- It holds valuable imaging applications for secondary liver cancer (metastatic cancer).
- Useful in preoperative evaluation and imaging of portal vein invasion.
- Detection of precancerous lesions through changes in Kupffer cell counts.

MPB-1523

Imaging of secondary liver cancer improves patient survival rates.

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- Early-stage colorectal cancer often has no obvious symptoms&approximately 20% of patients present with distant metastases at initial diagnosis. This is because the blood circulation from the colorectal region first drains into the portal vein system and then flows back to the liver. Therefore, the liver is the most common site for distant metastasis of colorectal cancer. 。
- Currently, about 50% of primary colorectal cancers metastasize to the liver. In the past, due to limitations in surgical techniques, patients with metastasis were only followed up without further intervention. However, in recent years, with advancements in surgical procedures, doctors now recommend surgical treatment for patients with liver metastases.
- Tumors that have metastasized to the liver usually differ in morphology from primary liver tumors, with greater differences in the density of immune cells within the liver parenchyma. Therefore, MPB-1523 is expected to provide better contrast enhancement.
- The target enrollment for the Phase 3 clinical trial has been adjusted from primary hepatocellular carcinoma (HCC) to focal liver lesions suspected to be primary or secondary malignant liver tumors, thereby broadening the potential application scope in the future.

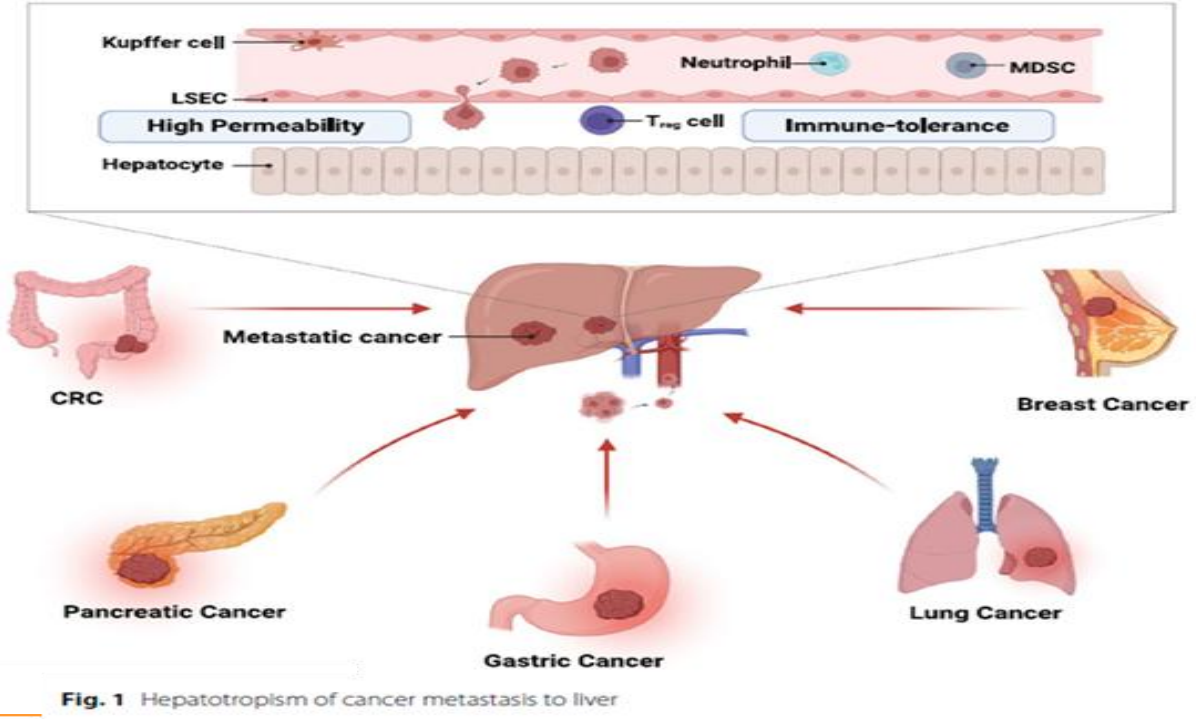

Fig. 1 Hepatotropism of cancer metastasis to liver

Wang *et al. J Exp Clin Cancer Res (2023) 42:177*

MPB-1523

Advantages of Preoperative Evaluation and Imaging of Portal Vein Invasion

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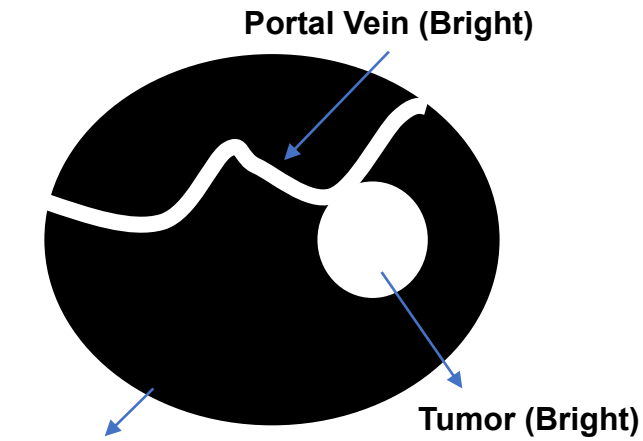
If a liver tumor invades the portal vein or veins, it affects staging and treatment strategies.

MPB-1523

(*Liver imaging with T2* weighting)

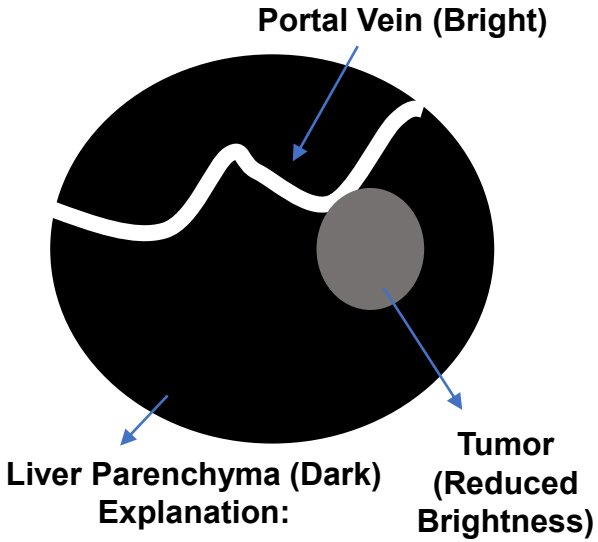


Explanation:

Preoperative assessment is crucial, even if a CT scan has already confirmed the diagnosis. If the patient's tumor is adjacent to blood vessels on both sides, attempting surgical resection may require removing a large portion of the liver, potentially damaging all blood vessels, making surgery unsuitable.

MPB-1523

(*Liver imaging with T2*-TrueFisp)

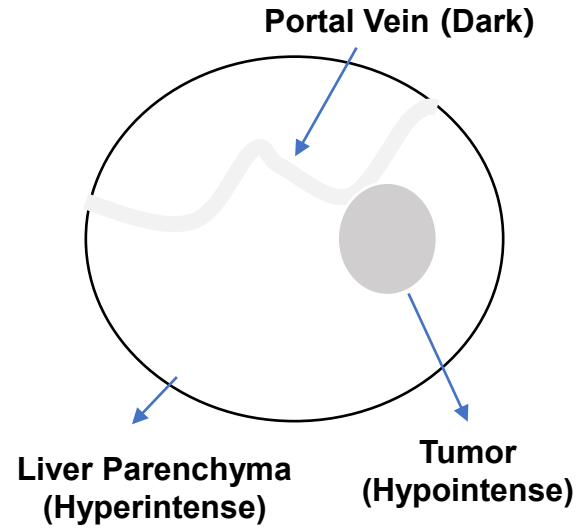


Explanation:

TrueFisp can reduce the signal intensity of tumors, providing better criteria for assessing whether the tumor has invaded the blood vessels.

Primovist

(Liver imaging with T1-weighted imaging)



Primovist's imaging contrast does not clearly determine whether there is invasion into the blood vessels.

MPB-1523 Clinical Phase II portal vein invasion imaging cases

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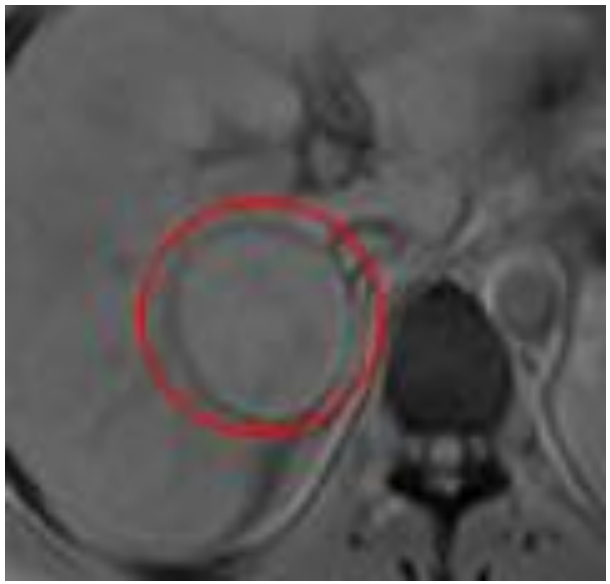
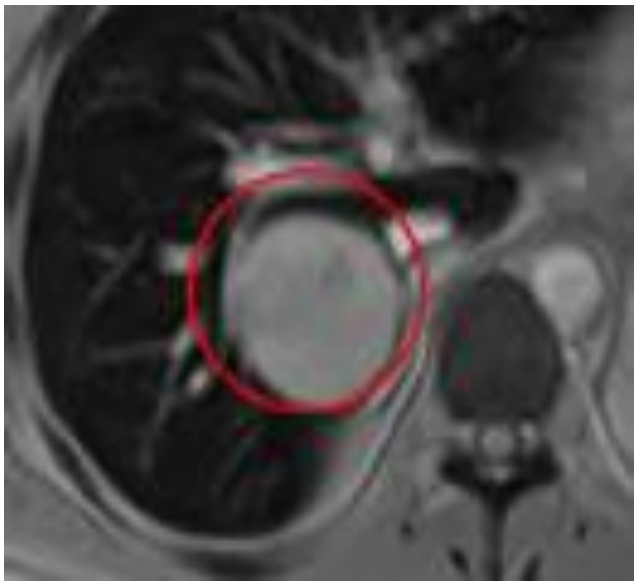
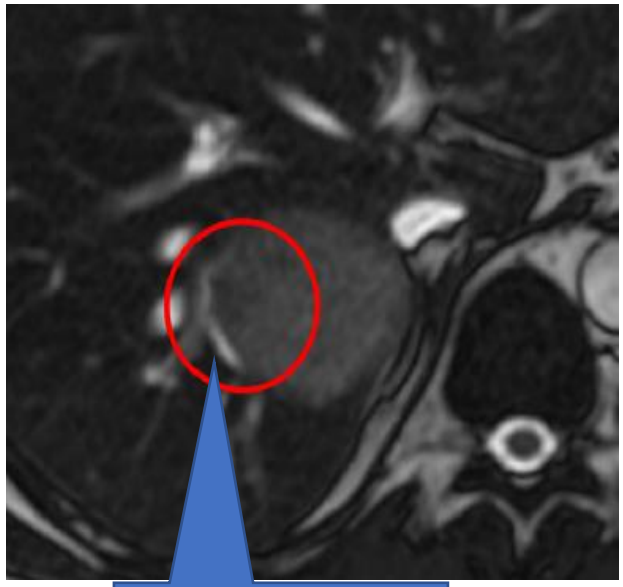
Pre

MPB-1523
(*Liver imaging with T2* weighting)

MPB-1523
(*Liver imaging with T2*-TrueFisp**)**







The tumor has invaded the blood vessels

MPB-1523

Detection of precancerous lesions through the characteristic changes in Kupffer cell count

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- The Kupffer cell density in the low-grade dysplastic nodule (LGDN) tissue is slightly reduced or normal compared to the surrounding normal liver tissue.
- The Kupffer cell density in the high-grade dysplastic nodule (HGDN) tissue is reduced by about 32% compared to the surrounding normal liver tissue.
- The Kupffer cell count in moderately differentiated liver cancer drops to 60% of normal liver tissue, while in poorly differentiated liver cancer, it is completely absent.
- When the tumor diameter is >5cm, the Kupffer cell count in the cancerous tissue is reduced by 54% compared to tumors <3cm.

Lesion Type	T2 Signal Characteristics	Kupffer Cell Density	Typical Pathological Basis
Normal Liver Tissue	Uniform Low Signal	18.9±7.9/mm²	Kupffer Cell Function Intact
LGDN	Low Signal	Slightly Reduced or Normal (Currently, there is no data showing cell density for LGDN)	Mild Dysplasia, Slight Increase in Cell Density
HGDN	Equal/High Signal	12.7±6.8/mm²	Sinusoidal Structure Preserved but Cell Count Reduced
Early-stage Liver Cancer	Slightly High Signal	11.2±6.2/mm²	Partial Destruction of Sinusoidal Structure
Moderately Differentiated Liver Cancer	High Signal	5.2±4.9/mm²	Abnormal Angiogenesis + Increased Cell Density

Ref: World J Gastroenterol 9(9):1885-1891.

MPB-1523

Detection of precancerous lesions through the characteristic changes in Kupffer cell count.

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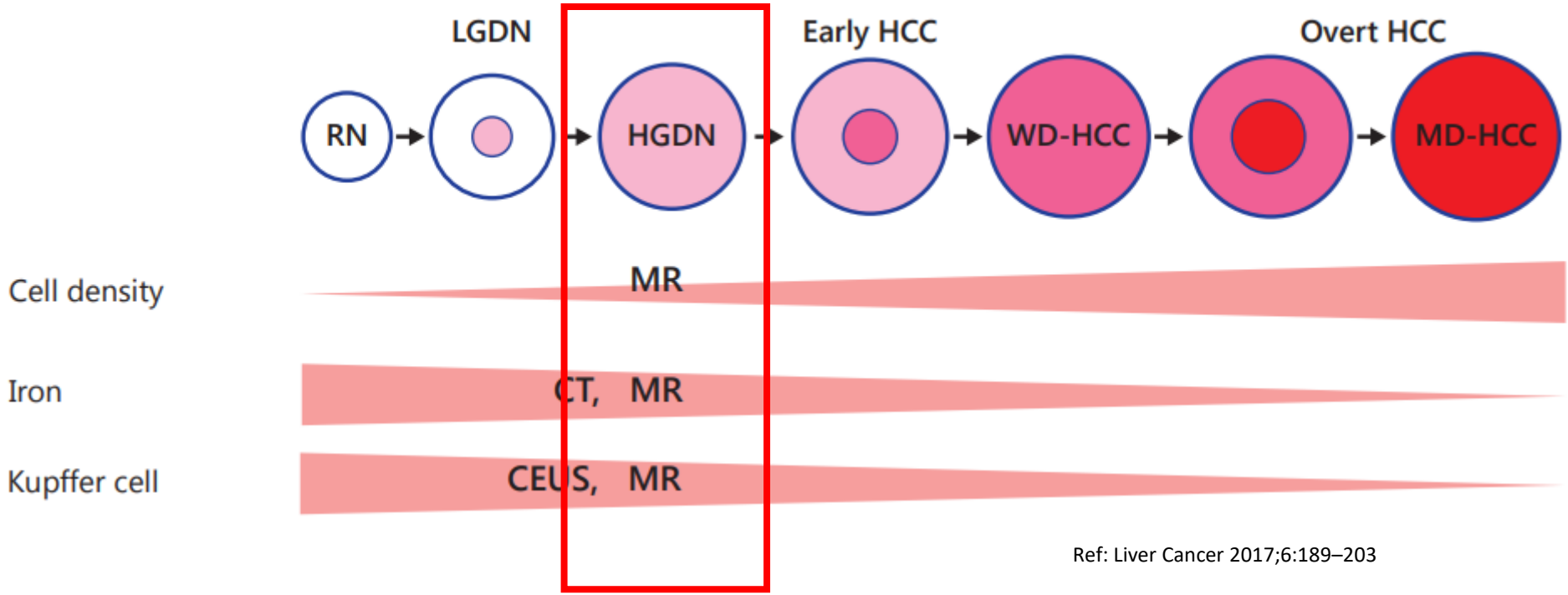
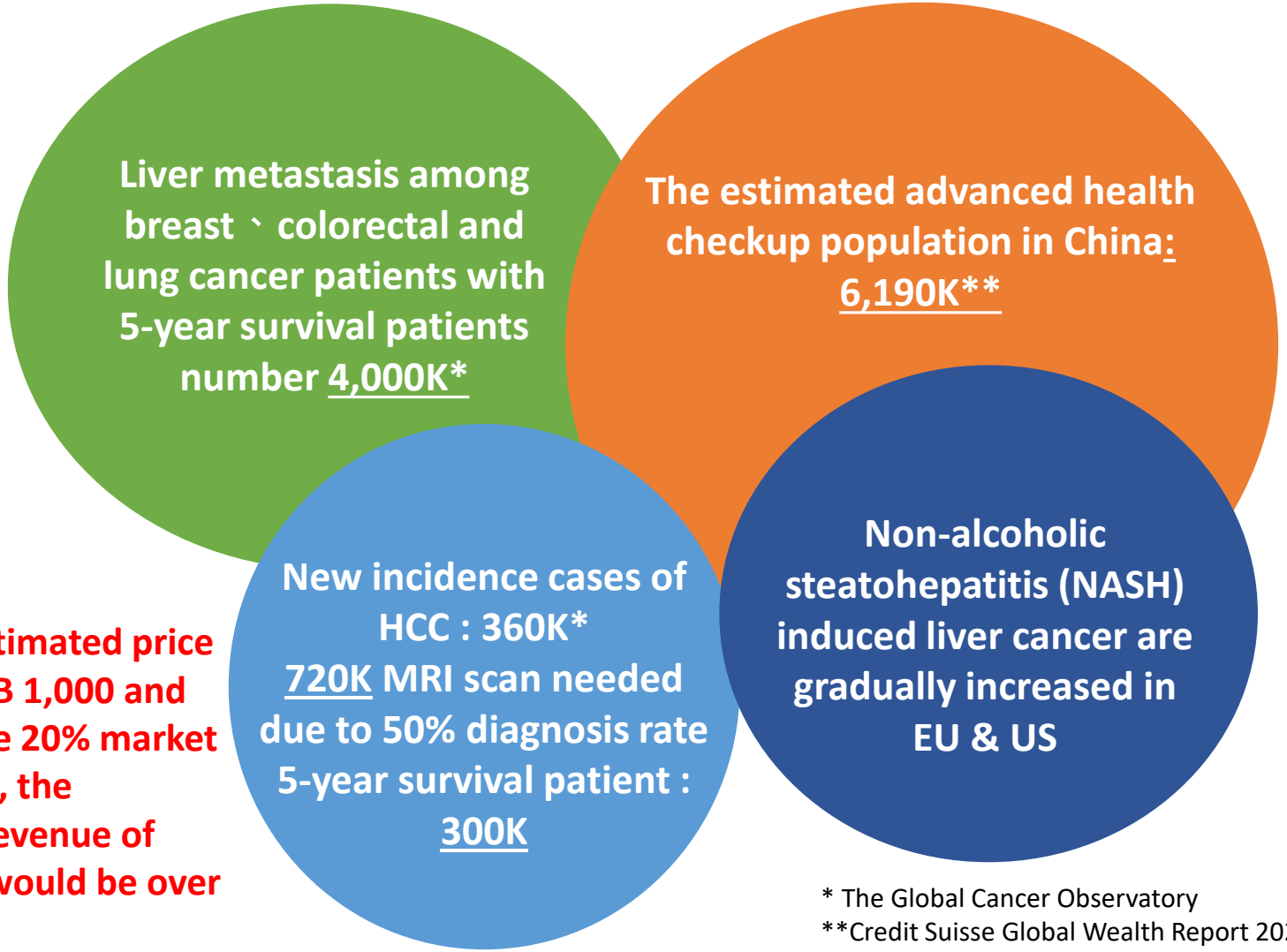
- Dysplastic nodules with abnormal differentiation should be monitored for the risk of malignant transformation, so distinguishing between benign, low-grade dysplastic nodules&high-grade dysplastic nodules is important.
- Traditional MRI contrast agents (such as Primovist) have lower sensitivity in diagnosing tumors smaller than 2 cm, whereas MPB-1523 has high sensitivity&even slight changes in Kupffer cells can create image contrast.



Ref: Liver Cancer 2017;6:189–203

Market Estimation: China as an Example



- **With the estimated price per vial RMB 1,000 and conservative 20% market penetration, the estimated revenue of MPB-1523 would be over RMB 700M.**

* The Global Cancer Observatory
**Credit Suisse Global Wealth Report 2022

MPB-1523

The Asian market, where liver cancer is prevalent, has a potential usage of nearly 8M times

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China
HCC Diagnosis 740K times
5-Year Survival 500K times
Breast, Colon & Lung Cancer 4,000K times
Total 5.24M times

South Korea
HCC Diagnosis 30K times
5-Year Survival 30K times
Breast, Colon & Lung Cancer 250K times
Total 310K times

Japan
HCC Diagnosis 80K times
5-Year Survival 700K times
Breast, Colon & Lung Cancer 990K times
Total 1.14M times

With a 20% market share, the total market is estimated to reach USD 200 million

Thailand
HCC Diagnosis 50K times
5-Year Survival 40K times
Breast, Colon & Lung Cancer 160K times
Total 250K times

Vietnam
HCC Diagnosis 50K times
5-Year Survival 30K times
Breast, Colon & Lung Cancer 150K times
Total 230K times

Philippines
HCC Diagnosis 20K times
5-Year Survival 20K times
Breast, Colon & Lung Cancer 190K times
total 230K times

Malaysia
HCC Diagnosis 4K times
5-Year Survival 3K times
Breast, Colon & Lung Cancer 66K times
Total 73K times

Singapore
HCC Diagnosis 3K times
5-Year Survival 2K times
Breast, Colon & Lung Cancer 33K times
Total 49K times

Indonesia
HCC Diagnosis 5K times
5-Year Survival 3K times
Breast, Colon & Lung Cancer 37K times
Total 45K times

Pipelines Update

- **MPB-1514: Intravenous iron for the treatment of iron deficiency anemia.**
  - Phase 2b clinical trial design has been discussed with FDA.
  - The trial will be initiated once sufficient funding is secured.
- **MPB-2043: A novel MRI contrast agent for lymph node metastasis.**
  - An IIT is ongoing. The first dose cohort enrollment completed, the second dose cohort is in preparation.
  - MegaPro plans to accelerate the clinical development of MPB-2043.
- **MPB-2354: A cell therapy drug capable of tracking implanted cells.**
  - Preparation for the Phase 1 clinical trial
  - Pre-IND submission is underway.

MPB-1734

New Formulation

Anti-cancer Drug

MPB-1734

Jevtana (Cabazitaxel) New Generation to Overcome Taxane Resistance

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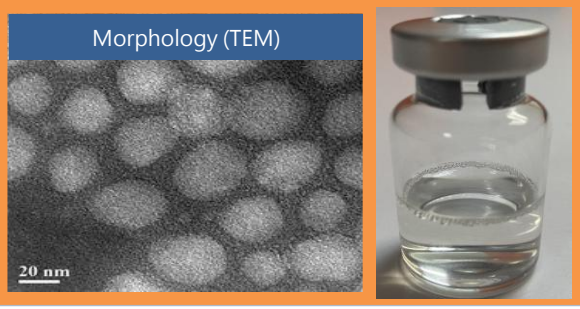
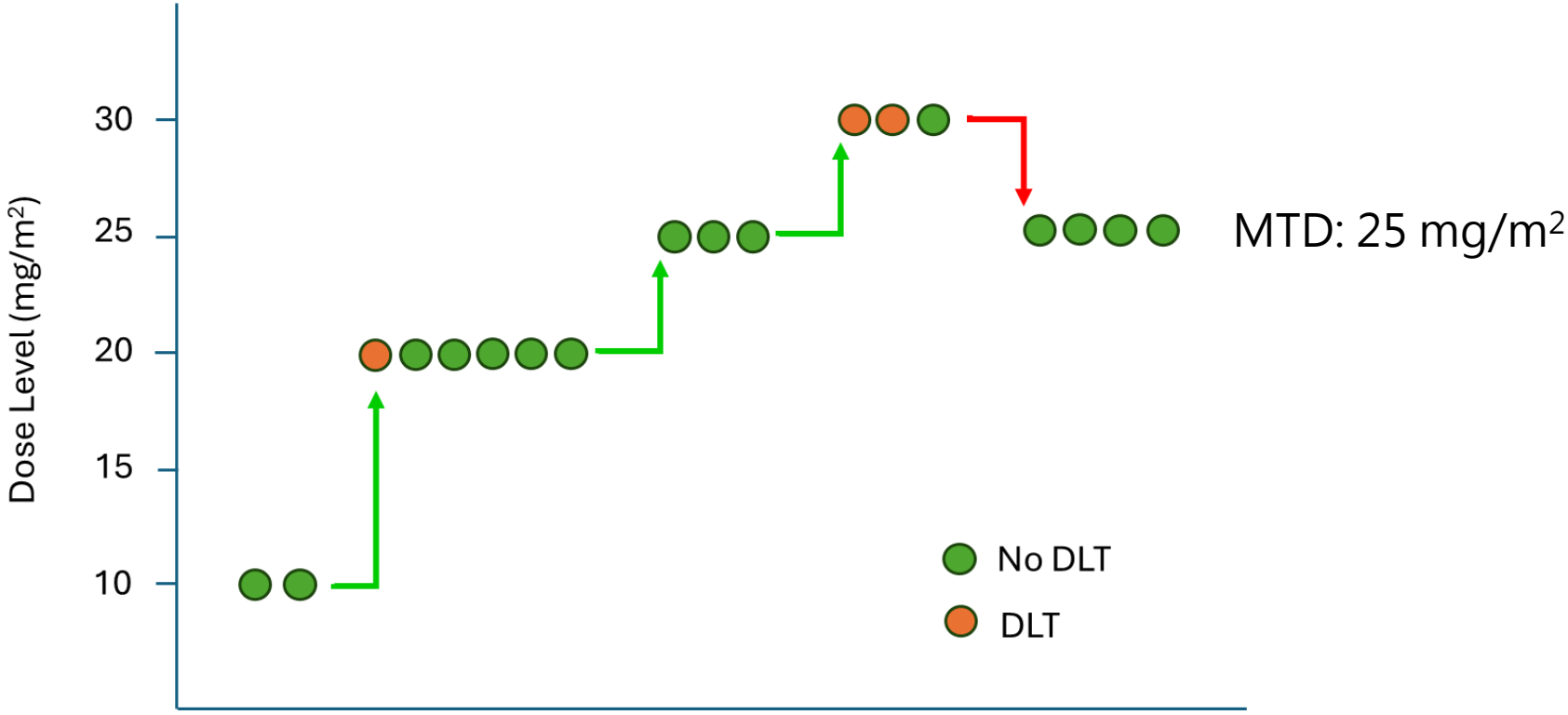
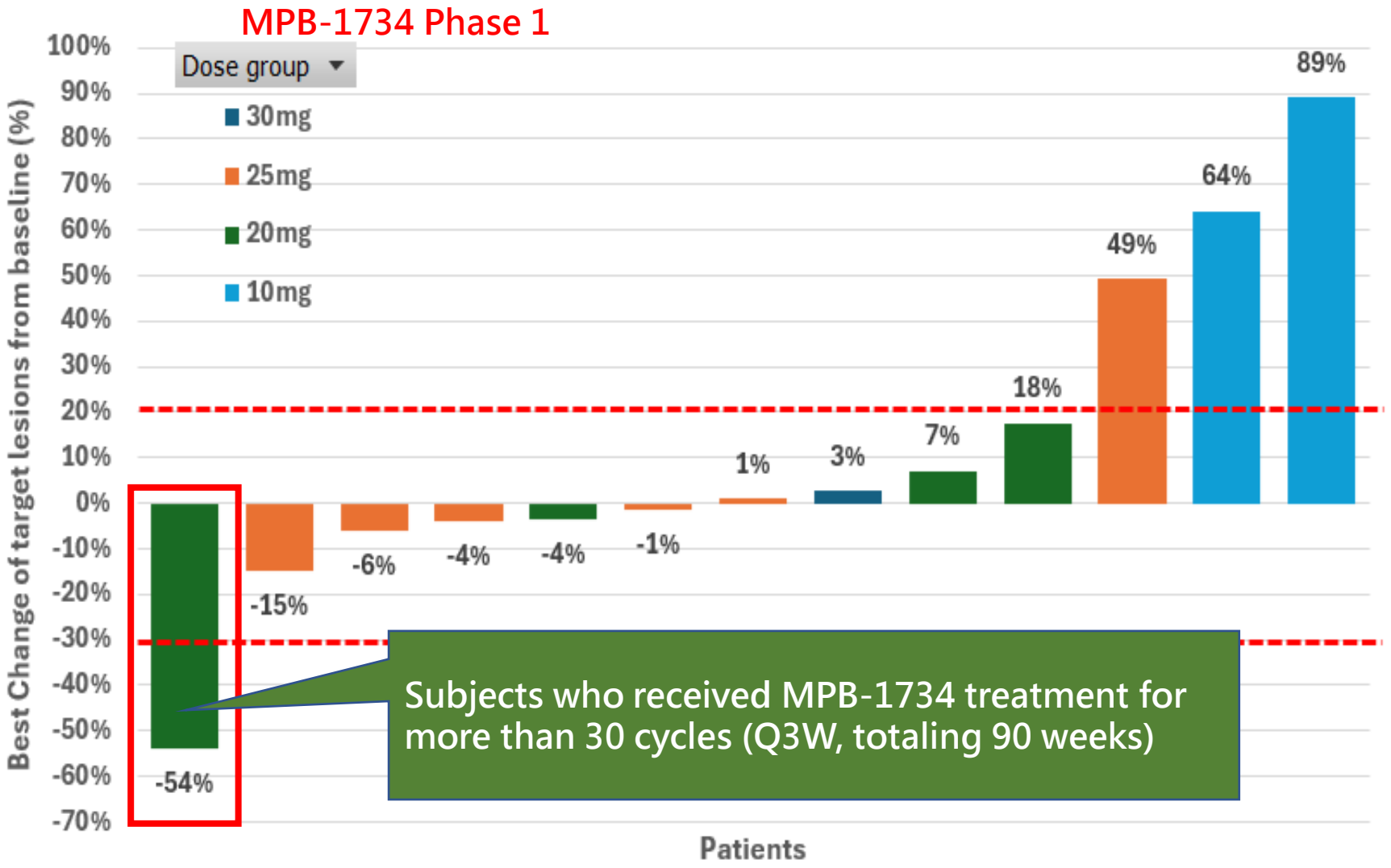
	MegaPro MPB-1734	Sanofi Jevtana
		
Patent	composition patent in US/JP/CN/IN	API expired
Solubility	solubility increased >1000 x	very low solubility, Tween80 must be used
Hypersensitivity	no steroid pre-treatment required.	hypersensitivity mainly caused by excipient Tween 80 (Black box warning)
Severe low neutropenia	neutropenia AE reduced	80% patients experienced life-threatening neutropenia (Black box warning)
Indication	focus on Head & neck and Prostate cancer	Only Prostate cancer

MPB-1734 Clinical Phase 1 Overview

- Part One (Phase 1 Clinical Trial) Progress：
  - 18 participants have been enrolled.
  - The dose escalation meeting has been completed&the trial investigators unanimously decided that the starting dose for Phase 2 clinical trial will be 25 mg/m² .



MPB-1734 Disease Control Rate (DCR) =77% (n=13)



Hematologic and Gastrointestinal Adverse Events Reduced

- TEAE (treatment-emergent adverse events) observation showed hematologic and lymphatic system disorders (neutropenia, anemia, diarrhea) reduced among all grades.
- The severity of neutropenia and diarrhea (grade ≥3) significantly reduced with MPB-1734.

	Jevtana Phase 1		MPB-1734 Phase 1			
	Lable	n=21	Phase 1			N=18
	TEAE		TEAE		TRAE	
	Grade 1-4 n (%)	Grade 3-4 n (%)	Grade 1-4 n (%)	Grade 3-4 n (%)	Grade 1-4 n (%)	Grade 3-4 n (%)
Blood and Lymphatic System Disorders						
Anemia 貧血	95%	10%	44%	28%	6%	6%
Neutropenia 中性白血球減少症 (DLT)	76%	48%	56%	28%	56%	28%
Gastrointestinal Disorders						
Diarrhea 腹瀉(DLT)	48%	14%	22%	0%	17%	0%

* Diéras, V. et al.
European Journal of Cancer, 2013, Volume 49, Issue 1, 25 - 34

MPB-1734

The 505(b)(2) New Drug Application (NDA) Expected in 2028.

MPB-1734 for Prostate Cancer (mCRPC)

1. U.S. FDA responded MegaPro through a Type C meeting
   - MPB 1734 qualify for a 505(b)(2) regulatory pathway, with the company's new material and preclinical data sufficient to support the submission.
   - FDA requested one extra hypersensitivity animal studies and a bioequivalence (BE) study to submit for the 505(b)(2) NDA application.
2. MegaPro planed a fundraising to support
   - CMC optimizations, including process scale-up and new excipient registration
   - One BE study before NDA submissions
   - NDA expected to the U.S., Canada&Europe, arround 2029.

MPB-1734 for Head and Neck Cancer (HNSCC)

1. MegaPro plans to proceed HNSCC phase II clinical combination with anti-PD-1 therapy with collaborators.

MPB-1734 Clinical Benefits from Tween80 Free Formulations

	Case 1	Case 2
Target	● **Emend IV®** (Merck) : Originally the only injectable aprepitant, for the prevention of chemotherapy-induced nausea and vomiting (CINV). ● **Cinvanti** (Heron Therapeutics) : The first Tween80 free injectable aprepitant formulation, approved by the U.S. FDA 2017.	● **Docetaxel**: Widely used in the treatment of breast cancer, non-small cell lung cancer, prostate cancer, gastric cancer&head and neck squamous cell carcinoma. ● **BEIZRAY** (by Zhuhai Beihai Biotech): no Tween80 formulation, significantly improving clinical safety, successfully approved by the U.S. FDA in 2024.
Pathway	After completing the bioequivalence (BE) study, the drug will obtain marketing approval via the 505(b)(2) regulatory pathway.	
Sales	● After the patent of Emend expired, Cinvanti captured **up to 43%** market share of the U.S. in 2019. This share later still maintained at 25–28% even with generics challenge. ● Cinvanti reached annual sales of USD **100M** in 2024.	● The annual sales of Docetaxel in the U.S. market is approximately 531,000 vials 2024. ● Beihai Biotech has licensed BEIZRAY to Zydus Pharmaceuticals 2024 with upfront payment of **USD 15M**, an additional **USD 10M** milestone payment and high double-digit profit-sharing arrangement.

MPB-1734

Megapro has the opportunity to improve hydrophobic drugs

	Docetaxel	Etoposide IV	Amiodarone IV
Usage	**Anti-cancer drugs** It is an anticancer drug extracted from the leaves of the European yew tree and is a semi-synthetic compound. Its action is to interfere with cell division. It is used to treat locally advanced or recurrent metastatic breast cancer, non-small cell lung cancer, as well as prostate cancer, gastric adenocarcinoma & head and neck cancers.	**Anti-cancer drugs** It is a widely used topoisomerase inhibitor chemotherapy drug. Etoposide is a synthetic derivative of podophyllotoxin (a substance found in abundance in the mayapple, especially in the roots of the American mayapple), used to treat various cancers, including testicular cancer, lung cancer, lymphoma, leukemia, neuroblastoma & ovarian cancer. It is also used in the treatment of hemophagocytic lymphohistiocytosis."	**Anti-arrhythmic drugs** Short-term use for the treatment of ventricular fibrillation, Wolff-Parkinson-White syndrome, supraventricular and ventricular tachycardia, atrial flutter & atrial fibrillation.
Market	The global docetaxel market value in 2024 is estimated at **$1.37 billion** & it is expected to grow to $2.37 billion by 2034, with a compound annual growth rate (CAGR) of 5.7%.	The market size of Etoposide is estimated to be **$720 million** in 2023. From 2024 to 2030, the total revenue of Etoposide is expected to grow at a compound annual growth rate (CAGR) of 5.8%, reaching nearly $1.06 billion.	The global market size for Amiodarone is expected to grow from **$1.4 billion** in 2023 to $2.5 billion in 2032, with a compound annual growth rate (CAGR) of 6.5% during the forecast period (2023-2032).

MPB-1734

Megapro platform applications & individual products are superior to those of similar companies

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	Megaprobio (6827)	Shanghai Yizhong (SH.688091)
Market Value 2025/7/31	**Approximately NTD 900 million (Approximately USD 30 million)**	**Approximately RMB 1.48 billion (Approximately USD 210 million)**
Platform Technology	● **Nanoparticle Technology Platform -** Develops a series of applications using the characteristic of macrophage phagocytosis of nano iron oxide. ● **Nanomicelle Technology Platform -** Independently developed high-molecular-weight nanomicelles to improve the solubility of hydrophobic drugs and reduce allergic reactions.	Mainly focuses on nanomicelle technology
Product Progress	The two fastest-growing products ● MPB-1523 MRI contrast agent is preparing to enter Phase 3 clinical trials; other products such as MPB-1514/2043 are currently undergoing clinical trials. ● MPB-1734 for prostate cancer has received FDA approval to proceed with the BE application for drug approval; other Tween 80-free products are under development.	● Paclitaxel micelles have been commercialized in China, with an estimated revenue of USD 24 million (RMB 170 million) in 2024. ● Docetaxel and Cabazitaxel micelles are currently in Phase 1 clinical trials.
Product Potential	● MPB-1523 is expected to be approved in the U.S., China & Taiwan, with plans to expand to Southeast Asia and Europe, with a market potential exceeding 200 million USD. ● MPB-1734 for prostate cancer is expected to be approved in the U.S. and Europe, with a market potential exceeding 300 million USD.	Currently, only paclitaxel micelles are commercialized in China, with no plans for approval in other regions at this time.

Value Investing

After ten years of hard work, it is now time to reap the rewards.

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- Megapro possesses a dual-technology platform with new drugs and new drug formulations, with a market size exceeding billions of dollars.
- Compared to other companies with similar progress, its current value is significantly undervalued.

Technology Platform	Code	Indication	RD	P1	P2	P3/ BE	NDA	Market Size
Nano-particles 505B1	MPB-1514	Iron deficiency anemia	Preparing to enter P2b					Global market > USD 2 billion
	MPB-1523	MRI-Liver cancer	Completed EOP2, preparing P3				2028 Submit	Southeast Asia > USD 200 million
	MPB-2043	MRI-Lymph node	IIT enrolling					No competitors, Global market > USD 2 billion
Nano micelles 505B2	MPB-1734	Prostate cancer	Prepare CMC and BE trials				2028 Submit	United States >USD 360 million
	MPB-1734	Other Tween 80 drugs	Screening					Global > USD 1 billion


Thank You