

Development of PEGylated protein therapeutics with tumor-selective accumulation and activation mechanisms

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Vision

- We aim to develop a simple and highly versatile DDS that can confer tumor-selective accumulation and activation to any protein.
- Although ADCs and cytokine therapeutics are highly potent, adverse effects and tumor resistance remain major challenges. Applying our seed technology aims to broaden their therapeutic window and develop safer, more effective cancer treatments.
ADCs: Prevent off-target drug release, enhance tumor penetration, and ensure uniform action on cancer cells.
Cytokine therapeutics: Avoid systemic cytokine storm while achieving strong local antitumor effects.

Marketability

- By 2034, the ADC market is projected at USD 2.99 billion (CAGR 9.23%) and cytokine therapeutics at USD 648 million (CAGR 9.84%) (Towards Healthcare). Our seed technology aims to widen these therapeutic windows for safer, more potent drugs.
- Target indications are NSCLC (564,000/year), SCLC (89,000/year), and ESCC (31,000/year) for ADCs, and GBM (39,000/year) for cytokine therapeutics (Japan, U.S., EU). Expected sales: USD 2.0B for ADCs, USD 0.3B for cytokines.
- Competitors include masked antibodies, mRNA, and polymeric micelles, but our seed excels in both PK/PD control and versatility.

Innovation

- Enables pharmacokinetic and activation control of any protein.
- Covalent PEGylation produces highly stable, uniformly modified proteins, providing CMC advantages.
- In blood and non-tumor tissues, proteins are PEG-protected and guided to tumors by targeting ligands. In tumors, PEG is removed, allowing deep penetration and activity recovery. This design optimizes safety, efficacy, and developability simultaneously.

Partnering

【 Expected partners 】

Pharmaceuticals • Chemical • Medical institute • Biotech/Drug Discovery Service • CMO/CDMO/CRO/SMO • Venture capitals

【 Expectation 】

Pipeline derivation, co-development of protein seeds via the platform, drug manufacturing, R&D and management talent, and startup support.

Research Outline

Key Words: #Antibody engineering, #Protein modification #PK control, #Cancer therapy

【Seed Technology】

- PEGylation fully masks proteins, enhancing blood stability and tumor penetration.
- Tumor-targeting ligands at the PEG terminus enable active targeting of cancer.
- Tumor-cleavable linkers release PEG in the tumor, exposing the active protein.

➡ **“Deliver, Penetrate, Release, Act” by a single molecule**

【Objective of This Study】

- Develop the 1st pipeline **“PEGylated ADC”**
- Develop the 2nd pipeline **“PEGylated cytokine”**
- Through pipeline development, establish a foundation for a platform technology applicable to diverse proteins.

【Goal of this study】

1st Pipeline: Candidates are screened in vitro, then assessed in vivo for distribution, efficacy, and safety.

2nd Pipeline: Candidates are screened in vitro, with key PK studies highlighting the advantages of the seed technology.

【References】 Mochida, (2025) Yakugaku Zasshi 145: 523-532. / Yang, Mochida, et al. (2021) Nature Biomedical Engineering 5: 1274-1287. / Suzuki, Mochida, et al. (2019) Journal of Controlled Release 301: 28-41.

【Intellectual Property Information】 WO2022239720A1, Title of invention: Antibody having reduced binding affinity for antigen, Applicant: Kawasaki Institute of Promotion, Filing date: May 10, 2021

