Technology/ Title	DBPR807/ Therapeutic Application of CXCR4 Antagonist DBPR807 for HCC Treatment	
Subtitle		
Technology Type	☐ Biotechnology ■ Pharmaceutical	☐Device/Diagnostics
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Technology Description	We have discovered a novel class of polyamines containing an oxazole heterocyclic ring as a core structure to target CXCR4 receptors. The representative compound DBPR807 has been shown to have potent activity and high specificity toward CXCR4 as well as good safety profiles. The proof-of-concept of DBPR807 on three hepatocellular carcinoma (HCC) animal models had been completed. Results revealed that as it was combined with Sorafenib, a first line marketed VEGFR tyrosine kinase inhibitor, or a PD-1 antibody, an immune checkpoint inhibitor, the tumor growth and cancer metastasis could be dramatically inhibited as compared to the single treatment with Sorafenib (combo -83% vs single -33%) or PD-1 antibody (combo -95% vs single -53%) in the murine orthotopic HCC model. Mechanistically, Sorafenib can inhibit angiogenesis, leading to developing hypoxic microenvironment which is forced to trigger the CXCL12/CXCR4 axis to generate a new angiogenic signaling, resulting in the relapse of liver tumor. This is the reason why combining with CXCR4 antagonist like DBPR807 can show a synergistic effect because this new angiogenic pathway is overwhelmingly suppressed. Regarding immunotherapy, as combined with PD-1 antibody, CXCR4 antagonist DBPR807 can not only normalize the immunosuppressive tumor microenvironment but also enhance infiltration of CTLs (cytotoxic T lymphocytes) to combat/kill cancer cells, resulting in a more significant synergistic effect in shrinking the tumor size.	
Intellectual Property	Patent title: Heterocyclic compounds and use thereof Approval: USA (US10882854), Taiwan (TWI664174), Australia (AU2018208366), Japan (JP6892716), Canada (CA3047146), New Zealand (NZ754272),	

	Russia (RU2756055C2), South Korea (KR102335082), India (IN379503), China (CN110381949), Hong Kong (HK40010586), Macao (ZL201880005371.5), Brazil (BR 112019013493-0) Pending: PCT (application No. PCT/US18/12748, pending) includes, European Union (7).
Key Publications	Song JS, Chang CC, Wu CH, Dinh TK, Jan JJ, Huang KW, Chou MC, Shiue TY, Yeh KC, Ke YY, Yeh TK, Ta YN, Lee CJ, Huang JK, Sung YC, Shia KS, Chen Y. A highly selective and potent CXCR4 antagonist for hepatocellular carcinoma treatment. Proc Natl Acad Sci U S A. 2021;118:e2015433118.
Business Opportunity	The global liver cancer drug market size was valued at USD 3.67 billion in 2024 and is projected to grow at a CAGR of 17.9% from 2025 to 2030. According to the American Cancer Society, more than 800,000 people are diagnosed with liver cancer each year, accounting for more than 700,000 deaths each year worldwide. Factors such as alcohol consumption, hepatitis B & C infections, obesity, and fatty liver disease are expected to contribute to a growing incidence rate of liver cancer. The development of novel therapies and treatment options for liver cancer, including targeted therapies, immunotherapies, chemotherapy, and combination therapies, has fueled the market growth. There are 12 FDA approved anti-liver cancer drugs on the current market, including 6 kinase inhibitors and 6 checkpoint inhibitors, in which the patent right of Sorafenib has expired in the spring of 2020; thus, combination therapy of it with DBPR807 has great potential to become the first-in-class anti-liver cancer small molecular drug in the near future. Histopathological analysis of tumor tissue indicated that lung metastasis is barely reduced in the sorafenib treated group as evidenced by the number of nodules counted in lungs; however, whether given alone or combined with sorafenib, BPRCX807 can significantly suppress lung metastasis relative to control or sorafenib-treated alone. implying that clinically it may have greater potential to become an essential element for combination cancer therapy to prevent migration and distant metastasis, a long-term issue needed to be immediately addressed in cancer treatments.

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