Docket #: S24-311

Targeting Epstein-Barr Virus (EBV) RNAs with an RNA Sensor to Deplete EBV-Transformed Cells and Treat EBV-Associated Diseases

Epstein-Barr virus (EBV) is a ubiquitous human herpesvirus that infects over 90% of the global population and is typically asymptomatic, yet it is causally linked to approximately 200,000 cancers each year and is associated with various autoimmune diseases, including multiple sclerosis, systemic lupus erythematosus and rheumatoid arthritis. EBV infects primarily B cells where it establishes lifelong latency and suppresses most viral protein expression to evade immune detection. In the most restricted latency states, infected cells express no viral proteins and instead produce high levels of non-coding RNAs. These low-latency B cells are thought to be a major driver of pathology in EBV-associated autoimmune disease, making their selective depletion a promising therapeutic strategy. However, no existing treatment has been developed to directly target EBV.

Scientists at Stanford have designed a novel therapeutic approach for EBV-associated diseases by targeting EBV-encoded non-coding RNAs using RADAR technology. This technology has the potential to reduce the burden of a broad range of chronic and often debilitating diseases for which treatment options remain limited and, because it relies on recognizing viral RNA, it may also be adaptable to other viral infections in which viral RNAs are expressed.

Stage of Development
in vitro

Applications

- Targeted depletion of EBV-transformed cells
- Treatment of EBV-associated diseases, including cancers, autoimmune diseases, infectious mononucleosis, and others
- Proof of concept to target viral RNAs from other viruses, including other herpesviruses and retroviruses

Advantages

- First in the market, since there is currently no approved antiviral therapy for EBV-infection, or treatment for EBV-associated cancers and autoimmune diseases
- Efficiently targets the correct cells with the matching latency type

Patents

- Published Application: WO2026085427

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