Treatment of Human Cytomegalovirus (HCMV) with Bromodomain Inhibitors

Background:
HCMV is a common virus that is present in the majority of adults, although healthy individuals will never develop signs or symptoms (CDC). However, serious life-threatening complications can occur in immunocompromised individuals, such as HIV or cancer patients, co-infected with HCMV. Currently licensed treatments are available, but with the increase of drug resistance in the clinic, the development of new effective treatment options for HCMV is necessary.

Technology Description:
Dr. Yi-Chieh Perng and Dr. Deborah Lenschow, at the Washington University School of Medicine, have determined that bromodomain inhibitors are effective for treating HCMV infection. Currently, bromodomain inhibitors have been successful for the treatment of cancer, cardiac, and anti-inflammatory diseases, however, they have not been described for HCMV. Recently Dr. Perng et al, determined one such molecule JQ1, a well-known bromodomain inhibitor, effectively inhibited HCMV in primary cells at a relatively low dose (20nM). Furthermore, in comparison to currently licensed HCMV drugs that target DNA replication, the JQ1 molecule inhibits HCMV during viral capsid formation, providing an alternative approach for controlling drug resistant viral strains. In addition to JQ1, several other bromodomain inhibitors were identified to effectively block HCMV infection with no toxicity, indicating this form of treatment is ideal for long-term usage which is essential for cancer/HCMV co-infected individuals. This novel discovery provides a promising approach for treating not only HCMV infections, but also, cancer/HCMV co-infected patients.

Key Advantages:
- **Novelty.** JQ1 and other bromodomain inhibitors have not yet been described for anti-viral therapies.
- **Low Dose Efficacy.** JQ1 is effective at low dose concentration (20nm), with no toxicity compared to currently licensed anti-HCMV therapies, making it an attractive candidate for long term therapy.
- **Validated.** JQ1 and other identified bromodomain inhibitors have been shown to significantly inhibit HCMV in primary human fibroblasts (*unpublished*).
- **Safety.** Bromodomain inhibitors are safe for other indications such as for cancer and cardiac diseases, and are also expected to be safe as an antiviral therapeutic.

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