I. INTRODUCTION

1.1 Background

Zoonotic diseases are contagious illnesses which spread between animals and people (Bauer et al.., 2021). Due to the fact that most of the fatal zoonotic diseases in the world are caused by infected animals, the more people continue to have close interaction with these animals, the higher likelihood of spillovers occurs (Ellwanger & Chies, 2021). Bats, which account for around 22% of all listed mammal species, are being recognized as natural reservoir hosts for several novel viruses that can cause fatal illnesses in humans and due to their quick evolutionary pace, toxicity to humans or other hosts, other bat-associated viral families, such as lyssaviruses are of significant public and veterinary health concern (Letko et al., 2020). According to an analysis by Khan et al. (2022), 73.17% of zoonotic diseases in Asia are bat-borne, with a fatality rate of 29.86%. This emphasizes the importance to better comprehend the pathogenesis of bat-borne viruses and to develop effective interventions that can mitigate their impact on public health well-being.

Glycosaminoglycans (GAGs) represent a group of linear, negatively charged polysaccharides present both on cell surfaces and within the extracellular matrix (Shetye et al., 2017). Based on the specific sulfation group, GAGs are divided into five main categories. These categories include sulfated GAGs, such as heparin and heparan sulfate (HS), chondroitin sulfate (CS), dermatan sulfate (DS), and keratan sulfate (KS), as well as non-sulfated GAGs, such as hyaluronic acid (HA) (Shi et al., 2021). Apart from HA, all GAGs in vivo are found covalently coupled to particular core proteins as proteoglycans and are ubiquitously expressed along the cell surface, in ECM, and in intracellular compartments (Jinno & Park, 2015). Almost every significant point of entry for pathogens is facilitated by GAGs, which help them connect to and invade host cells, migrate from one cell to another, and defend themselves against immune action (Aquino & Park, 2016). With that being said, investigating the precise mechanism of interaction and pathogenicity between Asian bat viruses and

the GAG attachment factor in this complex interplay is crucial to develop efficient therapeutic strategies to protect host cells from infection.

1.2 Scope of Research

This research involved pseudovirus production, determining pseudovirus infectivity (TCID50) on SH-SY5Y cells, and conducting a heparin inhibition assay (IC50). Both TCID50 and IC50 were assessed using a luciferase assay.

1.3 Objectives and Hypothesis

The research aimed to investigate and elucidate the role of the attachment factor GAG, particularly Heparin, in lyssavirus attachment. It was hypothesized that Heparin would mitigate Lyssavirus attachment towards SH-SY5Y cells.