

VMS063: A Novel, Highly Potent, Half-life Extended, Pan-measles Variant Investigational Antibody

Richard N.A. Martin, PhD, Daniel Chupp, PhD, Colin Powers, PhD, Feng Gao, MD, PhD, Michael Mina, MD, PhD, Robert Allen, PhD

Invivyd, Inc., New Haven, CT, USA

INTRODUCTION

- Measles Virus (MeV) is an RNA morbillivirus that poses serious public health concerns, with increasing outbreaks domestically and globally linked to gaps in vaccination^{1,2}
- MeV infection can cause severe clinical sequelae, including pneumonia, secondary infections, encephalitis, and long-term immunological amnesia³⁻⁵
- No directed antiviral treatments are currently available for MeV infections; treatment is limited to supportive or indirect interventions such as Vitamin A, IMIG, and pooled IVIG, all with varying levels of efficacy
- Monoclonal antibodies (mAbs) have the potential to provide direct, durable, and equitable immunity, regardless of immune-compromised status, and have demonstrated clinical efficacy against other viral infections (i.e., RSV & SARS-CoV-2)
- MeV is a highly attractive target for mAb therapy & prophylaxis owing to its high susceptibility to antibody neutralization and evolutionarily conserved antigenic structure, resulting in a single serotype
- MeV-directed mAbs could expand treatment options while providing an alternative approach to prophylaxis, including when vaccination is not feasible or sufficient
 - MeV-directed mAbs could also bridge the period between waning maternal antibodies and first measles vaccination, potentially enabling later vaccine receipt and more durable vaccine-induced immunity⁶
- VMS063 is a novel, investigational, half-life extended pan-measles variant neutralizing mAb that has been engineered to target the measles fusion protein (MeV-F)
- Here, we characterize the development of VMS063 and its *in vitro* neutralization activity against historical & contemporary MeV variants in authentic virus and pseudovirus settings

METHODS

- The developability of VMS063 was evaluated by determining the melting temperature (T_m) using nano Differential Scanning Fluorimetry (1 mg/mL in 1×PBS pH 7.4), hydrophobicity using Hydrophobicity Interaction Chromatography, and aggregation potential using Dynamic Light Scattering (DLS)
- The VMS063/MeV-F complex structure was elucidated using single particle Cryogenic-Electron Microscopy (Cryo-EM) with a final resolution of <3.5 Å
- Clinical specimen metadata obtained from Pathoplexus were used to identify evolutionary trends and genotype distribution based on the MeV N450 gene
- Neutralization activity was determined via authentic virus (FRNT) and pseudovirus neutralization assays

LIMITATIONS

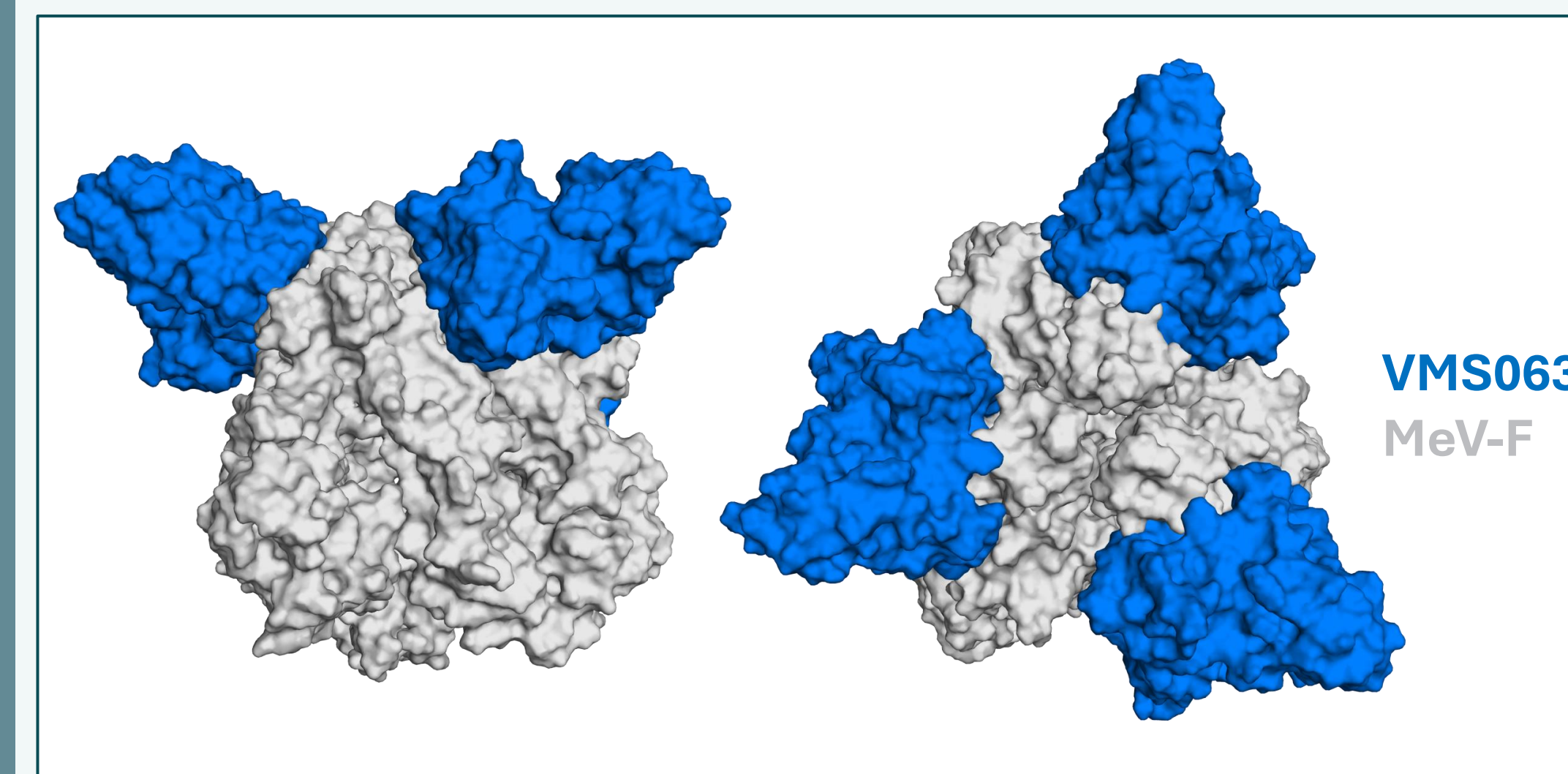
These findings are based on *in vitro* neutralization data and may not directly translate to clinical efficacy

DISCLOSURES

RM, DC, CP, MM, and RA are employees of Invivyd, Inc. and may own stock. FG was an employee of Invivyd, Inc. at the time the analysis was conducted. This work was funded by Invivyd, Inc. Medical writing support was provided by Stevin Joseph, PharmD, and Allison Curtis, PhD, Invivyd, Inc.

RESULTS

Figure 1. High-resolution structure of VMS063 (Blue) with the pre-fusion MeV-F trimer (Grey)



- VMS063 demonstrates stability in line with prior therapeutic mAbs, with a T_m >70 °C and a low propensity to aggregate
- Cryo-EM showed that VMS063 targets MeV-F at a highly conserved epitope, stabilizing the pre-fusion conformation towards preventing viral-cell fusion (**Figure 1**)
- Real-time genomic tracking data from Pathoplexus confirm that the B3 and D8 genotypes are the overwhelmingly dominant lineages driving measles outbreaks globally and domestically (**Figure 2**)
- VMS063 was shown to have high potency, with mean 50% neutralization at single digit ng/mL concentrations: 1.4 ng/mL and 4.2 ng/mL in pseudovirus and authentic MeV neutralization assays, respectively, against historical as well as the highest circulating contemporary variants (**Figures 3 & 4**)

Figure 3. VMS063 Neutralization of MeV Authentic Virus

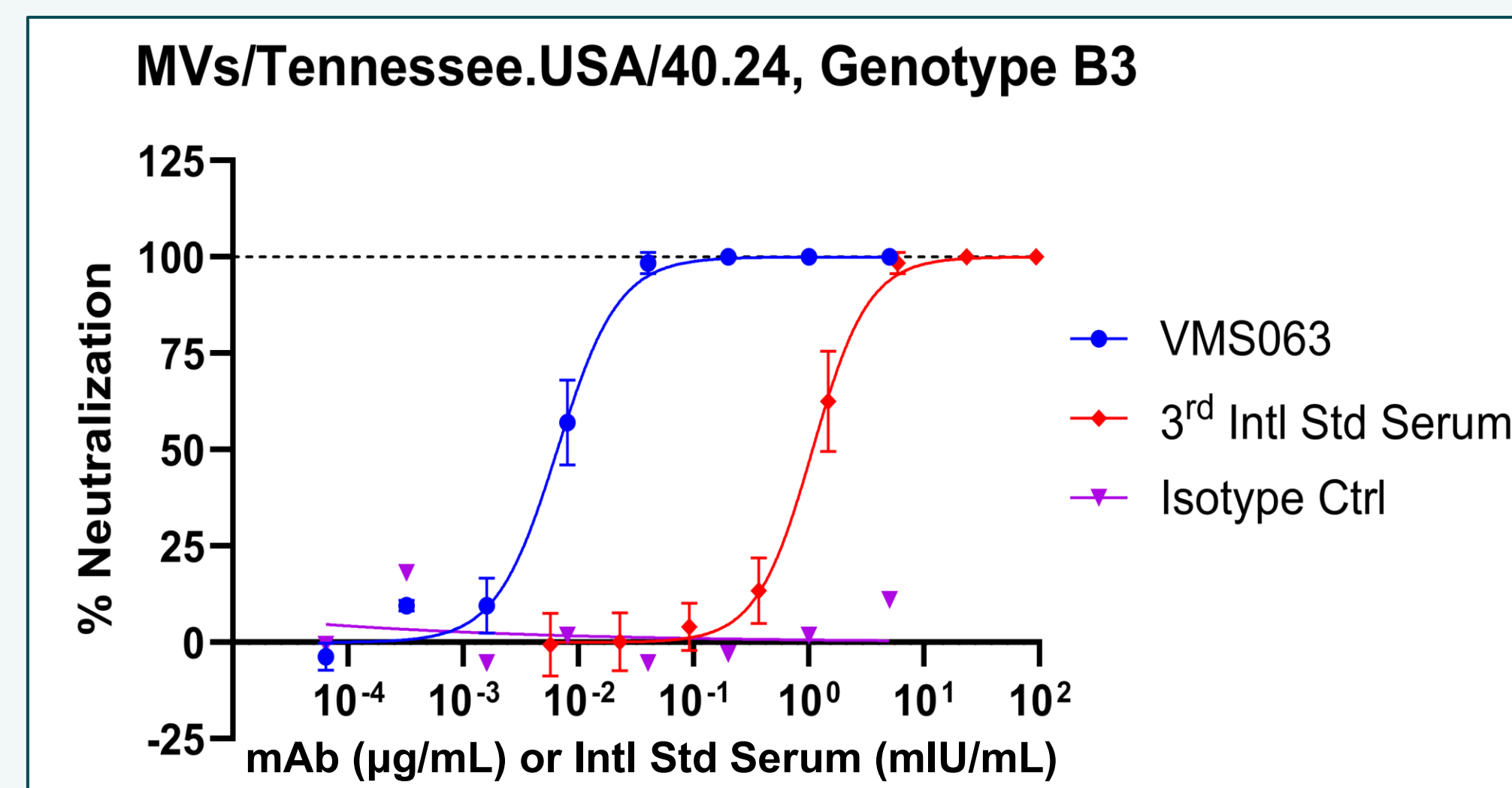
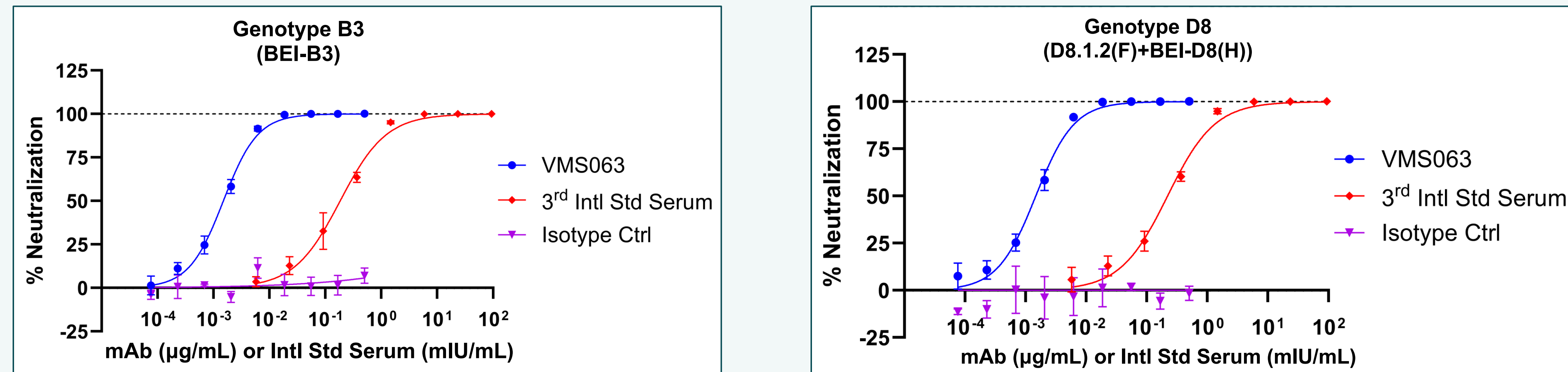


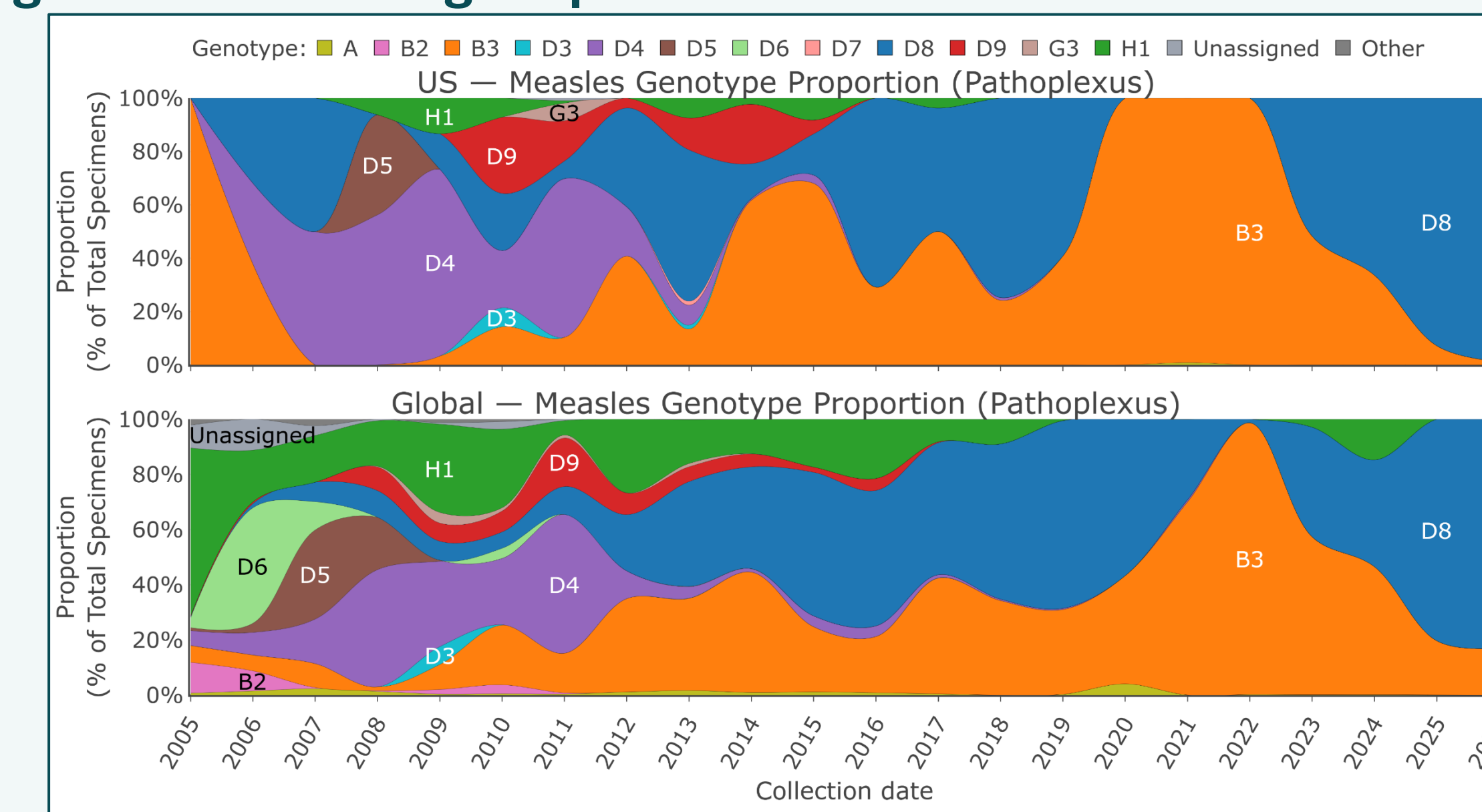
Figure 4. VMS063 Neutralization of MeV Pseudovirus



REFERENCES

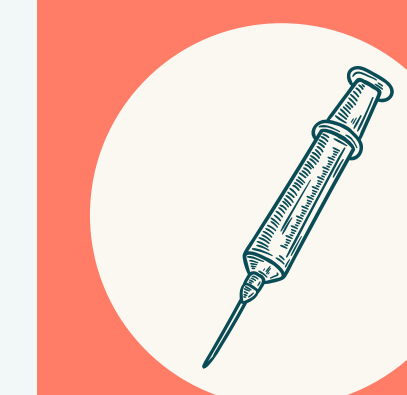
- Centers for Disease Control and Prevention. Measles Cases and Outbreaks. CDC. Updated August 14, 2026. Accessed August 17, 2026. <https://www.cdc.gov/measles/data-research/index.html>
- World Health Organization. Measles Deaths Down 88% Since 2000, but Cases Surge. Published November 28, 2025. Accessed August 17, 2026. <https://www.who.int/news/item/28-11-2025-measles-deaths-down-88-since-2000-but-cases-surge>
- Centers for Disease Control and Prevention. Clinical Overview of Measles. CDC. Updated August 5, 2026. Accessed August 17, 2026. <https://www.cdc.gov/measles/hcp/clinical-overview/index.html>
- Liksono BM, de Vries RD, Verburgh NJ, et al. Studies into the mechanism of measles-associated immune suppression during a measles outbreak in the Netherlands. *Nat Commun*. 2018;9(1):4944.
- Mina MJ, Kula T, Leng Y, et al. Measles virus infection diminishes preexisting antibodies that offer protection from other pathogens. *Science*. 2019;366(6465):599-606.
- Centers for Disease Control and Prevention (CDC). Measles prevention: recommendations of the Immunization Practices Advisory Committee (ACIP). *MMWR Morb Mortal Wkly Rep*. 1989;38(suppl 9):1-18. Published December 29, 1989. Accessed September 1, 2026. <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm0041753.html>

Figure 2. Circulating Proportions of CURRENT Measles Virus Variants*

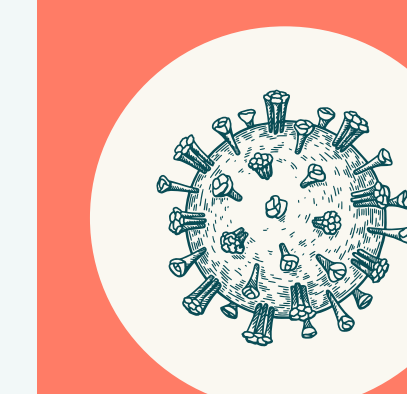


*based on N450 sequences (<https://pathoplexus.org/measles/search>)

Key Findings



VMS063 binds a highly conserved epitope of the MeV-F protein, stabilizing its pre-fusion conformation, supporting a mechanism of neutralization through inhibition of membrane fusion



VMS063 demonstrated sustained *in vitro* neutralization activity against all MeV variants tested, including the highest circulating contemporary genotypes, B3 and D8

Conclusions

- VMS063 demonstrated potent *in vitro* antiviral activity against contemporary MeV variants, supporting its potential utility for both prevention (pre/post-exposure prophylaxis) and treatment
- As a non-vaccine half-life extended mAb, VMS063 may provide a complementary, directly-acting immunization strategy for individuals who are too young or otherwise unable to be vaccinated, who may mount an inadequate vaccine-induced immune response, or whose immunity may have waned and thus are unprotected against the measles virus
- By expanding the options for measles prevention and treatment, VMS063 has the potential to reduce the risk of infection and transmission, support outbreak control, and contribute to measles elimination