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New protein identification in PRRSV

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Despite extensive characterization of PRRSV proteins by direct analysis and comparison to other arteriviruses, determinants of virulence, pathogenesis and protective immune recognition remain poorly understood. This lack of knowledge is a critical deficit that prevents progress in new vaccine Thus, we hypothesized that additional open reading frames (ORFs) are present in the PRRSV genome that may contribute to its biological properties, and so screened highly purified virions of the strain VR2332, the prototype type 2 PRRSV, for evidence of novel polypeptides. A 51 amino acid polypeptide was discovered that is encoded in an alternative upstream ORF5a of the subgenomic mRNA encoding the major envelope glycoprotein, GP5. It is present in infected cells and is incorporated into virions. A similar ORF is present as an alternative reading frame in all PRRSV sgmRNA5 and in all other arteriviruses, suggesting that the ORF5a protein plays a significant role in arterivirology. Its discovery also provides a new potential target for immunological and pharmacological intervention in PRRS.

Take home messages from the research to date are:

PRRS virus has a previously unknown, small protein, ORF5a, in the viral particle. Its function is not yet known, but is the subject of ongoing research.

ORF5a antibodies from immunized pigs does not neutralize PRRSV infection of permissive cells and immunization with recombinant protein does not protect pigs against infection.

A conserved motif in ORF5a appears to control variation in glycosylation of GP5, indicating that this region of GP5 is not under immunological selection to escape neutralizing antibodies.

The full scientific article is available for download at the Murtaugh lab website, murtaughlab.com, publications menu (`http://x245-13.cvm.umn.edu/AllPubs.html`), as publication number 175.

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