All picornavirus genomic RNAs are uncapped but have a 5'-terminal sequence of VPg. VPg is a peptide primer for the synthesis of the minus-strand RNA. The uridylylation of the VPg peptide primer is the first stage in the replication of picornavirus RNA. Attachment of this peptide to the RNA occurs via a Tyr (Y) residue and is performed by the viral RNA polymerase (3Dpol). FMDV uniquely expresses 3 distinct copies of the VPg peptides (VPg1-3) as the primer for RNA replication, which are 23 or 24 amino acids in length. The cre has been shown to be required in the form of RNA for replication of the viral RNA (1). This element occurs in different locations within various picornavirus genomes. The FMDV cre is located within the 5’ UTR of the RNA (2), just upstream of the internal ribosome entry site (IRES).

This study has shown that the FMDV 3C protein alone can substitute for 3CD, albeit less efficiently. In addition, the VPg precursors can function as substrates for uridylylation in the absence of added 3C or 3CD, and certain RNA sequences within the foot-and-mouth disease virus 5’ UTR but outside of the cre/bus can enhance VPg uridylylation activity(3).

Reference:
