Impact of cytokine response on FMDV infection outcome in cattle

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Introduction
Foot-and-mouth disease (FMD) remains the single most important constraint to international trade in live animals and animal products. After the acute phase of infection, a proportion of cattle infected with FMDV become persistently infected, which may be critical to the epidemiology of FMD. However, the factors leading to clearance or persistent infection of FMDV are not well defined, but recent studies have indicated the importance of the cytokine response. The present paper provides evidence of the association of IL-10 response during the acute phase of infection with the outcome of FMDV infection (persistency).

Materials and methods
Serum samples were collected from 25 cattle infected with the type O UKG/34/2001 at 0, 1, 2, 3, and 4 dpi. The presence of virus in pharyngeal regions (Probang samples) was assessed by virus isolation. ELISA was employed to measure IL-10 and IFN-gamma levels in sera. The level of viral RNA was then quantified by a quantitative RT-PCR assay as described previously (Zhang et al., 2004). Anti-FMDV antibodies in sera samples were detected by ELISA assay.

Results
All animals showed acute clinical signs of FMD and virus were present in their pharynx 28 dpi (so-called carriers).

Animal ID  Route of infection  Carrier status  Virus
VD40  subepidermo-lingual  Carrier  FMDV O UKG34/2001
VD41  subepidermo-lingual  Carrier  FMDV O UKG34/2001
VD56  subepidermo-lingual  Carrier  FMDV O SKR 2000
VD58  subepidermo-lingual  Carrier  FMDV O UKG34/2001
VD34  subepidermo-lingual  no-carrier  FMDV O UKG34/2001
VD35  subepidermo-lingual  no-carrier  FMDV O UKG34/2001
VD44  subepidermo-lingual  no-carrier  FMDV O UKG34/2001
VD45  subepidermo-lingual  no-carrier  FMDV O UKG34/2001
VD48  subepidermo-lingual  no-carrier  FMDV O UKG34/2001
VD49  subepidermo-lingual  no-carrier  FMDV O UKG34/2001
VD36  Direct contact  no-carrier  FMDV O UKG34/2001
VD37  Direct contact  no-carrier  FMDV O UKG34/2001
VD42  Direct contact  no-carrier  FMDV O UKG34/2001
VD43  Direct contact  no-carrier  FMDV O UKG34/2001
VD46  Direct contact  no-carrier  FMDV O UKG34/2001
VD47  Direct contact  no-carrier  FMDV O UKG34/2001
VD50  Direct contact  no-carrier  FMDV O UKG34/2001
VD57  subepidermo-lingual  Non-carrier  FMDV O SKR 2000
VD81  subepidermo-lingual  Non-carrier  FMDV O SKR 2000
VD62  subepidermo-lingual  Non-carrier  FMDV O SKR 2000
VD59  Direct contact  Non-carrier  FMDV O SKR 2000
VD60  Direct contact  Non-carrier  FMDV O SKR 2000
VD83  Direct contact  Non-carrier  FMDV O SKR 2000
VD64  Direct contact  Non-carrier  FMDV O SKR 2000
VD95  Direct contact  Non-carrier  FMDV O SKR 2000

Discussion
Many recent studies indicate that immuno-suppressive cytokines molecule including IL-10 which initiates T-cell inactivation during viral infection and, consequently, viral persistence. Our data suggest that cytokine IL-10 response has impact on FMDV infection outcome in cattle. Further study is required to clarify whether IL-10 is the only member of this cytokine family that could influence the outcome of FMDV infection.

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Reference