**INTRODUCTION:**

Foot and Mouth disease (FMD) is caused by Foot and Mouth Disease Virus (FMDV) which affects cattle, ovines, pigs and several wild species and it causes important economic loss. When an outbreak occurs control measures should be applied which include, besides the sacrifice of the infected animals, a ring vaccination of the surrounded cattle, with a vaccine capable of protecting animals against the disease in a short period of time. Few emergency vaccines have successfully induced complete protection in a short period of time post vaccination and it has been demonstrated that there is no correlation between the neutralizing antibodies induced by the vaccination and the protection, so proposing a possible protective role, on a short term basis, of other components of the immune response, besides the humoral immunity.

It is well established that the adjuvants play an important role on vaccines. In the present work we have studied the protection and the type of immune response induced by inactivated virus vaccines and immunomodulators in a murine model, at 4 and 7 days post vaccination (dpv). The kinetics which induce better protection levels in this model was studied in bovines.

**MATERIALS AND METHODS:**

Vaccines used in this work were FMDV 802 and FMDV 206, both inactivated. Both inactivated vaccines were formulated with 20ug FMDV/dose. Vaccines formulated with 20ug FMDV/dose were prepared and evaluated ex vivo in vitro secretion by peripheral blood mononuclear cells (PBMC), isolated from vaccinated mice. In vitro assay was done 4 and 7 days post vaccination (dpv).

**RESULTS:**

Fig. 1: protection levels induced in BALB/c mice vaccinated with different concentrations of inactivated FMDV in PBS. 8 mice per group were inoculated and challenged at A) 4 and B) 7 dpv. The dose of inactivated virus selected was the one that induced a low protection level, in order to be able to differentiate the effect of the adjuvants used in this work.

**PROTECTION INDUCED BY VACCINATION IN THE MURINE MODEL:**

Fig. 2: protection levels in BALB/c mice (protected) challenged animals x 100, at A) 4 and B) 7 dpv. The bars represent the mean of two experiments with 8 animals per group, except on groups 802 and 206, in which n = 4. A N group (2 control vaccinated and 2 non-vaccinated control animals). 4 dpv in vaccinated mice. O.D. of each sera, (1/10 dilution) is shown. Black line = mean O.D. of each group. Blue line = cutting edge. (*p<0.05 when compared with FMDV vaccinated animals).

**THE PROTECTION INDUCED BY VACCINATION SEEMS TO BE T-INDEPENDENT:**

**DISCUSSION:**

- In the murine model vaccines 802-FMDV and 206-FMDV increase the protection levels compared to FMDV group, at 4 and 7 dpv in the absence of SN Ab that could be considered as protective. Protection was related to total specific Ab. In cattle the vaccine protected all animals except the one that was inoculated at early time post vaccination, thus indicating a possible stimulation of marginal zone B lymphocytes and/or B1.
- In mice, protection and humoral immune response were T-independent. IgG1, IgG2a and IgG2b levels were induced at early time post vaccination, thus indicating a possible stimulation of marginal zone B lymphocytes and/or B1.
- In the murine model it was demonstrated that MO are indispensable for protection. On the other hand NK cells are not essential though they were modulated by vaccination and antibodies osoporization and virus-Ab complex phagocytosis by MO, play an important role in protection. In cattle, MO and IFN levels were induced by 802-FMDV, thus indicating that MO could play a key role in the immune response induced by this vaccine.
- Taken together, these results could explain why vaccines which induce a low, non neutralizing Ab are capable of protecting animals from viral challenge, at early times post vaccination.