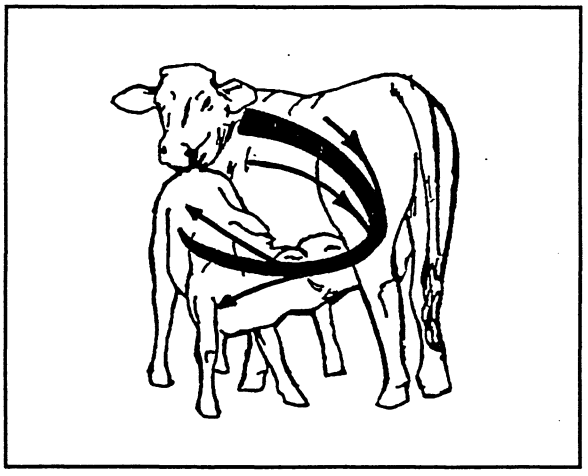

Figure 3. Maternal antibodies are transferred from the cow to the newborn calf via colostrum.

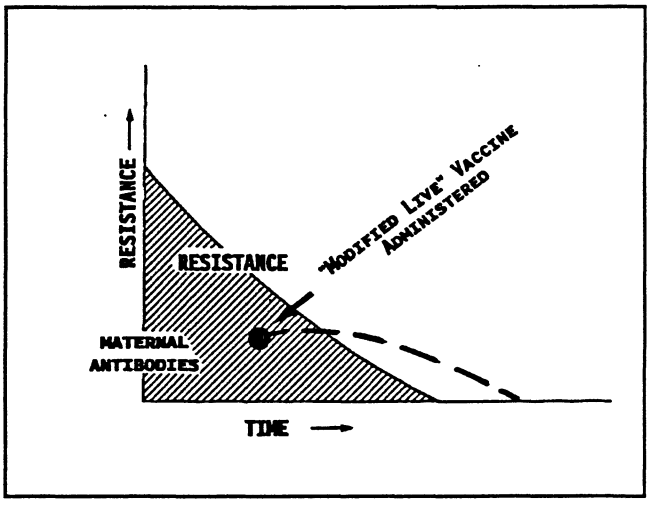

Figure 4. Response to modified live vaccines (includes both replicating-ML and non-repricating-ML vaccines) in the presence of maternal antibodies.

during the first 24 hours of life, it is important that the newborn calf receives colostrum immediately after birth. Excellent, non-specific resistance can be provided by properly feeding pregnant cows; adequate nutrition enhances the production of non-specific antibodies as well as the health and vigor of the calves at birth.

However, in addition to receiving adequate nutrition, a cow can develop specific resistance against specific infectious diseases **only** by vaccination against the disease or by surviving the disease itself. The cow produces antibodies against the disease and passes these antibodies to the calf through the colostrum.

Maternal antibodies passed to the calf via the colostrum are expected to be present in effective amounts as long as 4 to 5 months after birth. The length of time the maternal antibody remains in the calf also depends upon the amount produced by the cow and the amount absorbed through the calf's gut.

WHEN MATERNAL ANTIBODIES ARE PRESENT

In the presence of high levels of maternal antibodies, the MLV Vaccines (Replicating-MLV and Non-Replicating-MLV) can be neutralized in the body. They will not "trigger" the memory cells nor will they stimulate the production of antibodies; hence, we see no rise in resistance (Figure 4).

When maternal antibodies are present, the first dose of the **inactivated non-replicating** vaccines will trigger the memory cells. A second dose, given later, would stimulate a high level of antibodies and would be referred to as the "protective" dose (Figure 5).

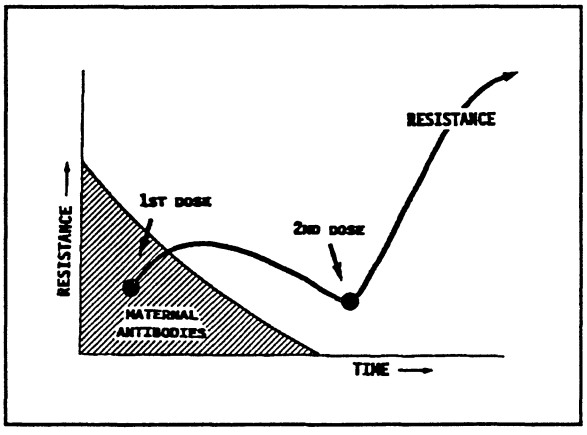

Figure 5. Response to "inactivated" vaccines in the presence of maternal antibodies.

However, in the presence of extremely high levels of maternal antibodies, even the inactivated non-replicating vaccines may be neutralized by the antibodies to the extent that even the memory cells may not be triggered. Thus a second dose at a later date would not be a "protective" dose; it would only serve as a "triggering" dose.

In the presence of maternal antibodies the IBR & PI3 **intranasal** vaccines can multiply in the surface cells of the nose and lungs, triggering the memory cells, and stimulating the production of short-lived, local antibodies in the cells of the upper respiratory tract; hence, short-lived, elevated resistance results (Figure 6).