

Myxoviruses and Their Propagation in the Mammary Gland of Ruminants

by Chas. A. Mitchell*, Oscar Nordland* and R.V.L. Walker**

IN 1941 McLELLAND and Hare (1) and Hirst (2) working independently made the extremely important observation that the virus of influenza agglutinates the erythrocytes of fowl. This laid the groundwork for the technique and extensive use of the haemagglutination method. Others discovered later that the causative agents of Newcastle disease, fowl plague and mumps brought about a similar reaction. Although there are other agents whose products of growth can produce a somewhat similar manifestation, consideration of them can be left out of this communication.

From time to time attempts have been made to classify viruses. The Nomenclature Committee of the Microbiological Conference attempted among other things to establish a nomenclature of these haemagglutinating viruses. This was published in 1955 by Andrews, Bang and Burnet (3) and the four viruses were grouped under the term *Myxovirus*. The one striking feature common to all is that they agglutinate the erythrocytes of fowl. This note is to direct attention to another common property.

In 1953 Mitchell, Walker and Bannister (4) published the results of attempts to propagate the virus of influenza, Newcastle disease and an unknown agent in the bovine mammary gland. The results suggested that this was possible although no conclusions were drawn. Studies were continued and the results published in other papers (5, 6, 7). This, together with some unpublished work is summarized below.

1. If a small amount of the causative virus of influenza, Newcastle disease

or fowl plague is instilled through the teat canal into the mammary gland of cattle or goats, it propagates and virus in the milk reaches a relatively high titre.

2. Propagation continues for about a week when the titre declines and the virus disappears.

3. No evidence of virus in the blood was found.

4. A day or two after the virus disappears neutralizing antibodies are found in the milk; first in the segment which was infected. These antibodies continue for months perhaps for the life of the animal.

5. The gland cannot be re-infected.

6. If the virus has been inactivated antibody formation is not induced, nor do antibodies form when viruses are instilled which do not propagate in the gland.

7. The viruses of Eastern, Western and Venezuelan encephalomyelitis, vaccinia and poliomyelitis (8) did not propagate in the gland.

8. The viruses to which the gland is susceptible are not related to host range; also if introduced by other routes such as subcutaneous, they fail to infect or localize in the gland.

9. No work was done to determine if the specific antibody present in the milk conferred protection in susceptible animals if given by the oral route.

Myxovirus parotitidis, the causative agent of mumps and the remaining member of the group behaved somewhat differently and for this reason, a few additional details are given.

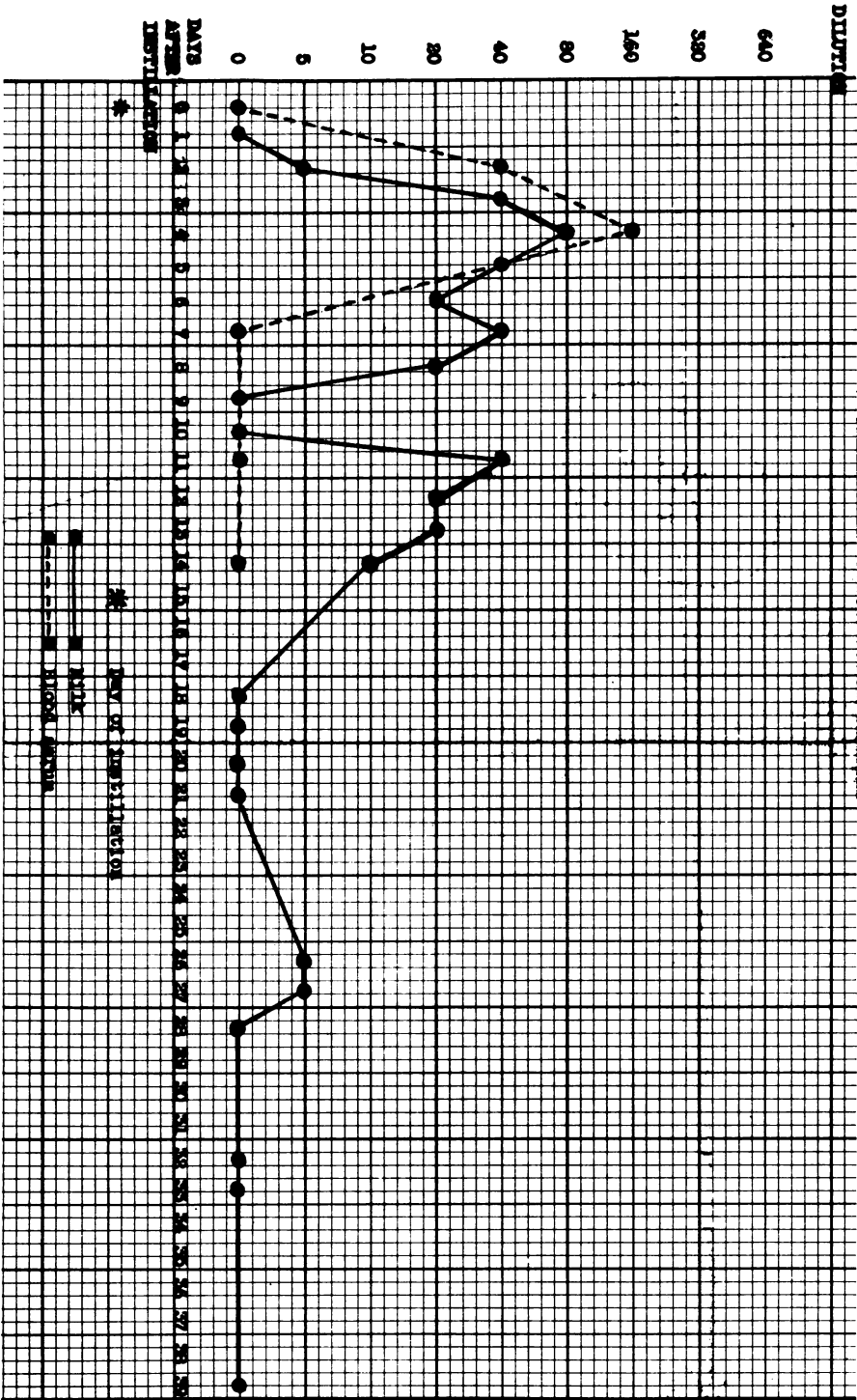
MATERIAL

Through the kindness of Dr. F. P. Nagler, Laboratory of Hygiene, Department of Health and Welfare, we obtained vials containing the Ender's strain of mumps virus which had been

* Gross Ile Experimental Station, Defence Research Board, Department of National Defence.

**Animal Pathology Laboratories, Health of Animals Division, Hull, P.Q.

CHART I
Haemagglutination Titres of Milk and Blood



propagated in chick embryo, the fluids harvested and lyophilized. This material was reconstituted with sterile saline solution and used immediately.

Animal and Route

A three-year old Jersey cow was chosen. It had been in lactation for ten months and was giving about 28 ounces of milk from each quarter. After removing all milk, 8.0 ml. of the reconstituted virus was instilled into the lactiferous sinus of the left front quarter through the teat canal, using for the purpose a teat tube attached to a hypodermic syringe.

Except on two occasions when developing chick embryos were used, determination of the presence of virus was made by the haemagglutination test. Samples of milk and blood taken before instillation were negative. Milk was collected daily for two weeks after instillation and thereafter at intervals until the 33rd day. Blood was also collected at intervals. The results are given in Chart 1.

SUMMARY

The four members of the *Myxovirus*, group, *M. influenza*, *M. multiformes*, *M. pesti galli* and *M. parotitidis* propagate in the mammary gland of cows or goats.

M. parotitidis shows some variation from the behaviour of the other three, in that it was found in the blood for a few days, did not reach a high titre in the milk nor disappear permanently from the gland as quickly.

RESUME

Les quatre membres du groupe *Myxovirus*, *M. influenza*, *M. multiformes*, *M. pestis galli* et *M. parotitidis* se propagent dans la glande mammaire de la vache et de la chèvre.

M. parotitidis montre un comportement différent des trois autres par le fait qu'il se retrouve dans le sang durant quelques jours, qu'il ne montre pas un titre élevé dans le lait et qu'il persiste plus longtemps dans la mammelle.

ACKNOWLEDGEMENT

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COMING EVENTS

JOINT CONFERENCE — MARITIME VETERINARY ASSOCIATION — SACKVILLE, N.B.
JUNE 24 - 26, 1958

10TH ANNUAL CONVENTION — CANADIAN VETERINARY MEDICAL ASSOCIATION
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