PHYSIOLOGY OF THE NEWBORN AND ITS ADAPTATION TO THE ENVIRONMENT INTRODUCTION

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Session 1

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INTRODUCTION

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Most of the preweaning losses of calves and piglets occur at birth or during the first days. Here are two examples reported in France:

1) In Charolais herds, 3.7 % of calves are stillborn, 2 % die during the first two days, and 2.5 % die the following 6 weeks until turning out to grass.

2) In pig herds, 6 % of piglets are stillborn, 8 % die during the first week and 3 % later up to weaning at four weeks.

At delivery, the fetus is required to undergo major changes in its physiology and anatomy in order to adapt to its new environment.

Its survival depends on the immediate establishment of efficient pulmonary exchange.

In most environments, the newborn is faced with the problem of maintaining its body heat. Feeding becomes intermittent and heavily dependent on the establishment of a close relationship with the mother.

A multitude of environmental stimuli are encountered for the first time. They include the microorganisms, especially those that implant very quickly in the gut. The short period covering the last hours of uterine life and the first hours of extra-uterine life is very critical.

Perinatal losses can be reduced in two ways:

The first way is to insure the newborn the best vitality in order to overcome all constraints of the new environment. This is achieved by dystocia.

1) providing the mother with good hygiene and adequate nutrition in late pregnancy;

2) minimizing fœtal suffering during delivery, for instance by avoiding the risks of dystocia in cattle.

The second way is to provide the newborn with a good environment, for instance by limiting cold stress and preventing the implantation of pathogen bacteria in gut. Colostrum is of primary importance as a source of antibodies and energy. A Seminar on its relation to immunity and survival in the newborn ruminant and pig was organized 4 1/2 years ago by the Commission of European Communities at Thiverval-Grignon.

These rules of hygiene and management of the mother and the newborn are well established. However they are still not always put into practice.

The purpose of the first session is to outline the main aspects of newborn physiology and its adaptation to the aerial environment. They include mother-newborn relationships, transmission of passive immunity, implantation of gut flora, development of digestive functions, energy metabolism and thermoregulation. Unfortunately, the adaptation of endocrine functions will not be considered because Dr. Comline from U.K., who was the most appropriate speaker, had commitments on the dates of the Seminar.