



**The Role of IGFs and Leptin in Nutrition-Reproduction Interactions and their Potential Application as Indicators of Nutritional Adequacy and Predictors of Reproductive Performance in Dairy Cattle**

*Dominique Blache*

*Department of Animal Science, The University of Western Australia  
Nedlands 6907, Australia*

The interaction between nutrition and reproductive activity has been described in both wild and farm animals. The lactating cow is one of the very best examples of this interaction. During lactation, the length of time spent in negative energy balance around parturition seems to be an important factor controlling the delay to return to breeding after parturition. The mechanism by which nutrition regulates the reproductive system is not fully understood in lactating dairy cows or indeed in any other situation in ruminants or mammals in general. However, to be effective, a nutritional signal should ultimately act on at least one of the 3 regulatory sites in the reproductive axis – the brain, the pituitary gland and the gonads. Nutrition is likely to involve metabolic signals that could act directly on one of these targets or it could interfere with other regulatory mechanisms such as the feedback by gonadal steroids on gonadotrophin secretion. In this presentation, we will use examples from laboratory rodents and ruminants, and from dairy cattle where they are available, to examine how IGF-1 and leptin, amongst several other blood metabolites and metabolic hormones, could be part of the link between nutrition and reproduction in the postpartum dairy cow. A number of studies have proposed a role for IGF-1 in the control of postpartum anoestrus and the framework of the current hypothesis will be presented. The role of leptin is still not clear for ruminants in general, but especially in cattle, because leptin was only recently discovered (about 6 years ago) and because a reliable radioimmunoassay for bovine leptin only became available since 1999. The possibilities and restrictions of a role for leptin in the control of reproduction by nutrition will be discussed. To conclude, we will examine the use of these two hormones as potential indicators of the adequacy of nutritional status for reproductive function and we will introduce insulin as another potentially important predictor.