ANTIVIRAL ACTION OF INTERFERON IN THE BOVINE SPECIES: STUDY IN VITRO AND IN VIVO

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Awaiting a multipotent antiviral vaccine preparation, perhaps a feasible goal for the future, there is still at the present time, we believe, enough room left for alternative ways to control viral diseases. Given the recent developments of bacterial production of interferon, the cost/benefits ratio of its possible use as antiviral has significantly increased. There is no more objective reason at this time to limit the investigations using interferon exclusively to the field of human health. Indeed , considerable economical interest could reside in an efficient way to control domestic animal viral diseases. We have undertaken the present study to evaluate interferon activity in the bovine species. As enough bovine interferon cannot be obtained for this purpose using our bovine cell system, we decided to use bacterially produced human interferon (Hu-IFNα_2). It is readily available now and has been provided to us by Dr.C.WEISSMANN (Zürich University). This interferon was shown to cross the species barrier, using in vitro cell systems.

We also showed that rotavirus[1] is sensitive to interferon. We also demonstrated that other bovine virus species responsible for economically important cattle diseases like Bovine Rhinotracheitis (Bovine Herpes virus I) or pseudorabies (Suid Herpes virus I) are inhibited by interferon[2]. As Bovine enteric coronavirus was associated with important economical losses, we decided to screen also in vitro for its susceptibility to interferon despite the fact that the HRT cells in which the cytopathogenicity of the vi-

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rus is easy to follow express a moderate antiviral effect only under interferon treatment.

As it was shown recently that the administration of α interferon to human volunteers protected them against a respiratory coronavirus challenge[3], we have started in vivo investigations in the bovine species also. Twelve calves were intramuscularly injected with different doses of interferon using a double blind protocole. We have been able to achieve an efficient protection of the animals against an experimental infection with vaccinia virus which causes lesions very easy to follow in a quantitative manner. A total protection can be reached at the higher dose used (10^6 Units/kg)[4]. Nevertheless, individual variation in sensitivity to the treatment was observed. Our experimental system appeared therefore a convenient model to approach the study of the mechanism of action of interferon in vivo we have already been able to follow in a couple of animals the biochemical modifications known to occur in cell culture under the action of interferon.

Moreover, we have obtained strong evidence for a role of endogenous interferon in the control of pathogenicity of rotaviruses in newborn calves.

We may therefore predict on the basis of our study, the first evidence ever for the efficiency of interferon in a viral infection in the bovine species, a broad perspective for its use in the veterinary field, at least in situations where proper vaccination has not been used.

References

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