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# AN PARAIMMUNITY INDUCER

# FOR THE CONTROL OF THE CONDITIONED INFECTIONS IN RABBITS

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## INTRODUCTION

In the intensive breedings of rabbits, perinatal and weaning infections are generally conditioned by a number of factors such as microclimate, environment, feeding and breeding systems (2).
Such infections result from interactions among many opportunistic agents as viruses, bacteria, protozoa, mycetes and yeasts. Yet, the adopted prophylaxis with specific vaccines has been often unsatisfactory, owing both to the large number of opportunistic and non-microbial agents involved.
The research aimed at eliminating the main stress factors and in the meantime at strengthening the non-specific natural defences of the animals, according to other aa. (6, 7, 8) in order to stop infections.
A biological inducer of non-specific immunity (POLI-IF) previously employed in cattle (4) and swine (3) has been used.

## MATERIALS AND TECHNIQUES

1. The biological inducer of paraimmunity (POLI-IF): is an emulsion in equal parts of:
   a) Inactivated and concentrated Newcastle virus, its titre being $10^{10}$ $EID_{50}$/ml;
   b) Endotoxin of E. coli, extracted from a suspension of $3 \times 10^{9}$ bacteria per ml;
   c) Incomplete Freund's adjuvant.
2. Laboratory animals and injection points:
   a) Albino mice, Swiss, of 20 to 25 g. weight;
   b) Albino guinea-pigs, Pirbright strain, of 400 to 500 g.;

c) Rabbits weighing nearly 2.0 Kgs, aged 75 days, of New Zealand breed.

The rodents used for safety tests have been given 2.0 ml/kg 1.w. POLI-IF s.c. and i.m.

In experimental efficacy tests the rabbits have been given 1.0 ml POLI-IF s.c./2.5 kg 1.w.

3. Techniques

a) The efficacy of POLI-IF has been evaluated indirectly and the following steps have been carried out;

-Daily clinical examination prior to and after injection for 1 week, respectively.

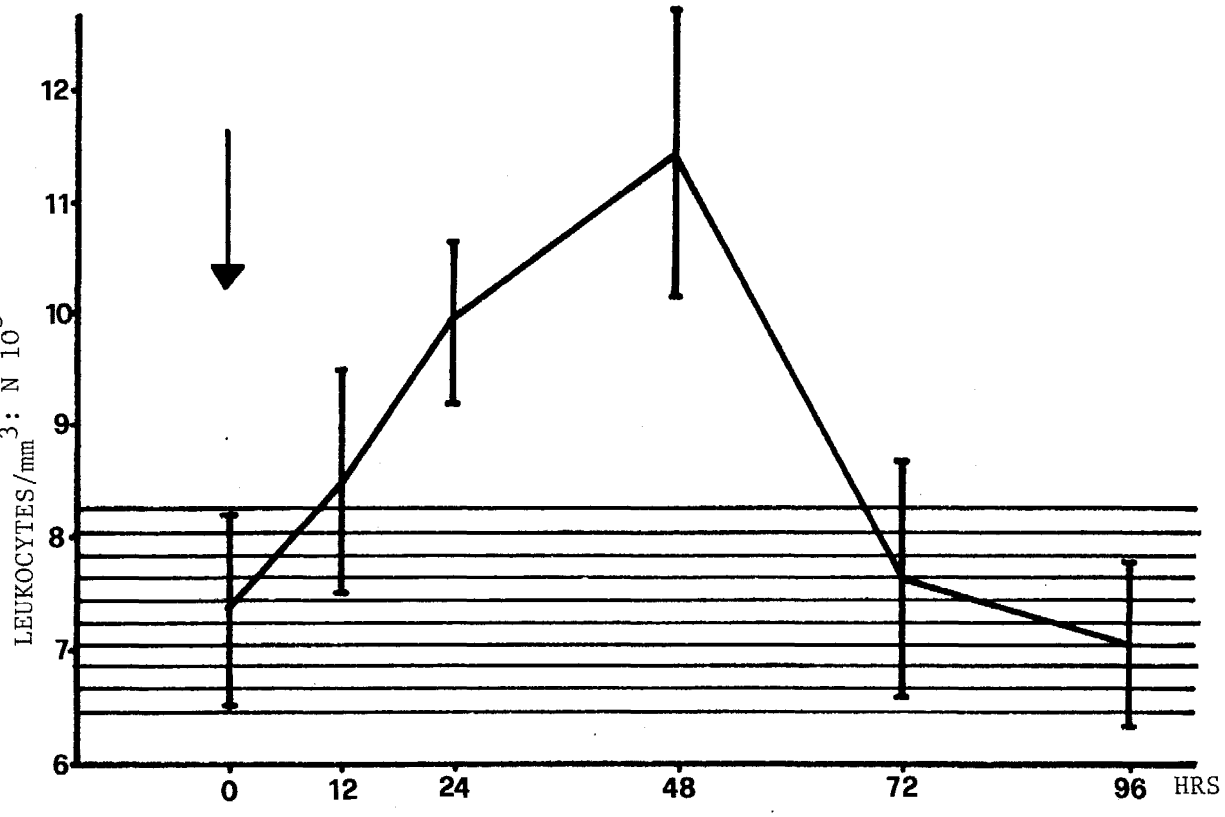


FIG. 1: Increase in circulating leukocites in rabbits following treatment whith POLI-IF.

Before injection and after 12-24-48-72-96 hrs blood specimens have been drawn and the following parameters evaluated:

-Hemocytometric examination for the determination of the circulating leukocytes;

-Determination of the circulating interferons rate using the vaccinia virus, grown on rabbit renal cells, line $RK_{13}$, as surveyor.

-Determination of the bactericidal activity of the serum, using

E. coli O149:K88ac:H19, Abbotstown strain, phase S as surveyor, according Dorn's method (1).

b) The practical efficacy of the POLI-IF has been controlled by using the product in a problem-herd, on treated and untreated rabbits according to the following:

-Daily clinical examination of animals;

-Drawing of pathological specimens from animals with acute conditioned syndromes or from dead animals, in order to isolate the opportunistic agents present.

-Mathematical and statistical processing of data as to ascertain the importance of the results obtained.

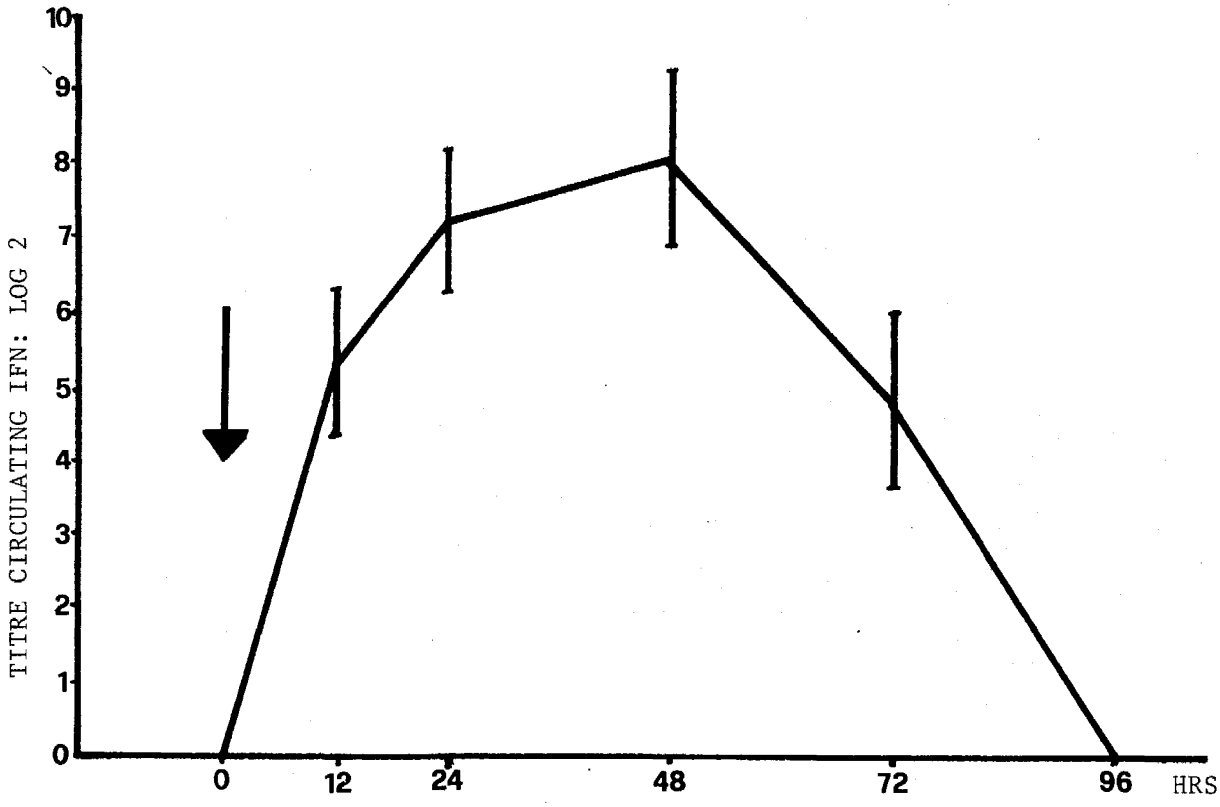


FIG. 2: Increase in circulating IFN in rabbits following treatment with POLI-IF.

## RESULTS

Both in field and experimental trials the presence of a persistent granuloma at the injection spot has been observed, followed by a mild and transient rise in temperature in some treated animals.

-The hematological examinations have not proved remarkable modifications of the elements of the red series and of the hemoglobin rate, while the

rabbits treated with POLI-IF showed a marked increase in leukocytes. This can be seen in Fig. 1 where both mean values and standard deviations before and after POLI-IF injection are present. The series of horizontal lines shows the values of the untreated controls. An analogous increase in circulating leukocytes had been proved after treating piglets and calves with POLI-IF (3-4); in rabbits the peak is reached with a slight delay in comparison with other species.

-The circulating interferons can be seen 12 hrs after POLI-IF injection and their rate shows a marked increase between 24 and 48 hrs. The disappearance of the IFN takes place 96 hrs after the inoculation of the

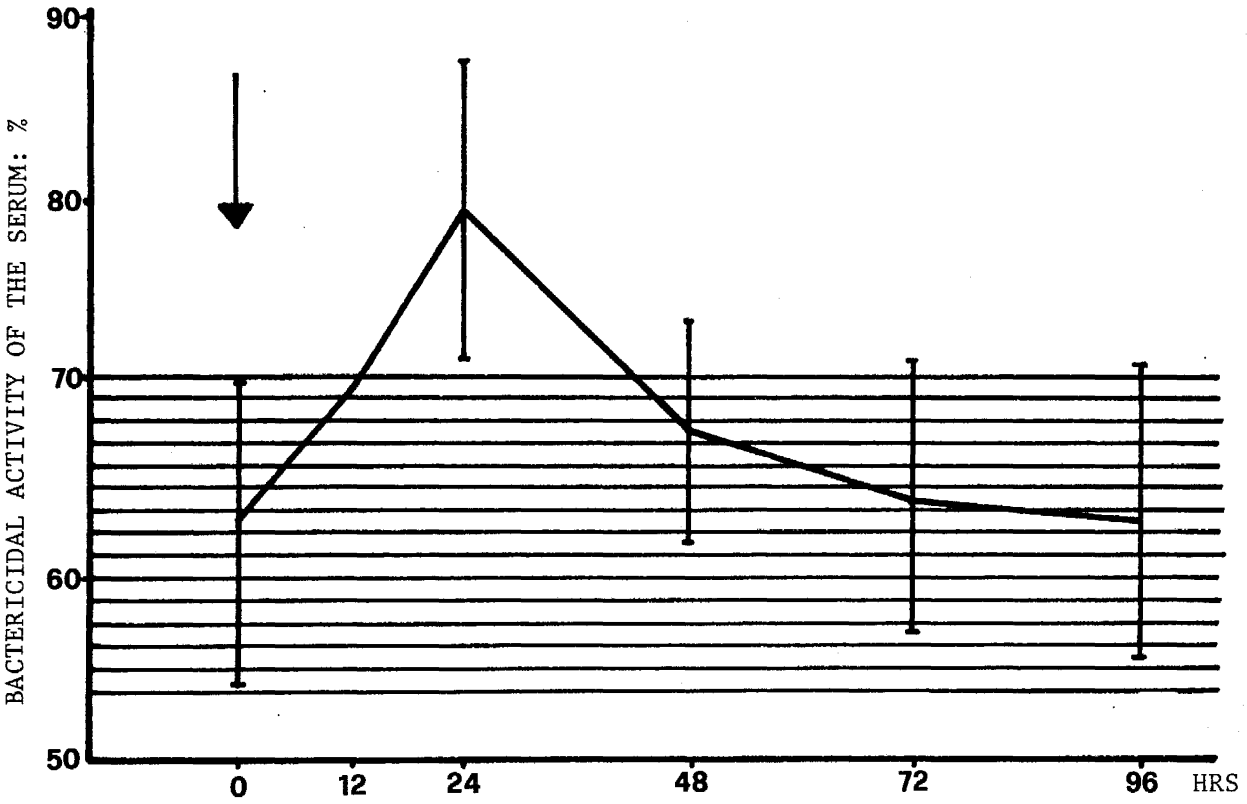


FIG. 3: Increase in the bactericidal activity of the serum following treatment with POLI-IF.

inducer. In Fig. 2 the mean values seen and the standard deviations are reported. The highest titres ascertained have reached nearly 500 U/ml.

-The bactericidal activity of the serum shows an increase that reaches its peak 24 hrs post injection of POLI-IF, with mean values from 60 to 80 per cent. In Fig. 3 the mean values and the standard deviations are reported. Worth noticing that the peak at 24 hrs is statistically significant for P 0.01.

-The field application of POLI-IF in a problem-herd has provided satisfactory results as far as conditioned diseases occurrence, mortality and discarded animals are concerned (Table 1). In fact, the consistent decrease in conditioned infections and mortality rate are highly significant for P 0.01.

In the problem-herd the conditioned syndromes observed mostly involved the gastroenteric tract while the agents seen were E. coli and Clostridia.

Table 1: POLI-IF field trial on weaning rabbits of a problem herd.

| | Treated with POLI-IF | | Untreated controls | |
|---|---|---|---|---|
| Weaning animals | 836 | | 778 | |
| Affected with conditioned syndromes | 111 | 13.3% | 441 | 56.7% |
| Dead animals | 43 | 5.1% | 152 | 19.5% |
| Discarded | 16 | 1.9% | 37 | 4.8% |

## CONCLUSIONS

The interferon inducers show their activity even in rabbits. A biological inducer such as the POLI-IF seems to have a great activity: it recalls high rates of circulating IFN, mobilizes the leukocytary system, increases the ABS of the serum.

Even if the above reported tests do not allow to clarify how the activity of the inducer develops, the practical results suggest the feasibility of a control of the conditioned infections in rabbits by resorting to the POLI-IF.

The vaccines prepared with the single infecting agents do not exert any action on the vast scale of organisms which develop their pathogenic activity in an impredictable way. It seems obvious to keep on with experimental trials in order to determine further application fields and limits of the inducers of non-specific inducers tested up to now.

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## ABSTRACT

Neonatal and weaning infections in rabbits intensive breeding are often conditioned. They result from interaction among microbial organisms (viruses,bacteria,protozoa,mycetes and yeasts) animals,eviroment, feeding and breeding system.
Owing to the above their prophylaxis with specific vaccines has been often unsatisfactory.
The research aimed at singling out some interferon biological inducers capable of strengthening the non-specific defence of animals.
POLI-IF,consisting of NDV,endotoxins of E.coli and incomplete Freund's adjùvant has resulted particulary effective. It has induced high levels of interferon in peripheral blood, increased the circulating leukocytes and increased the bactericidal activity in blood serum.
Field trials in problem-herds have shown that POLI-IF injiection lowers losses from conditioned infections,reduces the number of affected animals,the level of mortality and the incidence of discarded animals.



## RIASSUNTO

### INDUTTORE DI PARAIMMUNITA' NEL CONTROLLO DELLE INFEZIONI CONDIZIONATE DEL CONIGLIO.

Le infezioni neonatali e quelle del periodo dello svezzamento,negli allevamenti intensivi del coniglio,sono quasi costantemente condizionate. Esse derivano da complesse interazioni tra agenti microbici (batteri,virus,protozoi,funghi e lieviti) animali,ambiente, alimentazione,tecniche d'allevamento.
Per queste ragioni la profilassi di infezioni con vaccini specifici è risultata spesso deludente.
Scopo delle nostre ricerche è stato quello di saggiare un induttore biologico di paraimmunità,che aveva fornito risultati promettenti nei vitelli e nei suini,per il controllo delle infezioni condizionate dei conigli.
Il prodotto (POLI-IF),costituito da virus di Newcastle,endotossine di E.coli, ed adiuvante incompleto di Freund, ha dimostrato notevole efficacia. Esso è in grado di indurre tassi elevati di IFN nel sangue periferico,aumenta il numero di leucociti circolanti ed incrementa l'attività battericida del siero.
Le prove in campo effettuate in allevamento-problema hanno dimostrato che l'inoculazione di POLI-IF abbassa notevolmente le perdite da infezioni condizionate: vengono ridotte in maniera statisticamente significativa la percentuale dei colpiti,l'incidenza di mortalità e degli scarti di allevamento.

BIBLIOGRAFIA

1) Dorn W.,Melhorn G.,Klemm C.(1980): Untersuchungen zur Serumbakterizidie beim Kalb.
Exper. Vet. Med. 34,635-660.

2) Galassi D.,Pelliccioni A.,(1978):Infezioni condizionate perinatali nell'allevamento intensivo dei conigli:
Coniglicoltura 15,n.10,23-26.

3) Galassi D.,Pelliccioni A.,Galassi P.,Amadori M.,Urbani G.,Semprini P., (1983): Induttori d'Interferoni per la profilassi delle infezioni condizionate dei suinetti.
Selez.Vet. 24,1277-1287.

4) Galassi D.,Pelliccioni A.,Monaldi Marinozzi M.V. (1980):Controllo delle infezioni condizionate dei vitelli mediante induttori di paraimmunità.
CNR-P.F. IDAOA-Seminario Patologia prenatale e neonatale degli animali. Torino 19.10.1979-Ediz.Tip.Lit. E.Bono-Torino pagg.57-69.

5) Galassi D.,Amadori M.,Urbani G.,Semprini P.,Paganico G.,Guerrieri O., Galassi P.,Belfiore P.,Antonucci D.,:Attività battericida nel siero di suinetti trattati con induttore biologico di paraimmunità.
Atti 37° Convegno SISVET (in corso di stampa).

6) Mayr A.(1982a):Wissenschaftliche Entwicklung auf dem Gebiete der medikamentellen Steigerung der nichtantigenspezifichen,korpseigenen Abwer.
Tierärztl. Praxis 10,451-463.

7) Mayr A.(1982b):Paramunität und Paramunisierung.
Zbl.Vet.Med. B 29,5-23.

8) Mayr A.,Mayr-Bibrack B.(1983):Grundlagen der unspezifischen und spezifischen Abwehr gegen Infektionskrankeiten.
Berl.Münch.Tierärztl.Wschr.96,157-162.

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