COMMISSION OF THE EUROPEAN COMMUNITIES

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Report to Council and Parliament under
Article 2 of Council Decision (72/446/CEE)
of 28th December 1972 adopting a common
research programme in the field of Classical
and African Swine Fever

(presented by the Commission)

COMMISSION OF THE EUROPEAN COMMUNITIES
Directorate General for Agriculture
Coordination of Agricultural Research

Report to Council and Parliament under Article 2 of Council Decision N° (72/446/CEE) of 28th December 1972 adopting a common research programme in the field of Classical and African Swine Fever

INTRODUCTION

The first common programme of research on Classical (Hog Cholera) and African Swine fever covered the period 1964-1971. Its basic objectives were :

- the physical and chemical properties of the virus, the influence of physical and chemical factors on its stability, the physical and chemical properties of the specific viral proteins, and the structural and serological relations with other viruses for purposes of classification;
- the biological properties (1) of the virus with special reference to cellular systems capable of ensuring viral growth, methods of assaying infection, serological methods of identification, viral multiplication (1) of interferon and the relation between the properties of the virus and its virulence to the animal;
- the setting up of differential diagnosis between Classical (Hog Cholera) and African Swine fever from the different techniques used for the clinical diagnosis and the macroscopic examination of the lesions, the histo-pathological analysis and the virological and serological diagnosis.

(1) in vitro

The results of this programme were published in October 1971 under the auspices of the General Directorate for Agriculture under the title : "Properties of the virus of Classical swine fever and differential diagnosis of Classical and African Swine fevers".

The general approach to the diagnosis of the Classical (Hog Cholera) swine fever included field examinations which could identify a suspected outbreak pending laboratory confirmation.

For the African swine fever the approach was the same. However,in order to avoid confusion at the diagnostic level, a distinction was made between countries where both diseases existed and those where only Classical (Hog Cholera) swine fever was present. In both cases, but more particularly in the latter, laboratory diagnosis was widely used to obtain a reliable confirmation of the presence or the absence of African Swine fever. In fact, at the beginning of the programme, the typical lesions resulting for the African swine fever disease were frequently observed; but, subsequently, numerous atypical lesions akin to the Classical (Hog Cholera) swine fever appeared. Hence differential diagnosis based on anatomical examinations, proved unreliable. During the Seminar, organised by the Commission in Lisbon in 1971, it was suggested that subsequent efforts should concentrate on improving laboratory diagnosis.

The work initiated in the first programme was continued in the second programme (1973-1976) which is the subject of this report, and which was implemented following the Council approval in 1972 of the Commission proposed programme of research on two enzootic viruses of the pig, the Classical and African swine fever viruses (2). The content of the programme was selected to meet specific

objectives of the common agricultural policy and in particular to minimize the economic losses caused by these diseases and to promote the trade objective of the common agricultural policy (3).

RESEARCH ACTIVITIES

a) General

The task to carry out research on Swine Fever Viruses was given to seventeen laboratories of different research institutes (Annex I), of which fifteen dealt with Classical swine fever and five (in Spain and Portugal and subsequently the United Kingdom France and Denmark) with African swine fever. Several laboratories, (in the United Kingdom, Denmark and Ireland) joined during the second phase of the programme (4).

A new approach in the coordination of research activities seemed necessary to overcome certain difficulties encountered in the first phase of the programme. To enable a closer collaboration between the participating laboratories, the Commission invited scientists of international standing to assist it by giving advice on the scientific content and progress of the programme.

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(2) Decision (72/446/CEE) of 28 December 1972, O.J. N° 298/50

(3) The main economic losses in the Community were been caused by the Classical swine fever virus. The African swine fever virus is present in Spain and Portugal, and represents a constant threat to the Community.

(4) Luxembourg does not have a national agricultural research service. It works directly in cooperation with other Member States.

Seminars and Workshops were organised by laboratories in the Member States at the invitation of the Commission and after discussion within the programme working groups. The host laboratory made the necessary local arrangements, circulated papers and assisted the Commission in the choice of speakers.

Exchange of scientists between laboratories and visits of scientists for training or information, were arranged on an ad-hoc basis. Such exchanges and visits were essential to ensure full cooperation between laboratories and adequate access to information. A report was required from each scientist benefitting from these grants.

The proceedings of seminars and workshops have been published in conformity with the Commission's publication policy. Annex III provides the list of publications resulting from the research activities.

b) Main scientific objectives

The main scientific objectives of the programme were to isolate the African Swine Fever Virus (ASFV) and Classical Swine Fever Virus (CSFV) and to isolate and characterize their protein and nucleic acids. The availability of antigenic fractions of these viruses was to lead to the development of diagnostic procedures for quick and accurate detection of the virus. The immune response of the pig would be analysed and vaccines tested. In addition the Commission gave another dimension to the programme, conceiving it as a tool for promoting collaboration between scientists of different countries of the Community, and for making sure that the programme would result in practical achievements utilized directly for the benefit of farmers.

c) Exchange of scientists

Visits to laboratories by the Commission's scientific adviser and the exchange of techniques by means of exchange of personnel shortened the time required for standardization of techniques in all the laboratories working on the same subject, and for the evaluation of results. Work on ASFV was carried out in security laboratories, and was restricted to the Iberian laboratories (Madrid and Lisbon) and Pirbright laboratory. It was imperative that scientists from countries immune to ASFV should work in protected laboratories (5). The travel expenses of scientists were paid by the Commission.

d) Exchange of materials

The programme was also successful in developing inter-laboratory relationships, resulting in the transfer of virus samples from one laboratory to others (with the techniques necessary for purification and isolation of the virus as well as for its analysis). Exchange of virus strains and cell-lines between the different laboratories was essential to the development of the programme.

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(5) To overcome the difficulties in developing the research on ASFV which was carried out in confined laboratories and therefore where exchange of materials was not possible and exchange of scientists was not easy, a scientific task group which included experts in iridovirus research, in electron microscopy, in biochemistry on molecular virology and in virology and cell biology was convened in the Madrid Institute working on ASFV.

e) Seminars and Workshops

Discussions with scientists in different laboratories indicated considerable interest in collaboration among scientists working in the same field of research. Certain laboratories had developed techniques which could be very useful as standard procedures. For this reason, emphasis was given to organising workshops and seminars to enable dissemination of information.

All the workshops took place in 1975. Seminars were held on an annual basis, one per year. They were organized in order to bring together scientists of each participating laboratory, as well as scientists from third countries. The seminars included oral presentations of research results and discussions of current results and future needs.

The participants were divided into several discussion groups. Their proposals and conclusions were brought before the plenary meeting which adopted final suggestions for presentation to the Commission services and the Standing Committee on Agricultural Research (CPRA) (6). The list of seminars and workshops organised is attached in Annex II.

f) Harmonization of veterinary legislation

Closer co-operation with the Commission's services responsible for agricultural legislation in veterinary matters soon appeared necessary. Scientists, especially those involved in the epidemiology of swine fever virus and the appearance and disappearance of epidemics, felt that the legislators could and should benefit from the scientific knowledge accumulated in the field during many years.

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(6) Council Regulation N° (EEC) 1728/74 of 27 June 1974, O.J. N° 182/1.

As a result, veterinary legislation experts participated in the seminars and workshops which dealt with epidemiology and eradication of swine fever viruses.

In addition, a special Committee was established, including several senior scientists and members of the veterinary legislation services, to discuss speicific policy measures for eradication of swine fever diseases. Also, a survey was carried out on "Studies on the epidemiology and economics of swine fever eradication in the EEC". This study was financed by the research programme on swine fever viruses.

g) Finance

A total of 2.723,003 u.a. was allocated by the Council to finance the programme, of which 2.450.503 u.a. for research activities and 272.500 u.a. for co-ordinated activities. The research activities component corresponded to 50 % of the total cost, the other 50 % being provided by the participating institutes. The co-ordinated activities were financed by the Community in full. At the end of the programme, approximately 80 % of the original credit allocation was spent. The unused difference reflects partly strict management practices by the Commission, and partly the fact that one of the major contractors (l'INIA PORTUGAL) could not be implemented, due to political events in Portugal in the spring of 1975.

Annex VI gives the expenditure figures of the programme.

RESULTS

I. Classical swine fever virus

The isolation of the virus and the analysis of its proteins and Ribonucleic acid (RNA) were achieved. It is now known that one of the viral proteins is the antigen identical to an antigen in Bovine Virus Diarrhoea (BVD). The second protein of classical swine fever is unique to this virus. In order to utilize this knowledge and put it to practical use further work is necessary. The aim is to use the unique protein of CSFV in a radioimmunoassay which will make it possible to detect specific antibodies to that virus in pigs. With the available techniques BVD infection can be detected instead of classical swine fever infection. BVD infection of swine does not cause any deleterious effect, while the antibodies to this virus interfere with the detection of classical swine fever virus infection. The development of a radioimmunoassay to selectively detect antibodies to classical swine fever virus will make possible the early diagnosis of virus infection in young animals and breeding sows.

The programm provided useful information on the nature of vaccine strains available as well as on the conditions for improved vaccination with these vaccine virus strains. In addition, special attention was given to the immune system of the pig, which differs significantly from that of other animals. New information on the epidemiology of this virus infection was obtained. Finally, many new areas of research on the genetics of this virus, the viral nucleic acid and proteins as well as on the immune response in the young animal were opened as a result of the programme.

II. African swine fever virus

Though only few laboratories were engaged in research in this field, significant developments have occurred during the last four years.

The purification of ASFV was achieved and led to the analysis of the viral Desoxy ribonucleid acid (DNA) and structural proteins. Initial information on the mode of virus replication was obtained. Some of the viral antigens were isolated and partially identified. Many fields of research were opened as a result of this activity including a better understanding of the epidemiology of this virus disease which threatens to spread from the Iberian peninsula.

CONCLUSIONS

The general conclusion to be drawn is that this programme has provided some basic knowledge on the two swine fever viruses and that it has opened the way to practical future achievements in the fields of diagnostic procedures and in the development of better field control measures.

More specifically, the programme has demonstrated that :

- although reliable data is still sparse, a view seems to emerge that a cycle of low virulence virus infection can be established in breeding herds. The conditions in which this occurs cannot be fully defined until further evidence on the characteristics of herds infected in this way is obtained from field testing activities now in progress. It is suggested that large self contained herds producing their own replacements and medium sized herds in areas with dense pig populations, where there are regular introductions

of fresh breeding stock, and movements of piglets, are most at risk of developing such a cycle. The situation in these herds could be likened to a fire which is regularly receiving fresh fuel to keep it burning. The exact mechanism of transmission in these herds is not yet clear, but probably dependent on contact between piglets carrying the virus, and newly entered gilts or young sows.

Detailed analysis of the data from affected herds and comparisons with the characteristics of unaffected herds and areas is almost certain to reveal the key factors that are responsible for the development of the carrier herd cycle. The prevalence of such herd infections appears low (5%) from work in the most frequently affected districts of Lower Saxony, but the proportion of pigs showing serological evidence of infection within affected herds is high (40%). Findings in similar work in France have revealed positive serological reactions in 46% of a small number of sows in suspect herds with reproductive problems. This evidence, added to observations on the small numbers of piglets in affected litters that are capable of spreading the virus, as well as the timing of infection in pregnancy necessary to produce this phenomenon, suggest that the proportion of infective piglets produced in an affected herd must be small.

Although reliable field evidence is even more sparse and virological evidence on the stability of swine fever virus strains is somewhat contradictory, it does appear that virus from carrier pigs can produce the classical form of clinical swine fever. However, the development of this overt disease in a herd may take several months, which suggests that the acquisition of normal virulence depends on successive passages in a number of susceptible pigs in the herd.

- For the reasons outlined it seems unlikely that vaccination can overcome the carrier cycle in breeding herds. It should appreciably reduce the risk of this phenomenon developing but, unfortunately, it also reduces the possibilities of detecting the presence of carrier infection by serological tests.
- The potential for spread of swine fever by direct contact is high because of the rapid turnover in pig herds, intensity of production systems, density of populations and complexity of marketing systems. However, it has been shown that if the chain of contacts can be followed quickly and thoroughly it is possible to contain the infection before large numbers of herds are involved. Identification of pigs and registration of movements are, therefore, the first priority in a prevention programme so that when control becomes necessary quarantine and other measures can have maximum effect.
- Information on the risk of spread by indirect contact is rather contradictory. The virus appears quite resistent but it is generally accepted that the risk from surviving virus in the environment is fairly easily eliminated by good hygiene, management and readily acceptable official controls.
- The problem of swill varies with national food habits which determine the possibilities of uncooked pork gaining entry to pig feed. Experience indicates that the risks of introducing swine fever from heavily infected countries is such that such importations are hard to justify. However, this risk can be minimised by effective control over the cooking of swill to be fed to pigs.

Annex IV provides schematic information on the scientific problems existing at the beginning of the programme.

Annex V provides information on the different subjects dealt with within the programme and the results achieved.

ANNEX I

LIST OF PARTICIPATING INSTITUTES IN THE COMMON PROGRAMME ON CLASSICAL AND AFRICAN SWINE FEVER

SUBJECT	INSTITUTE	TITLE OF THE PROJECT
Classical Swine Fever Virus (C.S.F.V.)	Bundesforschungsanstalt für Viruskrankheiten der Tiere - TÜBINGEN (Fed. Rep. of Germany)	- Organization of C.S.F.V.
	Institut für Virologie der Tierärztlichen Hochschule - Hannover (Fed. Rep. of Germany)	- Organization of C.S.F.V.
		- Pathogenesis of subclinical Hog Colera
	Institut National de Recherches Vétérinaires - UCCLE (Belgium)	- Studies on the properties of the virus
		- Studies on Virus vacine.
	State Veterinary Institute for Virus research - LINDHOLM-KALVEHAVE (Denmark)	- Studies on the "Common Antigens" of swine fever and BVD viruses.
		- CSF vaccine
		- Diagnosis of C.S.F.V.
		- Pathogenis of C.S.F.V.
	Laboratoire Central de Recherches Vétérinaires - MAISONS ALFORT (France)	- Studies on C.S.F.V.
		- Classical Swine fever vaccine.
	Laboratoire de Pathologie Porcine, Station de Recherches de Virologie et d'Immunologie - THIVERVAL-GRIGNON (France)	- Studies on C.S.F.V.
		- Antibodies response to C.S.F.V.
		- Study of the immunoglobulins.
		- Study of immunogenicity.

SUBJECT	INSTITUTE	TITLE OF THE PROJECT
	Veterinary Research Laboratory, ABBOTSTOWN-CASTLENOCK Co Dublin (Ireland)	- Serology of Bovine virus diarrhoea
	Instituto Zooprofilattico Sperimentale della Lombardia e dell'Emila - BRESCIA (Italy)	- Studies on C.S.F.V.
	Instituto Zooprofilattico Sperimentale dell' Abruzzo, TERAMO (Italy)	
	Instituto Zooprofilattico Sperimentale dell' Umbria e delle Marche - PERUGIA (Italy)	
	Centraal Diergeneeskundig Institut, Afdeling Virologie - LELYSTAD (The Netherlands)	- Virology pathobiology and diagnosis of C.S.F.V.
		- Techniques for detecting antibodies
		- Epizootiology of swine fever
		- Immunology
	Institute of Virology, Veterinary Faculty - UTRECHT (The Netherlands)	- Studies on C.S.F.V. and related viruses
		- Reviews on Togaviruses.
	Virology Department, Central Veterinary Laboratory - WEYBRIDGE (U.K.)	- Ultrastructure of swine fever virus
		- Serological relationship between swine fever virus and other agents.
		- Incidence of antibody to swine fever virus in the U.K.
		- Viral contamination of foetal bovine serum.

SUBJECT	INSTITUTE	TITLE OF THE PROJECT
African Swine Fever Virus	The animal Virus research Institute - PIRBRIGHT (U.K.)	- Studies on the composition of C.S.F.V.
	Department of Animal Husbandry, University of Bristol (U.K.)	- Immune system of the pig
	Centro Regional de Investigacion y Desarollo Agrario, Departmento Virologia Animal - MADRID (Spain)	- Studies on the composition of A.S.F.V. - Changes in the basic biological properties of the African swine fever field of virus.
	The animal Virus research Institute - PIRBRIGHT (U.K.)	- Studies on ASFV - Assay of ASFV. - Nature of resistance to ASFV - Airbone transmission of the virus
	Laboratorio Nacional de Investigaçao Veterinaria - LISBOA (Portugal)	- Studies on the properties of ASFV - Pathogenesis
	Laboratoire Central de Recherches Vétérinaires - MAISONS ALFORT (France)	- Studies on the Virus - Diagnosis - Pathogenesis and immunobiology
	State Veterinary Institute for Virus Research - LINDHOLM-KALVEHAVE (Denmark)	- Crossed immunoelectrophoretic characterization of virus antigens in cells infected with ASFV
	Centro Regional de Investigacion y Desarollo Agrario, Departamento Virologia Animal - MADRID (Spain)	

ANNEX II

List of Seminars and Workshops organized for the purpose of co-ordination in the Classical and African Swine fever programme.

I. SEMINARS

1. Seminar on "Porcine Immunology"
Thiverval-Grignon, September 17-18, 1973.

2. Seminar on "Studies on Virus Replication",
Brussels, May 2 - 4, 1974.

3. Seminar on "Diagnosis and Epizootiology of Classical Swine fever",
Amsterdam, April 30 - May 2, 1975.

4. FAO/EEC Expert Consultation on the Eradication of African and Classical swine fevers,
Hannover, September 6 -10, 1976

II. WORKSHOPS

1. Workshop on "Virological Methods",
Utrecht, September 2 - 6, 1974.

2. Workshop on "Immunological Techniques",
Lindholm, June 9 - 14, 1975.

3. Workshop on "Diagnosis of African Swine Fever",
Madrid, February 24 - 28, 1975.

4. Workshop on "Diagnosis of Classical Swine Fever",
Lelystad, May 1, 1975.

5. Workshop on "Concentration and purification of Hog Cholera Virus",
Perugia, March 2 - 14, 1975.

6. Workshop on "Purification and Concentration of African Swine fever virus"
Madrid, September 18 - 26, 1975.

ANNEX III

LIST OF PUBLICATIONS RESULTING FROM THE RESEARCH ON SWINE FEVER VIRUSES

This list of references does not include the papers presented in the FAO/EEC consultation on Eradication of Classical and African swine fevers HANNOVER, 6 - 10 September 1976.

I. BUNDESFORSCHUNGSANSTALT FÜR VIRUSKRANKHEITEN DER TIERE - TÜBINGEN

- KORN, G. Über die Veränderung von Krankheitsverlaufsformen der Schweine pest und damit verbundene Virulenzveränderungen des Virus nach stimulierung der "Lymphozyten". - Berl. Münch. Tierärztl. Wschr. 86, 447-449 (1973)

- KORN, G., MATTHAEUS, W., LORENZ, R. and JAKUBIK, J. Über eine Globulin (Transferrin) und Antikörperbildungsstörung während des Leukopeniestadiums der Schweinepesterkrankung. Z. Immun.-Forsch. Bd. 145, S. 139-155 (1973)

- KORN, G., und LORENZ, R.J. Blutbilduntersuchungen bei verschiedenen Verlaufsformen der Schweinepestinfektion unter besonderer Berücksichtigung von lymphozytären Reaktionen Zellschatten, Bewegungsformen von Lymphozyten ("Lysozyten") und Knochen markreaktionen - Zbl. Bakt. Hyg., I. Abt. Orig. A 229, 229-322 (1974)

- MATTHAEUS, W. und KORN, G. Über die Auftrennung von Kristallviolettvakzinen gegen die europäische Schweinepest zur Isolierung und Charakterisierung des Immunosierenden Agens. - Archiv für die gesamte virus forschung, 44, 133-144 (1974)

- MATTHAEUS, W. und KORN, G. Das Verhalten von präzipitierenden Substanzen aus normalen Organen und Zellen im Vergleich zu dem der präzipitierenden Pankreaseantigene mit Schweinepest infizierte Schweine - Zbl. Vet. Med. B, 22, 239-253 (1975)

MATTHAEUS, W. und KORN, G.
Serologische Identifizierung und Verhalten des hochvirulenten Schweinepestvirus in der Immunoelectrophorese
- Zbl. Vet. Med. B, 22, 47-59 (1975)

KORN, G. und MATTHAEUS, W.
Krankheits-, Immunvorgänge und Virulenzveränderungen bei der Schweinepest als Reaktionen des betroffenen Lymphomyeloiden Systems
- Berl. Münch.-Tierärztl. Wschr. 88, 6 - 9 (1975)

MATTHAEUS, W., KORN, G. und SCHLOTTERER, E.
Immunoelectrophoretische Studien über Character und Spezifität der Immunpräzipitate von Schweineseren und Zellsuspensionen nach der Infektion mit hochvirulentem Virus der europäischen Schweinepest
Zbt. Ved. Med. B 22, in press (1976)

MATTHAEUS, W.
Isolation and characterisation of the immunizing agent of crystal violet vaccines against Hog Cholera

KORN, G. An enhancing effect on the process of swine fever disease and the virulence by stimulating lymphocytes

C.E.C. Seminar on "Porcine Immunology" Thiverval-Grignon 17th-18th September 1973 (EUR 5450)

MATTHAEUS, W. On the specificity of antigens of Hof Cholera virus detected by the agergel diffusion test and Immunofluorescence

ENZMANN, P.J. Synthesis of Viral RNA

C.E.C. Seminar on "Studies on virus replication" Brussels, 2nd-4th May 1974 (EUR 5451)

KORN, G. and MATTHAEUS, W.,
On the selection of pig immune sera for conjugation in swine fever diagnostic
C.E.C. Seminar on "Diagnosis and Epizootiology of Classical Swine Fever" Amsterdam, 30th April-2nd May 1975 (EUR 5486)

II. INSTITUT FÜR VIROLOGIE DER TIERÄRZTLICHEN HOCHSCHULE - HANNOVER

LIESS, B., H.R. FREY, U. BUCKSCH, B. ROEDER and J. FROST
Hog Cholera viral antigens (brief review) and some recent results on the relationship to envelop antigens of Bovine Viral Diarrhea-Mucosal Disease Virions.

C.E.C. Seminar on "Studies on Virus Replication" Brussels, 2nd - 4th May 1974 (EUR 545I)

LIESS, B., H.R. FREY, D. PRAGER, S.M. HAFEZ and B. ROEDER
The course of the natural swine fever virus infection in individual swine and investigations on the development of inapparent SF infections.

C.E.C. Seminar on "Diagnosis and Epizootiology of Classical Swine Fever" Amsterdam, 30th April - 2nd May 1975 (EUR 5486)

LIESS, B. and D. PRAGER
Detection of neutralizing antibodies (NIF test) :
Use of new technical equipment (CCSC System) for laboratory swine fever diagnosis.

C.E.C. Seminar on "Diagnosis and Epizootiology of Classical Swine Fever" Amsterdam, 30th April - 2nd May 1975 (EUR 5486)

MOENNIG, V. The purification of viral glycoproteins by affinity chromatography on Con A Sepharose

C.E.C. Laboratory manual for research on Classical and African Swine Fever, EUR 5487, 52-55 (1975)

III. INSTITUT NATIONAL DE RECHERCHES VETERINAIRES - UCCLE

CHARLIER, G., LEUNEN, J., WELLEMANS, G., STROBBE, R.
De electroforetische mobiliteit van Varkenspestvirus en Runderdiarheevirus

LEUNEN, J. Vaccination contre la Peste porcine et porteur de virus
Ann. Med. Vet. 119, 93-103 (1975)

CHARLIER, G., STROBBE, R., LEUNEN, J.
Kwantitatieve Analyse van de Proteinen van normale varkenssera
Vlaams Dierg. Tijdsch. 43, 249-252 (1974)

VAN AERT, A. The immunologically related swine fever and mucosal disease precipitinogens and nucleotide metabolism
Vlaams Dierg. Tijdsch. 44, 349-364 (1975)

VAN AERT, A. Purification and some properties of swine fever related mucosal disease precipitinogen
Vlaams Dierg. Tijdsch. 44, 339-348 (1975)

VAN AERT, J. Purification of the Bovine viral diarrhoea/Hog Cholera antigen
C.E.C. Seminar on "Porcine Immunology" Thiverval Grignon, 17th-18th September 1973 (EUR 5450)

LEUNEN, J., FLORENT, A.
Diagnosis and epizootiology of Classical Swine Fever in Belgium
C.E.C. Seminar on "Diagnosis and epizootiology of Classical swine fever" Amsterdam, 30th April - 2nd May 1975 (EUR 5486)

IV. STATE VETERINARY INSTITUTE FOR VIRUS RESEARCH - LINDHOLM

ASKÅ, J., BASSE, A., OVERBY, E.
Pathogenicity for the pig Fetus of two German Strains of Hog Cholera
Nord. Vet. Med. to be published (1977)

DALSGAARD, K. and OVERBY, E.
Vaccination of pigs against Hog Cholera (Classical swine Fever) with a detergent split vaccine
Acta Vet. Scand., 17 in plan (1976)

ESKILDSEN, M. and OVERBY, E.
Serological diagnosis of Classical swine fever ; a comparison of a modified direct complement fixation test with an

immunofluorescence plaque neutralization test in the diagnosis of experimental subclinical infection.
Acta Vet. Scand. 17, 131 - 141 (1976)

OVERBY, E. Immunization against Swine fever with a Danish bovine viral Diarrhoea Virus Strain UG59
Nord. Vet. Med. 25, 497 - 503 (1973)

OVERBY, E. and SCHJERNING-THIESEN, K.
Klassik svinepest-et aktvelt problem for faellesmarkeds landene
Saertryk Med. Danske Dyrlaeg, 56, 553-555 (1973)

OVERBY, E. and SCHJERNING-THIESEN, K.
Afrikansk svinepest (ASP) ogdens udbredelse é Europa
Saertryk Med. Danske Dyrlaeg, 57, 411 - 414 (1974)

OVERBY, E. Subklinisk Klassisk svinepest. Etaktuelt diagnostisk og immunologisk problem
Saertryk Dansk Vet., 58, 917-923 (1975)

DALSGAARD, K. The technique of quantitative electrophoresis (crossed immunoelectrophoresis) and its application in the study of viral antigens
C.E.C. Seminar on "Studies on virus Replication" Brunsels, 2nd - 4th May 1974 (EUR 5451)

SCHJERNING-THIESEN, K.
Diagnostic procedures in Denmark in case of suspected classical swine fever
C.E.C. Seminar on "Diagnosis and Epizootiology of Classical swine fever" Amsterdam, 30th April - 2nd May 1975 (EUR 5486

DALSGAARD, K. Co-Author in :
"Studies on African Swine fever virus : purification and analysis of virions" to be published, 1977 (EUR 5626)

V. LABORATOIRE CENTRAL DE RECHERCHES VETERINAIRES - MAISONS ALFORT

AYNAUD, J.M., LARENAUDIE, B.
Diagnosis of subclinical or atypical forms of swine fever

Demonstration of low virulent strains in tissue culture and detection of neutralizing antibodies

C.E.C. Seminar on "Diagnosis and Epizootiology of Classical swine fever", Amsterdam 30th April - 2nd May 1975 (EUR 5486).

VI. LABORATOIRE DE PATHOLOGIE PORCINE - STATION DE RECHERCHES DE VIROLOGIE ET D'IMMUNOLOGIE - THIVERVAL-GRIGNON

METZGER, J.J. et PERY, P.

Structural features of the porcine immunoglobulin G. inter-chain disulfide bridges. B.B.R.C., 55, 1,253-259, 1973.

GUERIN, G., HAHN, C.W. et METZGER, J.J.

Les immunoglobulines M porcines. Analyse des chaînes polypeptidiques constitutives de la molécule.
Ann. Rech. Vétér., 4, 599-611, 1973

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Valence et affinité des anticorps IgM anti-haptènes.
C.R. Acad. Sci, 278 (D), 3395-3398, 1974.

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3ème I.P.V.S. Lyon, 13, 1, juillet 1974.

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Characterisation of the humoral immune response in the piglet.
3ème I.P.V.S. Lyon, 15, 1, juillet 1975.

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Immunological response in piglets : Effect of passive specific antibodies.
3ème I.P.V.S. Lyon, 14, 1, juillet 1974.

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Les anticorps homocytotropiques chez le Porc. Journées de la Recherche porcine en France.
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Rec. Méd. Vétér. Alfort, 152/3, 169-173, 1976

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ANNEX IV : OBJECTIVES OF THE PROGRAMME on Classical and African Swine Fever

- **Basic research**
  - Research on CSFV
    - Virus structure
    - Virus replication
    - Virus antigens
    - Virus genetics
  - Research on ASFV
  - Research on pig immunology
    - Immunological response in pigs
      - Young animals
      - Adult animals
    - Antiviral antibodies
    - Partial immunization
  - Research on vaccination
    - Development of vaccines (live inactivated vaccines)
    - Research on vaccination techniques (active and inactive)
  - Research on epidemiology
    - Natural spread of virus
    - Development of epidemics
  - Research on control measures
    - Eradication methods
    - Immunization
- **Diagnosis**
  - Development of techniques for early detection of viruses
  - Education of field workers (veterinarians)
  - Central laboratory and reference center
- **Field work**
  - Contact with diagnostic laboratories
  - Education of farmers

ANNEX V : RESULTS of the Classical and African Swine Fever programme

	HOG CHOLERA	ASFV
VIRUS		
a. Morphology	E.M. on HC and BVD available	Available
b. Purification of virions	Achieved	Achieved
c. Analysis of viral protein	Further characterization is needed	Available
d. Nucleic acid	RNA (M.W. 3×10^6) characterized	DNA (M.W. 100×10^6) partially characterized. Information on internal organization (by restriction enzymes) needed.
VIRUS STRAINS		
Pathogenic		The reason for differences in pathogenesis not known.
Apathogenic	Isolated and described	Isolated and available
Vaccine strains		Not available
Laboratory strains		
VIRAL GENETICS		
ts mutants	Required for the study of viral gene functions	Required for the study of viral gene functions
a. Proteins		
b. Nucleic acids	Analyses of infected cells are required	Analyses of cell associated proteins and their biosynthesis are required
c. Membranes		
VIRAL ANTIGENS		
Membrane	Common Ag with BVD	
Structural	Glycoproteins — further analyses are required	Analyses are required
Nonstructural	Proteins	
VIRAL DIAGNOSIS		
a. Diagnostic technique	BVD and HC common Ag must be isolated	Viral Ag must be isolated and characterized
Viral antigens	Neutralization tests needed	Neutralizing antibodies
Viral antibodies		Comparison of virus isolates is required
Radioimmunoassays	Not available and further research needed	RIA is required
Immunization		
a. Natural vaccination	Rise of antibodies; protection by live and dead vaccines is known	Not available
b. Effect on T & B lymphoblasts		T & B lymph. studies are needed
Effect on thymus	Interaction between lymphoid cells Effect on thymus must be studied	
c. Transmission		Airborne infection, eradication,
Eradication	Eradication program needed	immunization & control measures
Immunization		are needed

ANNEX VI

FINANCIAL STATEMENT for the research programme on Classical and African Swine Fever

in UA

INSTITUTES	Funds available in UA	Funds used (UA)	% used
Hanovre	60.328	60.200	- 100
Tübingen	60.656	43.531	72
Uccle	257.520	174.604	68
Alfort	79.224	71.418	90
Thiverval-Grignon	225.053	216.413	96
Brescia	100.454	87.588	87
Perugia	91.360	90.560	99
Teramo	65.900	57.201	87
Lelystad	110.995	85.695	77
Utrecht	35.415	24.894	70
Madrid	247.999	247.277	- 100
Lisbonne	400.000	231.949	58
Dublin	102.930	102.930	100
Pirbright	302.203	131.276	43
Lindholm	132.000	131.931	- 100
Bristol	109.095	105.165	96
Weyhidge	69.370	48.924	71
Coordination	272.500	236.672	87
TOTAL	2.723,003	2.148.228	79