

# *Curriculum Vitae*

**Peter F. Wright**

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## I. Education

- 1975 **Hons B.Sc.** University of Western Ontario  
London, Ontario, CANADA
- 1977 **M.Sc.** University of Guelph, (Ontario Veterinary College)  
Guelph, Ontario, CANADA  
Thesis: 'Serum Proteins in Aleutian Disease of Mink'
- 1981 **Ph.D.** University of Guelph, (Ontario Veterinary College)  
Guelph, Ontario, CANADA  
Thesis: 'Aleutian Disease of Mink : Serodiagnosis and Seroepidemiology'

## II. Positions Held and Duties Performed

### 1981-1987 **Research Scientist, Immunology Section**

Agriculture Canada  
Animal Diseases Research Institute (ADRI)  
3851 Fallowfield Road  
P.O. Box 11300, Stn.'H'  
Nepean, Ontario  
CANADA K2H 8P9

Duties: Development, standardization and validation of enzyme immunoassays for the diagnosis of infectious diseases of veterinary importance. Member of Brucellosis research group. Provision of scientific and technical advice to the Laboratory Division and the Animal Health Program.

Human Resources: Direct responsibility for two technical staff.

Financial Resources: Technology development budget of approximately \$10-15,000 per year.

### 1987-1990 **Head, Serology Section**

Animal Diseases Research Institute (as above)

Duties: Continuation of projects described above. Establishment of a Methods Development and Transfer Unit in support of technology transfer and quality assurance in diagnostic serology. Establishment of a certification/accreditation program for federal/private diagnostic laboratories. Management of four diagnostic units (CF, AGID, ELISA and Brucellosis) conducting approximately 200,000 tests per year for 21 diseases (primarily for import/export certification). Provision of scientific and technical advice to the Laboratory Division and the Animal Health Program.

Human Resources: Direct responsibility for three professional and 15-18 technical staff.

Financial Resources: Annual combined diagnostic/technology development budget of approximately \$140,000 per year.

### 1990-1995 **Head, Animal Production Unit**

Agency's Laboratory, Seibersdorf  
International Atomic Energy Agency  
Wagramerstrasse 5, P.O. Box 100  
A-1400 Vienna, AUSTRIA

1992-1995 \* **Head, OIE Collaborating Centre for ELISA and Molecular Techniques in Animal Disease Diagnosis**

1993-1995 \* **Head, FAO/IAEA Central Laboratory for ELISA and Molecular Techniques in Animal Disease Diagnosis**

1993-1995 \* **Head, WHO Collaborating Centre for ELISA and Molecular Techniques in Zoonoses Diagnosis**

\* International designations of Animal Production Unit

Above position undertaken as a 'Leave of Absence for International Service' from Agriculture Canada (July, 1990 to July, 1995)

Duties: Development, standardization, validation, quality assurance and supply of 7 ELISA, 3 RIA and 5 mineral/metabolite kits in support of Technical Cooperation and Coordinated Research Programmes in animal health and reproduction. Annual production and distribution of approximately 120 ELISA, 300 RIA and 50 mineral/metabolite kits to approximately 140 counterpart laboratories in some 50 different developing countries. Establishment of a quality assurance certification program for counterpart laboratories. Provision of fellowship training and inter-regional training courses in disease diagnosis and in reproduction. Provision of scientific and technical advice to the IAEA, FAO, OIE and WHO and to counterpart laboratories.

Human Resources: Direct responsibility for 4-6 professional and 4-6 technical staff.

Financial Resources: Annual combined technology development/kit production/training budget of approximately \$250,000 US per year.

1995-1997 **Research Scientist, Centre of Expertise for Foreign Animal Disease**

Canadian Food Inspection Agency  
National Centre for Foreign Animal Disease  
1015 Arlington Street,  
Winnipeg, Manitoba  
CANADA R3E 3M2

Returned from overseas assignment to substantive position as Research Scientist. Primarily involved in the development and implementation of transition and start-up plans for the relocation of foreign animal disease diagnostic and research programs from old laboratory site (Hull, Quebec) to new laboratory facility (Winnipeg, Manitoba).

Duties: As part of management team - Development and implementation of organisational structure for the delivery of diagnostic, technology development and training course components of the NCFAD. Development and implementation of human resource plan for recruitment and deployment of scientific, technical and support staff. Development and implementation of capital plan, primarily equipment acquisitions. Development and implementation of quality assurance plan for transition of diagnostic services for some 15 foreign animal diseases of viral aetiology. Development and implementation of training and technical certification plan for new staff.

Human Resources: Total staffing target of 15 professional, 23 technical and 11 management/support staff.

Financial Resources: Start-up budget of \$4.2M for new equipment and an annual budget of approximately \$500K for diagnostics/technology development/general operating (excluding facilities).

1997-2005

**Deputy Director, National Centre for Foreign Animal Disease**

Canadian Food Inspection Agency  
National Centre for Foreign Animal Disease  
1015 Arlington Street,  
Winnipeg, Manitoba  
CANADA R3E 3M2

The National Centre for Foreign Animal Disease (NCFAD) has scientific expertise in virology, molecular biology, immunology, serology, bacteriology and pathology. Scientific staff, in concert with technical staff and program coordinators, are responsible for the delivery of diagnostic, research/technology development and training programs in foreign animal disease. The diagnostic program is of primary importance and includes scheduled or routine services that involve the use of official test methods and procedures for import/export, survey, surveillance or other planned projects. Special or *ad hoc* services involve the use of official or other test methods and procedures for confirmatory negative and high risk samples, non-routine specimens, potential emerging diseases, legal challenges or other supplemental data.

The laboratory consists of biocontainment level 2, 3, 3+ and 4 laboratory suites and level 3+ and 4 animal cubicles.

Duties: Reporting to the Director and as part of the management team – development, implementation and day-to-day operation of diagnostic, research/technology development and training course programs in support of the Canadian National Animal Health Program.

Human Resources: NCFAD full staff complement of 21 professional, 30 technical and 14 management/support personnel.

Financial Resources: Annual budget of approximately \$680K for diagnostics/technology development/general operating (excluding facilities). In recent years, the NCFAD has successfully obtained substantial research funds through federal CRTI and RPS programs.

Note: The NCFAD 'officially' began diagnostic operation in late spring of 1998. Shortly thereafter, the lab successfully achieved accreditation under ISO/IEC: 17025 as a diagnostic laboratory and under Eurochem/CITAC Guide 2 as a research laboratory.

The lab and its staff have been baptised under fire in two major crises: the BSE outbreak of 2003 and the highly pathogenic avian influenza outbreak of 2004. As a consequence of both outbreaks, the NCFAD has taken on an even more pivotal role as the national reference laboratory for both of these diseases within a network of federal and provincial laboratories.

As scientific experts, both senior management and scientific staff participate on numerous CFIA committees related to the prevention of, preparedness for, response to and recovery from foreign, zoonotic and emerging disease outbreaks.

Technology development and research activities at the NCFAD have grown and expanded continuously. NCFAD staff have successfully competed in a number of national and international programs. As a consequence, NCFAD scientific staff are increasingly sought after as international experts.

2006-Present **Manager, National Aquatic Animal Health Laboratory System (NAAHLS)**  
Fisheries and Oceans Canada  
Gulf Fisheries Centre  
343 Université Ave  
Moncton, New Brunswick  
CANADA E1C 9B6

The Canadian Food Inspection Agency (CFIA) and Fisheries & Oceans Canada (DFO) are responsible for the co-delivery of the newly created National Aquatic Animal Health Program (NAAHP). While the CFIA has the overall responsibility for NAAHP, it looks to DFO for the provision of diagnostic services, test method development, regulatory research, and expert scientific advice. Previously, DFO's programs and activities in aquatic animal health have been regional in perspective and delivery. With the creation of NAAHP, DFO is now undertaking the development of a National Aquatic Animal Health Laboratory System (NAAHLS). This will provide the necessary laboratory infrastructure required to support the national program. The Pacific Biological Station (Nanaimo), the Freshwater Institute (Winnipeg) and the Gulf Fisheries Centre (Moncton) with its affiliated Aquatic Animal Pathogen and Biocontainment Laboratory (Charlottetown) will form the core group of DFO NAAHLS laboratories. NAAHLS activities will be managed out of the Centre of Expertise for Aquatic Animal Health based in Moncton with operational oversight and liaison with CFIA through the National Aquatic Animal Health Science Branch (Ottawa). The creation of NAAHLS underscores DFO's shared commitment to the development of: (i) sound diagnostic and research strategies for Canadian species and production environments that meet or exceed international standards; (ii) quality laboratory systems and networks providing testing services for declaration of disease freedom, surveillance of 'at risk' populations, and management of reportable disease incursions; and (iii) science-based policies and programs to mitigate socio-economic and health impacts on producers and consumers.

### **III. Scientific Recognition**

1. 1983 Invited to organize and present one week lecture course on 'Introduction to Enzyme Immunoassay', Laboratory Centre for Disease Control (LCDC), Health & Welfare Canada.
2. 1984/  
1989 Scientific advisor to the UNU Brucellosis Research Network Project (based on success, support has been extended beyond the initial 5 years, still active today).
3. 1987 Appointed Head of Serology Section, ADRI. Position held until assuming duties with the IAEA in 1990.
4. 1987 Invited lecturer, First FAO/IAEA/SIDA Research Coordination Meeting on 'Improving the Diagnosis and Control of Infectious and Parasitic Diseases of Livestock in Developing Countries with the Aid of Immunoassay and Related Techniques', Uppsala, Sweden.
5. 1987/  
1990 Co-director of MSc programme of Y.L. Trottier, Université de Montréal, Faculté de Médecine Vétérinaire, St. Hyacinthe, PQ.

6. 1988 Invited lecturer and laboratory instructor, FAO/IAEA Regional Training Course for Latin America on the 'Use of Immunoassay and DNA Probe Methods for Diagnosis of Animal Diseases', Buenos Aires, Argentina.
7. 1989 Co-chairman, first meeting of WHO/FAO/IAEA Working Group on Enzyme Immunoassay for Brucellosis Research and Diagnosis, Nepean, Canada.
8. 1989 Designated as 'Scientific Expert' for the purposes of 'Expert' missions to Technical Cooperation Projects within the Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture.
9. 1989 Invited speaker ('Current and Future Serological Trends'), International Symposium on Advances in Brucellosis Research, Texas A&M University.
10. 1989 Invited consultant on Brucellosis ELISA technology transfer and diagnostic application, Instituto Nacional de Tecnologia Agropecuarias (INTA), Buenos Aires, Argentina. (sponsored by the Inter-American Institute on Cooperation in Agriculture, IICA)
11. 1991/  
1995 Appointed FAO/IAEA representative to the WHO/FAO/IAEA Working Group on Enzyme Immunoassay for Brucellosis Research and Diagnosis.
12. 1991/  
1995 Appointed FAO/IAEA representative to and working member of the Standards Commission of the OIE.
13. 1992 Designation of Animal Production Unit, Agency's Laboratory, Seibersdorf as the 'OIE Collaborating Centre for ELISA and Molecular Techniques in Animal Disease Diagnosis'.
14. 1992 Invited expert, FAO Expert Consultation on Strategies in Diagnosis and Control of Brucellosis in Asia, Beijing, China.
15. 1993 Invited paper ('Standardization and validation of ELISA techniques for the detection of antibody in infectious disease diagnosis'), OIE Scientific & Technical Review special issue on 'biotechnology applied to the diagnosis of animal diseases' (Vol. 12).
16. 1993 Designation of Animal Production Unit, Agency's Laboratory, Seibersdorf as the 'FAO/IAEA Central Laboratory for ELISA and Molecular Techniques in Animal Disease Diagnosis'.
17. 1993 Designation of Animal Production Unit, Agency's Laboratory, Seibersdorf as the 'WHO Collaborating Centre for ELISA and Molecular Techniques in Zoonoses Diagnosis'.
18. 1993 Invited expert, FAO Regional Workshop on Formulation of Guidelines for a Regional Brucellosis Control Programme for the Middle East, Amman, Jordan.
19. 1995 /  
2011 Appointed Canadian representative to the Standards Commission of the OIE.
20. 1995 Invited lecturer and laboratory instructor, FAO/IAEA/ILRI Inter-regional Course on ELISA's for Detection of Antibodies to Tick-borne Diseases, International Livestock Research Institute (ILRI), Nairobi, Kenya.

21. 1996 Invited speaker ('New Approaches to Brucellosis Control'), Joint OIE/WAVLD Biotechnology Session of the VIIIth International Symposium of World Association of Veterinary Laboratory Diagnosticians, Jerusalem, Israel.
22. 1996 Invited speaker ('Development, Standardization and Validation of Enzyme Immunoassays') and participant, Workshop on Evaluation of the Performance of Antigen ELISA's for the Detection of Trypanosomes, International Livestock Research Institute (ILRI), Nairobi, Kenya.
23. 1997 Invited speaker and OIE representative ('International harmonization of standards for diagnostic tests and vaccines: Role of the Office International des Epizooties'), 1<sup>st</sup> International Conference on Veterinary Vaccines and Diagnostics, Madison, Wisconsin.
24. 1999 Invited speaker, IDEXX-sponsored, AAVLD Workshop on 'Serology Quality Assurance', 42<sup>nd</sup> Annual Meeting of the AAVLD, San Diego, California.
25. 2000 Co-organizer and speaker, AAVLD Serology Committee Workshop on 'Test Method Standardization and Validation', 43<sup>rd</sup> Annual Meeting of the AAVLD, Birmingham, Alabama.
26. 2000 / 2003 Elected Chair, AAVLD Serology Committee.
27. 2000 / 2005 Appointed Provincial (Manitoba) Representative to AAVLD House of Delegates.
28. 2002 Invited expert, 1<sup>st</sup> FAO/IAEA Consultants Meeting on OIE Validation and Certification of Diagnostic Assays for Infectious Animal Diseases, Vienna, Austria.
29. 2002 Invited Co-chair, CIHR Conference on Biological Terrorism: Canadian Research Agenda, Session III, Pathogens in the Food Chain, Toronto, Ontario.
30. 2002 / 2006 Appointed Chair, OIE Ad Hoc Group on Nonstructural Protein Tests for Foot and Mouth Disease Diagnosis, Paris, France.
31. 2002 / 2004 Appointed Chair, OIE Ad Hoc Group on Brucellosis, Paris, France.
32. 2003 Invited expert, 2<sup>nd</sup> FAO/IAEA - OIE Consultants Meeting on OIE Validation and Certification of Diagnostic Assays for Infectious Animal Diseases, Vienna, Austria.
33. 2003 Invited Chair, 3<sup>rd</sup> Int'l Vet. Vaccine and Diagnostics Conference, Plenary Session 4, List A and Emerging Diseases, Guelph, Ontario.
34. 2006 Invited expert, FAO/IAEA Consultants Meeting on Standards, References and Validation, Vienna, Austria.
35. 2006 Invited speaker, First Global Conference of OIE Reference Laboratories and Collaborating Centres, Florianopolis, Brazil.
36. 2008/ Present Invited expert, OIE Ad Hoc Group on Validation of Diagnostic Assays, Paris, France

37. 2010 Invited speaker, Second Global Conference of OIE Reference Laboratories and Collaborating Centres, Paris, France.

#### IV. Publications & Communications

##### A. Scientific Journals

1. 1978 An, S.H., DePauli, F.J., Wright, P. and Ingram, D.G. (1978) Characteristics of Inapparent Aleutian disease virus infection of mink. *Res. Vet. Sci.* 24:200-204.
2. 1980 Wright, P.F., DePauli, F.J. and Wilkie, B.N. (1980) Enzyme-linked immunosorbent assay of Aleutian disease viral antibodies. *Scientifur* 4:40-42.
3. 1982 Wright, P.F. and Wilkie, B.N. (1982) Detection of antibody in Aleutian disease of mink: comparison of enzyme-linked immunosorbent assay and counterimmunoelectrophoresis. *Am. J. Vet. Res.* 43:865-868.
4. 1983 Spencer, J.L., Gilka, F., Gavora, J.S. and Wright, P.F. (1983) Distribution of lymphoid leukosis virus and p27 group-specific antigen in tissues from laying hens. *Av. Dis.* 28:358-373.
5. 1985 Wright, P.F., Gall, D.E.J. and Kelly, W.A. (1985) Effect of meniscus formation and duplicate sample placement configurations on the variability of measurement of three microtiter photometers. *J. Immunol. Methods* 81:83-93.
6. 1985 Wright, P.F., Kelly, W.A. and Gall, D.E.J. (1985) Application of a timing protocol to the reduction of inter-plate variability in the indirect enzyme immunoassay for detection of anti-*Brucella* antibody. *J. Immunoassay* 6:189-205.
7. 1986 Sheppard, J.W., Wright, P.F. and de Savigny, D.H. (1986) Methods for evaluation of EIA tests for use in detection of seed-borne pathogens. *Seed Sci. Technol.* 14:49-59.
8. 1986 Afshar, A., Wright, P.F. and Dulac, G. (1986) Development and evaluation of an indirect enzyme immunoassay for detection of porcine antibodies to pseudorabies virus. *Can. J. Vet. Res.* 50:422-426.
9. 1986 Dohoo, I.R., Wright, P.F., Ruckerbauer, G.M., Samagh, B.S., Robertson, F.J. and Forbes, L.B. (1986) A comparison of five serological tests for bovine brucellosis. *Can. J. Vet. Res.* 50:485-493.
10. 1986 Afshar, A., Wright, P. and Dulac, G. (1986) Dot-enzyme immunoassay for visual detection of antibodies to pseudorabies virus in swine sera. *J. Clin. Microbiol.* 23:563-567.
11. 1987 Afshar, A., Wright, P.F. and Dulac, G. (1987) Evaluation of an enzyme immunoassay for detection of antibodies to pseudorabies virus in porcine field sera. *Can. J. Vet. Res.* 51:539-541.
12. 1987 Afshar, A., Wright, P.F., Myers, D.J., Bouffard, A. and Dulac, G. (1987) Specificity of the indirect enzyme-linked immunosorbent assay for detection of pseudorabies virus antibodies in pigs exposed to bovine herpesvirus-1. *Am. J. Vet. Res.* 48:1461-1464.
13. 1987 Afshar, A., Thomas, F.C., Wright, P.F., Shapiro, J.L., Shettigara, P.T. and Anderson, J. (1987) Comparison of competitive and indirect enzyme-linked

immunosorbent assays for detection of bluetongue virus antibodies in serum and whole blood. J. Clin. Microbiol. 25:1705-1710.

14. 1987 Afshar, A., Thomas, F.C., Wright, P.F., Shapiro, J.L., Anderson J. and Fuller, R.W. (1987) Blocking dot-ELISA using a monoclonal antibody for detection of antibodies to bluetongue virus in bovine and ovine sera. J. Virol. Methods 18:271-280.
15. 1987 Nielsen, K.H., Wright, P.F., Cherwonogrodzky, J.W., Duncan, J.R. and Stemshorn, B.W. (1987) Enzyme immunoassay for diagnosis of bovine brucellosis. Annals Institut Pasteur, Microbiol. 138:75-79.
16. 1987 Wright, P. (1987) Enzyme immunoassay: observations on aspects of quality control. Vet. Immunol. Immunopathol. 17:441-452.
17. 1988 Nielsen, K.H., Wright, P.F., Kelly, W.A. and Cherwonogrodzky, J.C. (1988) A review of enzyme immunoassay for detection of antibody to *Brucella abortus* in cattle. Vet. Immunol. Immunopathol. 18:331-347.
18. 1989 Afshar, A., Thomas, F.C., Wright, P.F., Shapiro, J.L. and Anderson, J. (1989) Comparison of competitive ELISA, indirect ELISA and standard AGID tests for detecting bluetongue virus antibodies in cattle and sheep. Vet. Record 124:136-144.
19. 1992 Trottier, Y.L., Wright, P.F. and Lariviere, S. (1992) Optimization and standardization of an enzyme-linked immunosorbent assay protocol for serodiagnosis of *Actinobacillus pleuropneumoniae* serotype 5. J. Clin. Microbiol. 30:46-53.
20. 1992 Afshar, A., Wright, P.F., Taylor, E.A., Shapiro, J.L. and Dulac, G. (1992) Development and evaluation of an enzyme-linked immunosorbent assay for detection of bovine antibodies to epizootic hemorrhagic disease of deer viruses. Can. J. Vet. Res. 56:154-160.
21. 1992 Afshar, A., Eaton, B.T., Wright, P.F., Pearson, J.E., Anderson, J., Jeggo, M. and Trotter, H.C. (1992) Competitive ELISA for serodiagnosis of bluetongue: evaluation of group-specific monoclonal antibodies and expressed VP7 antigen. J. Vet. Diagn. Invest. 4:231-237.
22. 1993 Wright, P.F., Nilsson, E., van Rooij, E.M.A., Lelenta, M. and Jeggo, M.H. (1993) Standardization and validation of enzyme-linked immunosorbent assay techniques for the detection of antibody in infectious disease diagnosis. Rev. sci. tech. Off. int. Epiz. 12:435-450.
23. 1995 Saravi, M.A., Wright, P.F., Gregoret, R.J. and Gall, D.E.J. (1995) Comparative performance of the enzyme-linked immunosorbent assay (ELISA) and conventional assays in the diagnosis of bovine brucellosis in Argentina. Vet. Immunol. Immunopathol. 47:93-99.
24. 1997 Wright, P.F., Tounkara, K., Lelenta, M. and Jeggo, M.H. (1997) International Reference Standards : Selection and definition of antibody standards for the indirect enzyme-linked immunosorbent assay (ELISA). Rev. sci. tech. Off. Int. Epiz. 16:824-832.

25. 1998 Wright, P.F. (1998) International standards for test methods and reference sera for diagnostic tests for antibody detection. *In* Veterinary laboratories for infectious diseases (J.E. Pearson, ed.). Rev. sci. tech. Off. Int. Epiz. 17:527-533.
26. 1998 Rebeski, D.E., Winger, E.M., Aigner, H., Wright, P., Crowther, J. and Dwinger, R.H. (1998) Study on the effect of  $\gamma$ -irradiation on bovine serum samples on the ability of monoclonal antibodies to detect invariant antigens of *Trypanosoma congolense*, *T. vivax* and *T. brucei* in enzyme-linked immunosorbent assays. Vet. Parasitol. 79:109-112.
27. 1999 Rebeski, D.E., Winger, E.M., van Rooij, E.M.A., Schöchli, R., Schuller, W., Dwinger, R.H., Crowther, J.R. and Wright, P. (1999) Pitfalls in the application of enzyme-linked immunoassays for the detection of circulating trypanosomal antigens in serum samples. Parasitol. Res. 85:550-556.
28. 1999 Wright, P. and Zhou E.-M. (1999) Developments in international standardization. Vet. Immunol. Immunopathol. 72:243-248.
29. 2004 Clavijo, A., Wright, P. and Kitching, P. (2004) Developments in the diagnostic techniques for differentiating infection from vaccination in foot-and-mouth disease. Vet. J. 167:9-22.

#### **B. Books & Chapters**

1. 1984 Nielsen, K. and Wright, P.F. (1984) Enzyme immunoassay : application to the detection of bovine antibody to *Brucella abortus*. Agriculture Canada (publ.), Ottawa, Ontario. pp 1-121.
2. 1986 Nielsen, K.H., Wright, P.F., Kelly, W.A. and Cherwonogrodzky, J.W. (1986) *Brucella* spp. *In* Methods of Enzymatic Analysis (H.U. Bergmeyer, ed.). Verlag Chemie, Weinheim, GDR. 9 (2), pp 152-160.
3. 1988 Wright, P.F. and Nielsen, K.H. (1988) Application of enzyme immunoassay in veterinary medicine. *In* Non-isotopic Immunoassay (T.T. Ngo, ed.). Plenum Press Corp., New York, NY. pp 129-146.
4. 1990 Wright, P.F., Nielsen, K.H. and Kelly, W.A. (1990) Primary binding techniques for the serodiagnosis of bovine brucellosis : enzyme immunoassay. *In* Animal Brucellosis (K.H. Nielsen and J.R. Duncan, eds). CRC Press Inc., Boca Raton, Florida. pp 199-235.
5. 2009 Jacobson, R.H. and Wright, P.F. (2009) Principles and methods of validation of diagnostic assays for infectious diseases. *In* Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, OIE, Paris, Chapter 1.1.4/5. (<http://www.oie.int/en/international-standard-setting/terrestrial-manual/access-online/>)

#### **C. Conference & Workshop Proceedings**

1. 1988 Wright, P. (1988) Enzyme immunoassay: observations on aspects of quality control. *In* Veterinary Immunology – Proceedings of the 1<sup>st</sup> International Veterinary Immunology Symposium (B.N. Wilkie and P.E. Shewen, eds). Elsevier, Amsterdam, The Netherlands. pp 441-452.

2. 1990 Wright, Peter F. and Nielsen, Klaus H. (1990) Current and future serological trends. *In* Advances in Brucellosis research : an International Symposium (L.G. Adams, ed.). Texas A&M University Press, College Station, Texas. pp 305-320.
3. 1991 Wright, P. (1991) Indirect ELISA for the serodiagnosis of bovine brucellosis. *In* Networking in Brucellosis research - Report of the United Nations University Brucellosis Research Network (J.F. Frank, ed.). United Nations University Press, Tokyo. pp 175-180.
4. 1992 Jeggo, M., Wright, P., Anderson, J., Eaton, B., Afshar, A., Person, J., Kirkland, P. and Ozawa, Y. (1992) Review of the IAEA meeting in Vienna on standardization of the competitive ELISA test and reagents for diagnosis of bluetongue. *In* Bluetongue, African Horse Sickness and Related Orbiviruses, 2nd International Symposium (T.E. Walton and B.I. Osburn, eds). CRC Press Inc., Boca Baton, Florida. pp 547-560.
5. 1996 Wright, P.F. (1996) Development, standardization and validation of enzyme immunoassays: an integrated process. *In* Antigen ELISAs for Trypanosomes – Evaluation of the performance (S. Mozaria, R. Masake, J. Rowlands and T. Musoke, eds). International Livestock Research Institute (publ.), Nairobi, Kenya. pp 13-18.
6. 1999 Wright, P.F. (1999) International harmonization of standards for diagnostic tests and vaccines: role of the Office International des Epizooties. *In* Advances in Veterinary Medicine (Volume 41) - Veterinary Vaccines and Diagnostics (R.D. Schultz, ed.). Academic Press, San Diego, California. pp 669-679.
7. 2006 Wright, P., Edwards, S, Diallo, A, and Jacobson, R. (2006) Development of a Framework for International Certification of Diagnostic Tests as Fit for Purpose. *In* Developments in Biologicals (Volume 126) pp 43-51.

#### **D. Conference & Poster Presentations**

1. 1978 Ingram, D.G. and Wright, P.F. (1978) Role of complement in the pathogenesis of Aleutian disease. *Can. Soc. Microbiol.* (abst)
2. 1978 Wright, P., DePauli, F.J., Ingram, D.G., Chodirker, W.B. and Komar, R. (1978) Demonstration of a virus from man causing a disease in mink like Aleutian disease. *Can. Fed. biol. Soc.* (abst).
3. 1978 DePauli, F.J., Wright, P. and Ingram, D.G. (1978) Characteristics of a virus from man causing a disease in mink like Aleutian disease. *Can. Fed. biol. Soc.* (abst)
4. 1980 Wright, P.F. and Wilkie, B.N. (1980) Comparison of two serological techniques for the detection of antibody in Aleutian disease of mink. *Conf. Res. Work. An. Dis.* (abst)
5. 1980 DePauli, F.J., Wright, P.F. and Wilkie, B.N. (1980) Results of a serological testing program for Aleutian disease of mink. *Conf. Res. Work. An. Dis.* (abst)
6. 1981 Wright, P.F. and Wilkie, B.N. (1981) Inhibition of anti-viral antibody activity in Aleutian disease of mink. *Can. Fed. biol. Soc.* (abst)
7. 1983 Wright, P.F. (1983) Enzyme immunoassay : after a decade of advances. 55<sup>th</sup> *Conf. Av. Dis.* (abst)

8. 1984 Wright, P.F. and Kelly, W.A. (1984) Species gammaglobulin cross-reactivity relative to rabbit anti-bovine IgG. *Can. Soc. Microbiol.* (abst)
9. 1984 Cherwonogrodzky, J.W., Wright, P.F., Perry, M.B., MacLean, L. and Bundle, D.R. (1984) Serological evidence that *Brucella abortus* A antigen is O-chain polysaccharide. *Can. Soc. Microbiol.* (abst)
10. 1984 Garcia, M.M., Stewart, R.B. and Wright, P.F. (1984) Detection of bovine antibodies against *Fusobacterium necrophorum* by enzyme immunoassay. *Can. Soc. Microbiol.* (abst).
11. 1984 Wright, P.F., Dohoo, I.R., Ruckerbauer, G.M., Samagh, B.S. and Robertson, F.J. (1984) Evaluation of an enzyme immunoassay for detection of bovine brucellosis. *Conf. Res. Work. An. Dis.* (abst)
12. 1984 Cherwonogrodzky, J.W., Wright, P.F., Perry, M.B., MacLean, L. and Bundle, D.R. (1984) Identification of the *Brucella abortus* A antigen as the O-chain polysaccharide. *Conf. Res. Work. An. Dis.* (abst)
13. 1984 Wright, P.F., Garcia, M.M. and Stewart, R.B. (1984) Enzyme immunoassay for the detection of bovine antibodies to *Fusobacterium necrophorum*. *Conf. Res. Work. An. Dis.* (abst)
14. 1984 Wright, P.F., Dohoo, I.R., Ruckerbauer, G.M., Samagh, B.S. and Robertson, F.J. (1984) Evaluation of serodiagnostic assays for detection of bovine brucellosis. *37<sup>th</sup> Ann. Bruc. Res. Conf.* (abst)
15. 1985 Wright, P.F., Gall, D.E.J. and Kelly, W.A. (1985) Meniscus formation : a hidden source of variability in microtiter enzyme immunoassays. *Recent Developments in ELISA and Other Solid-phase Immunoassay Systems*, Guy's Hospital, London, UK (abst)
16. 1985 Nielsen, K., Rosenbaum, B., Stiller, J. and Wright, P.F. (1985) A class-capture enzyme immunoassay for isotype detection in bovine sera. *Recent Developments in ELISA and Other Solid-phase Immunoassay Systems*, Guy's Hospital, London, UK (abst).
17. 1985 Wright, P.F., Kelly, W.A., Gall, D.E.J. and Nielsen, K. (1985) A timing protocol for reduction of inter-assay variation in the indirect enzyme immunoassay. *Fed. Am. Soc. exp. Biol.* (abst)
18. 1985 Wright, P. and Nielsen, K. (1985) Performance of conjugated monoclonal and polyclonal antiglobulins in the indirect enzyme immunoassay for detection of bovine serum antibodies to *Brucella abortus*. *38<sup>th</sup> Ann. Bruc. Conf.* (abst)
19. 1985 Wright, P.F., Nielsen, K., Cherwonogrodzky, J., Perry, M.B. and Bundle, D.R. (1985) Comparison of four antigens and two antiglobulins in the detection of bovine anti-*Brucella* antibody by indirect enzyme immunoassay. *Conf. Res. Work. An. Dis.* (abst)
20. 1985 Afshar, A., Wright, P. and Dulac, G. (1985) Dot-enzyme immunoassay for visual detection of antibodies to pseudorabies virus in swine serum. *Conf. Res. Work. An. Dis* (abst)

21. 1985 Afshar, A., Wright, P., Myers, D., Bouffard, A. and Dulac, G. (1985) Enzyme immunoassay and serum neutralization activity in sera of pigs infected with infectious bovine rhinotracheitis and challenged with pseudorabies virus. Conf. Res. Work. An. Dis. (abst)
22. 1986 Wright, P.F. and Nielsen, K. (1986) Comparison of monoclonal (Mc) and polyclonal (Pc) antiglobulins in an enzyme immunoassay (EIA) for detection of bovine brucellosis. Fed. Am. Soc. exp. Biol. (abst)
23. 1986 Cherwonogrodzky, J., Wright, P.F., Nielsen, K., Perry, M.B. and Bundle, D.R. (1986) Comparison of four antigens in an enzyme immunoassay (EIA) for detection of bovine brucellosis. Fed. Am. Soc. exp. Biol. (abst)
24. 1986 Nielsen, K., Wright, P., Kelly, W., Sugden, E., Gall, D. and Duncan, R. (1986) Enzyme immunoassay for large-scale diagnostic serology : an approach. 1<sup>st</sup> Int. Vet. Immunol. Symp. (abst)
25. 1986 Wright, P.F., Gall, D.E.J. and Kelly, W.A. (1986) Quantitative data expression of bovine anti-*Brucella* antibody activity in the indirect enzyme immunoassay (EIA). 1<sup>st</sup> Int. Vet. Immunol. Symp. (abst)
26. 1986 Wright, P.F. and Nielsen, K. (1986) Comparison of polyclonal and monoclonal antiglobulins in the indirect enzyme immunoassay (EIA) for diagnosis of bovine brucellosis. 1<sup>st</sup> Intl. Vet. Immunol. Symp. (abst)
27. 1986 Wright, P.F., Gall, D.E.J. and Kelly, W.A. (1986) Quantitative expression of anti-*Brucella* antibody activity in the enzyme immunoassay. 39<sup>th</sup> Ann. Bruc. Res. Conf. (abst)
28. 1986 Afshar, A., Thomas, F.C., Wright, P.F., Shapiro, J.L., Shettigara, P.T. and Anderson, J. (1986) Comparison of competitive and indirect enzyme-linked immunosorbent assays for detection of bluetongue virus antibodies in serum and whole blood. Conf. Res. Work. An. Dis. (abst)
29. 1987 Wright, P.F., Gall, D.E.J. and Kelly, W.A. (1987) Enzyme immunoassay : quantitative expression of antibody activity. XXIII Wld. Vet. Cong. (abst)
30. 1987 Wright, P.F., Nielsen, K.H. and Cherwonogrodzky, J.W. (1987) Comparison of four antigens and two antiglobulins in the detection of bovine anti-*Brucella* antibody by ELISA. Can. Soc. Microbiol. (abst)
31. 1987 Ruckerbauer, G.M., Nielsen, K.H. and Wright, P.F. (1987) Adaptation of the complement fixation test to automated read-out. Conf. Res. Work. An. Dis. (abst)
32. 1987 Cherwonogrodzky, J.W., Perry, M.B., Bundle, D.R. and Wright, P.F. (1987) Differentiation of vaccinated and *Brucella abortus* infected cattle with *B.abortus* 1119-3 O-chain polysaccharide. XXIII Wld. Vet. Cong. (abst)
33. 1991 Afshar, A., Wright, P.F., Taylor, L., Shapiro, J.L., Dulac, G.C., Gard, G. and Bowen, R.A. (1991) Development and evaluation of an indirect enzyme-linked immunosorbent assay (ELISA) for detection of antibodies to epizootic hemorrhagic disease (EHD) viruses. 2<sup>nd</sup> Intl. Symp. on Bluetongue, African Horse Sickness and Related Orbiviruses (abst)
34. 1991 Shakarchi, N.H., Afshar, A. and Wright, P.F. (1991) Combined indirect enzyme-linked immunosorbent assay (COM-ELISA) for the detection of antibodies to

bluetongue and epizootic haemorrhagic disease of deer. 2<sup>nd</sup> Intl. Symp. on Bluetongue, African Horse Sickness and Related Orbiviruses (abst)

35. 1991 Nilsson, E., van Rooij, E. and Wright, P. (1991) The effect of pH on the determination of the optimum concentrations of ABTS and H<sub>2</sub>O<sub>2</sub> for use in the ELISA. 25 Years of Immunoenzymatic Techniques (abst)
36. 1992 Richards, J.I., Wright, P.F., Garcia, M., Perera, B.M.A.O. and Plaizier, J.C. (1991) Development and transfer of nuclear and related kit technology for animal science research institutes in developing countries. 12<sup>th</sup> Int'l Cong. on Animal Reproduction (abst)
37. 1992 Lelenta, M., Wright, P.F. and Jeggo, M.H. (1992) Standardization of internal QC and assay acceptance in antibody ELISA's. 3<sup>rd</sup> Int'l Vet. Immunol. Symp. (abst)
38. 1992 Wright, P.F. and Jeggo, M.H. (1992) International Standardization of ELISA data expression for antibody activity. 3<sup>rd</sup> Int'l Vet. Immunol. Symp. (abst)
39. 1992 Nilsson, E., Wright, P., Jeggo, M.H. and Dargie, J.D. (1992) The development of internationally standardized and fully validated ELISA kits for animal disease diagnosis. VI Int'l Symp. WAVLD (abst)
40. 1995 Rebeski, D.E., Winger, E., van Rooij, E.M.A., Geiger, R. and Wright, P.F. (1995) Current status of the FAO/IAEA antigen ELISA kit used for the diagnosis of bovine trypanosomiasis. British Society of Parasitology, Trypanosomiasis and Leishmaniasis Seminar (abst)
41. 1996 Wright, P.F. (1996) New approaches to Brucellosis control. VIII Int'l Symp. WAVLD (abst)
42. 2002 Sabara, M., Larence, J. and Wright P. (2002) Evaluation of a Japanese quail fibrosarcoma cell line (QT-35) for use in the propagation, titration and serologic detection of avian metapneumoviruses. 45<sup>th</sup> AAVLD Conference
43. 2005 Wright, P. (2005) International validation: moving towards a graduated process. 1<sup>st</sup> Int'l Mtg on Design and Analysis of Diagnostic Test Evaluation Studies (abst)
44. 2005 Wright, P. (2005) Fit for purpose: a laboratory perspective 1<sup>st</sup> Int'l Mtg on Design and Analysis of Diagnostic Test Evaluation Studies (abst)
45. 2006 McGladdery, S. and Wright, P. (2006) National Aquatic Health Laboratory System. 5<sup>th</sup> Annual Mtg CAHLN (abst)
46. 2006 Wright, P. (2006) Reference Laboratories: the Need to Update Roles and Mandates. 1<sup>st</sup> Int'l Conf. of OIE Ref. Labs and Collaborating Centres (abst)
47. 2010 Wright, P. and Robinson, M.M. (2010) OIE Quality Standard and Guidelines for Veterinary Laboratories: Infectious Diseases, 2<sup>nd</sup> Int'l Conf. of OIE Ref. Labs and Collaborating Centres (abst)

## **E. Specific Protocols, Guidelines & Standards**

HALD Standard Protocols for Enzyme Immunoassays:

1. 1988/ Three bench mark enzyme immunoassay protocols developed by the MDT

- 1990 Unit of the Diagnostic Serology Section at ADRI, Nepean which, at the time, represented the national standards for the Health of Animals Laboratory Division (HALD).
- i. Brucellosis : Indirect enzyme immunoassay for the detection of bovine antibody to *Brucella abortus*.
  - ii. Pseudorabies : Indirect enzyme immunoassay for the detection of porcine antibody to pseudorabies virus.
  - iii. Bluetongue : Competitive enzyme immunoassay for the detection of antibody to bluetongue virus.

FAO /IAEA Standard Protocols for ELISA Kits:

2. 1990/1995 ELISA kit protocols developed by the Animal Production Unit of the Agency's Laboratories Division, Seibersdorf which still represent the international standards for the Joint FAO/IAEA Programme.
  - i. Rinderpest ELISA : Competitive enzyme immunoassay for the detection of antibody to rinderpest virus.
  - ii. Brucellosis ELISA : Indirect enzyme immunoassay for detection of bovine antibody to *Brucella abortus*.
  - iii. Brucellosis ELISA : Competitive enzyme immunoassay for detection of bovine antibody to *Brucella abortus*.
  - iv. Babesiosis ELISA : Indirect enzyme immunoassay for the detection of bovine antibody to *Babesia bovis*.
  - v. Infectious Bovine Rhinotracheitis ELISA : Indirect enzyme immunoassay for the detection of bovine antibody to bovine herpesvirus 1.
  - vi. Leukosis ELISA : Indirect enzyme immunoassay for detection of bovine antibody to bovine leukosis virus.
  - vii. Bluetongue ELISA : Competitive enzyme immunoassay for the detection of antibody to bluetongue virus.
  - viii. Contagious Bovine Pleuropneumonia ELISA : Indirect enzyme immunoassay for the detection of bovine antibody to *Mycoplasma mycoides mycoides*.
  - ix. Hemorrhagic Septicemia ELISA : Direct sandwich enzyme immunoassay for detection of *Pasturella multocida*.
  - x. FMD/VS ELISA : Indirect sandwich enzyme immunoassay for detection of antigens of foot and mouth disease virus and vesicular stomatitis virus.
  - xi. FMDV ELISA : Liquid Phase Blocking Enzyme Immunoassay for detection and titration of antibody to foot and mouth disease virus.
  - xii. Trypanosomiasis ELISA : Direct sandwich ELISA for the detection of antigens of *Trypanosoma brucei*, *T. congolense* and *T. vivax*.

OIE Standards Commission Guidelines:

3. 1993 Guidelines for International Reference Standards for Antibody Assays.
4. 1994 Guidelines on Data Sheets for Reference Standards.
5. 1994 Guidelines for the Validation of Diagnostic Tests for Infectious Diseases.
6. 1995 Guidelines for Laboratory Quality Evaluation.
7. 1996 Guidelines for Laboratory Proficiency Testing.

OIE Standards Commission Standards:

8. 2000 OIE Standard for Management and Technical Requirements for Laboratories Conducting Tests for Infectious Animal Diseases
9. 2004 OIE Standard and Guidelines for Validation and Certification of Diagnostic Assays