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# Curriculum Vitae

of

John Godsman Watt

BVMS, MRCVS, C.Biol. F.I.Biol, FRSA

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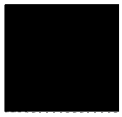

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# John Godsman Watt
BVMS., MRCVS., CBiol., FIBiol., FRSA.

**Born** [redacted]

**Educated** New Deer School, Aberdeenshire
Aberdeen Grammar School
Royal (Dick) School of Veterinary Studies, University of Edinburgh.

**Marital Status** [redacted]

**Graduated** Batchelor of Veterinary Medicine and Surgery, 1959
Member of the Royal College of Veterinary Surgeons, 1959.

**Elected** Member of the Institute of Biology, 1983
Member of the Association of Consulting Scientists, 1984.
Fellow of the Royal Society of the Arts, 1990
Fellow of the Institute of Biology, 1991.

1959 Entered veterinary general practice for five months.

1959 Appointed Assistant Lecturer in the Dept., of Veterinary Surgery in the University of Edinburgh with responsibility for general surgery and student instruction in surgical technique.

1960-61 Seconded part-time to assist establishment of an experimental cardiovascular surgery unit to expedite the clinical acceptance of cardio-pulmonary bypass techniques. This work involved the design of methods for the collection, storage and use of canine blood and plasma to supply extra-corporeal circulation in animal experiments intended to mimic the techniques to be applied later in the human surgical field. Secondary studies were made on the changes in the blood volume of animals subjected to by-pass techniques.

1961-65 Appointed Research Assistant in Veterinary Surgery to direct investigations on the establishment of a routine blood and dried plasma transfusion service for horses, cattle and dogs and in the establishment of a development laboratory for studying methods of preparation and use of blood protein fractions in veterinary medicine.

1961-70 Seconded to serve part-time with the Department of Surgical Science in the University of Edinburgh Medical School (Professor Sir Michael Woodruff) to participate in research projects:

- The use of immunologically competent cells in the treatment of malignant neoplasias.
- The preparation and use of anti-lymphocyte serum and its subfractions in immunosuppression and organ transplantation.

1964 Appointed for one year to serve on the Scientific Subcommittee of the British Veterinary Association.

1965-67.1 Advisor on the design, manufacture and application of disposable plastics for use in Veterinary practice situations. Inter alia, the first polypropylene infusion cannula was introduced and is still in use in both human and veterinary medicine.

1965-66 Appointed Research Assistant in the Department of Veterinary Surgery of the University of Edinburgh to investigate the technical problems of plasma protein fractionation in veterinary

medicine and to investigate the practicality of using certain fractions for prophylactic purposes; especially the use of fractions containing the IgG and IgM proteins for prevention of colibacillosis in neonatal calves, lambs and pigs.

1966 Member of the Medical Research Council ad-hoc Committee to advise on the preparation and use of antilymphocyte serum.

1966-72 Member of the Medical Research Council Working Party on the preparation, use and control of antilymphocyte serum and its fractions for tissue transplantation.

1966-67 Appointed Research Fellow in the Department of Veterinary Surgery.

1967 Recipient of a Wellcome Travel Fellowship. Appointed Research Consultant in the Veterans Administration Hospital, Tucson, Arizona, for a period of six months to investigate the application of forced flow electrophoresis and selective plasmapheresis to the preparation of blood protein fractions, especially to the preparation of antilymphocyte globulin from immunised horses.

1967-70 Appointed Superintendent of the Scottish Blood Products Unit to direct and control production of human plasma fractions for clinical use; to direct the establishment and operation of a development plant designed to increase the range and scale of the production facilities of the unit and to supervise the design of a new fractionation unit to be built on a new site on the outskirts of Edinburgh.

1968 - Appointed Honorary Fellow of the University of Edinburgh.

1969 Consultant to the Red Lion & Sun Society of Iran to advise on the construction of a blood transfusion programme with plasma processing facilities in Tehran.

1970-83 Appointed National Scientific Director of the Scottish National Blood Transfusion Association and Director of the Protein Fractionation Centre.

1971 Member, Science Research Council special study group on the development of enzyme technology in the UK.

1972 Member of the European Space Research Organisation (Now the European Space Agency) Committee on Electrophoretic Separation as part of the ESRO Post-Apollo space research programme.

1972 Member of an ad-hoc working party to consider the advisability of establishing a study group on separation and detection techniques in biology under the aegis of the Council of Europe.

1972-75 Member of the study group on Separation and Detection Techniques in Biology, a sub-committee of the Committee on Science & Technology of the Council of Europe. This group was later renamed as EFRAC, The European Fractionation Committee.

1973-84 Member, Joint Steering Committee on Blood Products Production (UK).

1973-78.1 Consultant to Iranian National Blood Transfusion Service to assist in construction of a primary transfusion centre with fractionation and education facilities in Tehran and to aid design and construction of a new national transfusion headquarters.

1973-74 Member of PASE (Post Apollo Space Electrophoresis); a joint ESRO/NASA study group.

1974-76 Member of the Materials Science Consultant Group (MSCG) of ESRO to study and advise on projects including crystal growth, magnetic levitation, fluid physics and metallurgical study including welding in space and preparation of gravitationally immiscible alloys. This included

design of zero-gravity drop experiments, sounding rocket experiments, experiments which were included in the programme of SKYLAB and in some aspects of equipment design such as centrifuges, solar furnaces and freezedriers for SPACELAB; part of the SPACE SHUTTLE programme.

1974-78 Member, Medical Research Council working party on Factor IX concentrates.

1974-93 Member of the Blood Products Panel of the British Pharmacopoeia.

1975-89 Member of the Blood and Blood Products SubCommittee of the European Pharmacopoeia Commission (Group of Experts 6(B)).

1975 Consultant to the Canadian Red Cross Blood Transfusion Service to advise on arrangements required for fractionation of plasma and the provision of plasma proteins to the national health care programme. Most of the recommendations have been adopted including the proposal that the national headquarters of the service be moved from Toronto to Ottawa.

1976-86 Member, Biologicals SubCommittee of the Committee on Safety of Medicines.

1976 Member of the NIH(USA) planning committee for the Conference on Plasma Processing Technology (The Reston Conference).

1977 Member, WHO group of experts on the preparation of Minimum Requirements on Processing of Blood and Blood Products.

1978-86 Member, SubCommittee on Immunological Products of the Committee on Review of Medicines.

1978 Consultant to the National Serum and Vaccines Institute, Agouza, Egypt to assist commissioning of a new plasma processing centre.

1979 Consultant to the Blood Foundation of New Zealand to advise on the economic and practical feasibility of plasma processing in New Zealand. A report was submitted and most of the recommendations have been activated.

1983 Consultant to the National Vaccine and Serum Institute of the Peoples Republic of China to lecture and to discuss the arrangements for plasma processing in China with visits to the four main centres of this activity.

1983 Member, first WHO expert group to discuss and report on the condition of Acute Immunodeficiency Syndrome (AIDS).

1984-85 Temporary expert to WHO on the condition of blood transfusion in the developing world with special reference to the practice of plasmapheresis.

1984-87 Member, WHO expert group on Integrated Blood Transfusion in the Developing World. Constructed questionnaires for a major international survey and prepared assessments of the resulting information.

1984 - 99 Established as a full-time independent consultant to the biologicals manufacturing industry with special interest in plasma processing and application of the concepts of good manufacturing practice and quality assurance.

1985-92 Consultant adviser to NASA-sponsored groups on the conduct of multi-centre study of aspects of protein chemistry in the space environment including development of subsistence systems and the processing of rare clinical materials.

1985-90 Director, BIOSEPARATION ASSOCIATES LTD, a private company dedicated to the

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| | processing of abattoir waste and recovery of useful materials using biotechnological methods. This company commenced processing in late 1989 in specially constructed premises in Livingston, Scotland with an initial capital of £3.5 million, later raised to £5.0 million. The company failed, due in part to the political pressures consequent to identification of BSE (Bovine Spongiform Encephalitis) in British cattle. |
| 1985-90 | Coordinator, European Pharmacopoeia Study Group on Human Immunoglobulin. |
| 1985-88 | Consultant to the Canadian Red Cross Society Blood Programme on the construction of a new regional centre for the city of Toronto with special reference to establishment of Quality Assurance systems and attainment of Good Pharmaceutical Manufacturing Practice (GMP). |
| 1985 -2001 | Consultant to the Fatimid Foundation of Pakistan, a charitable organisation with official support in the foundation of clinics for blood collection and treatment of haematological diseases, especially haemophilia and thalassaemia. |
| 1986 to 1999 | Consultant to the Centro de Hematologia Santa Caterina. This Brazilian charity is involved in blood transfusion, plasma processing and the care and education of haemophilics in Rio de Janiero but with patients coming from many other places in Latin America. Engaged in planning a new fractionation plant to replace that built in 1976 and to operate at international levels of GMP. This is the largest haemophilia treatment centre in the world. |
| 1987 - 1997 | Elected Member of Council, The Association of Consulting Scientists. |
| 1988-89 | Consultant to the Canadian Blood Committee on evaluation of the impact of changes in practice and of recombinant technology on plasma procurement and processing over the next decade. |
| 1988-91 | Chairman, Members Committee, The Association of Consulting Scientists. |
| 1988-90.1 | Consultant to the Rh Institute, University of Manitoba on GMP and restructuring of the Plasma processing plant. |
| 1990 | Advisor to the Central Laboratories of the Netherlands Red Cross on the construction and equipment design for a new plasma processing facility. |
| 1990 | Awarded Fellowship of the Royal Society of the Arts. |
| 1991 | Awarded Fellowship of the Institute of Biology. |
| 1991 | Elected Vice-Chairman, The Association of Consulting Scientists. |
| 1992 | Member of the Overseas Development Agency Mission to assess the impact of humanitarian aid on the well-being of the people and effect on the agricultural industry of North West Russia. |
| 1992- 93 | Member of the Ministry of Agriculture Fisheries and Food Study Group on privatisation of state farming in Russia. |
| 1993 -97 | Member, Parliamentary and Scientific Committee. |
| 1996 - 2001 | Consultant to IVIC (Venezuelan Institute for Scientific Investigation) to assist commissioning of a plasma processing plant |
| 1999 -. | Technical adviser to a Syrian project to produce sturgeon in a farmed source to provide Sturgeon meat and caviar in tonne quantities |
| 2001 - | Established VWF Imports, a small operation importing equipment for production of fishing flies, materials for fly dressing and finished flies from India. |

# Main Achievements

In 1967 human plasma processing in Scotland was confined to the laboratory scale of less than 2000 litres of liquid plasma per year to provide AHF concentrate, Fibrinogen, Human Normal Immunoglobulin and Freezedried Human Albumin. The construction of the Protein Fractionation Centre, completed in 1974 and the most highly automated plant of its kind in the world at that time, allowed Scotland (5.2 million population) to become self-sufficient in all plasma fractions having a known clinical application at the time I left the position of Scientific Director in 1984. In all, 27 different products were being prepared at the centre including a number of aqueous solutions required in transfusion and clinical practice and a bovine serum prepared as a laboratory reagent containing over twenty-five analytes of precise known value. The volume of human plasma being processed had risen to over 70,000 litres per year. The design, construction and commissioning of this plant, including the development of a new, automated control approach to the operating process represents a major personal achievement.

During the course of this development the main introduction was the invention of a process of plasma fractionation that used a flowing stream in which all reagents were blended sequentially to imitate the conventional batch system used previously. This introduced time as an essential parameter in plasma processing and allowed process time to be reduced from five days to two hours; thus limiting the element of risk of valuable and scarce raw material, reducing the capital cost of installation, increasing the scale flexibility of such plants and allowing easier adoption of technology changes.

Secondary developments in centrifuge design, in means for removal of organic solvents from protein solutions and dispensing techniques allowed further reduction in product risk and increased the economy of operation. The development of a method for removal of frozen plasma from transfer packs has the effect of reducing the danger of major microbiological contamination of plasma as a process material and has been adopted as a criterion of pack design by four major manufacturers of disposable blood collection systems. New pack designs and equipment for opening the packs have been introduced to the commercial market.

Much of this work is described in over forty scientific publications and a number of patents.

An extension of this development has been designed as a more radical procedure for automated plasma processing geared particularly for application in those parts of the world where skilled manpower and pharmaceutical tradition are in short supply. This device, the Cascade Bioseparator, permits the manipulation of all of the "Cohn Parameters" including ionic strength within an environment in which it is not possible to stray away from operation under full GMP conditions.

The first example of this system was commissioned in the premises of Bioseparation Associates Ltd and was operational but the full range of its capability had not been explored when the company failed. It had been used to produce from animal plasma some fractions for veterinary application and one of these, an immunoglobulin for oral use, had been exposed to successful field trial. The device is capable of being programmed to make many hundreds of different fractions of plasma and of operation at scales previously unattainable, varying between 3.0 and 25.0 tonnes per day.

# Consultant Activity

Apart from the elements of consultancy mentioned above there have been many shorter projects for industrial

organisations and national agencies in various countries. These have been mostly in the field of plasma processing but have included also waste treatment and reclamation as well as equipment and process design in a variety of other fields. These have been invested with a degree of confidentiality but it is a matter for satisfaction that almost all clients have retained my services more than once and one or two had made arrangement for permanent access to my services until my official retirement in 2001.

# Affiliations

Membership has been accepted by the following organisations and learned societies:

The British Veterinary Association
The British Society of Haematology
The Parenteral Drug Association (USA)
The Parenteral Society (Founding Member)
The American Association for the Advancement of Science
The Association of Veterinarians in Industry
The International Association for Biological Standardisation
The Association of Consulting Scientists
The British Society of Blood Transfusion (Founding Member)
The Institute of Biology
The Scottish Society for Contamination Control
The Royal Society for the Encouragement of Arts, Manufactures and Commerce.

# Publications and Lectures

Watt, J.G. and Doxey, D.L. (1961). "The Treatment of Warfarin Poisoning in A Labrador Bitch". Vet. Rec. 73: 548.

Watt, J.G. (1962). "Fluid Replacement Therapy in the Surgical Patient". Adv. Sm. Anim. Pract. 3:76.

Spreull, J.S.A., Wilson,J.C., Head, K.W. and Watt, J.G. (1964). "Case Discussion". Adv. Sm. Anim. Pract. 5:

Fisher, E.W., Watt, J.G. and Dalton, R.G. (1965). "The Use of Dilute Acids in the Treatment of White Scours". Vet. Rec. 77: 93.

Watt, J.G. (1966) "The use of Fluid Replacement Therapy in the Treatment of Neonatal Diseases of Calves". Vet. Rec. 77: 1474.

Watt, J.G. and Stenhouse, A. 1966) "A Method of Continuous Drip Infusion". Vet. Rec. 78: 642.

Abasa, H.M., Nolan, B., Watt, J.G. and Woodruff M.F.A. (1966) "Effect of Antilymphocyte Serum on the Survival of Renal Homotransplants in Dogs". Transplantation 4: 5, 618.

Watt, J.G. (1967) "Fluid Therapy for Dehydration in Calves". J. Amer. Vet. Med. Ass. 150: 7, 742.

Bier, M., Watt, J.G., Beavers, C.D., Bruckner, G.C. and Walsh, D.E. (1967). "Continuous Recovery of Antibody by *in vivo* Electrophoresis". Append. I: Am. Chem. Soc. Symp. Calif.

Watt, J.G. and Bier, M. (1968). "Continuous Recovery of Antibody by *in vivo* Electrophoresis II". 1968, B25, Abstr. 155. National Meeting Amer. Chem. Soc.

Watt, J.G. (1968). "Fluid Therapy". In Current Veterinary Therapy III, Edited by R.Kirk and published by W.B. Saunders Co, Phil. pp16 - 24.

Clunie, G.J.A., Nolan, B., James, K., Watt, J.G. and Woodruff, M.F.A. (1968) "Prolongation of Canine Renal Allograft Survival with Antilymphocyte Serum". Transplantation 6: 3, 459.

Watt, J.G. and Logan, E.F. (1968). "Protection Studies in Colibacillosis of Newborn Calves". An invited report to the Agricultural Research Council Fact-finding Commission on Bovine Neonatal Disease. London, November 1968.

Watt, J.G., Mackie, W.S., Fell, B.F., Logan, E.F. and Mitchell, B. (1969). "Some Effects of Selective Plasmapheresis on the Plasma Proteins of the Sheep". Res. Vet. Sci. 11: 168.

Watt, J.G., (1969) "Automatically Controlled Continuous Recovery of Plasma Protein Fractions for Clinical Use: A Preliminary Report". Vox Sang. 18: 42.

Watt, J.G. (1970) "Methods and Problems Associated with the Routine Preparation of Anti-Rh Immunoglobulin". In "The Rh Problem", Edited by J.G. Robertson and F. Dambrosio. Annali Obstetrica.

Logan, E.F., Stenhouse, A., Watt, J.G. and Clark, Anna E. (1970) "Recovery of Immunoglobulin G from Horses by combination of Selective Plasmapheresis and Forced Flow Electrophoresis". Res. Vet. Sci. 11: 431.

Watt, J.G. and Smith, J.K. (1971) "Plasma Protein Fractionation". Proc. Biochem. Sept. pp 29 - 32.

Smith, J.K, Watt, J.G., Watson, C.N. and Mastenbroek, G.G.A. (1972) "Alternatives to Freezedrying for the removal of Ethanol from Plasma Proteins I: Vacuum Distillation of Human Albumin". Vox Sang. 22: 120 - 130.
Watt, J.G. (1972). "Automatic Fractionation of Plasma Proteins". Vox Sang. 23: 126 - 134.

Watt, J.G., Smith, J.K., Grant, W. and Turnbull, C. (1972). "New Developments in Large Scale Plasma Fractionation". Proc. Roy. Soc. Edin. (b)71 Suppl. pp 15 - 34.

Watt, J.G., (1974). "Isoelectricfocussing and Forced Flow Electrophoresis" Comp. Rend. Symp. Frascati, ESRO SP-101 pp 279 - 282.

Watt, J.G., and Dickson, A.J. (1977). "An Interim Report on the CSVM Fractionation Process", in Protein Separation and Plasma Fractionation. Edited by H.E. Sandberg, DHEW Publication No 8(NIH) 78-1422, Washington 1978.

Watt, J.G., (1979). "Plasma Fractionation". Clinics in Haematology 5:(1): 95 -112.

Watt, J.G., Grant, W., and Patterson, Moira R. (1979). "Experience of Changing Pyrogenicity in Albumin Solutions". Dev. Biol. Stand. 44: 69 - 74.

Hennessen, W.E, Brummelhuis, H.G.L., Chariatte, N., Geiger, H., Kistler, P., Malgras,J., Plan, R., Saint-Blancard, A., Spielmann, W., and Watt, J.G. (1979). "Collaborative Assay on Human Albumins of Different Origin". Dev, Biol. Stand. 44: 69 -74.

Watt, J.G., (1979) Epidemic Hepatitis B Caused by Commercial Human Immunoglobulin". Lancet (1): 1399 -
Patterson, Moira R., McQuillan,T., and Watt, J.G. (1979). "Recherche des Endotoxins dans les Derives Sanguins par le Test Pyrogenes sur Lapin compare au Test Limulus". Year-book, Brussels Veterinary School.

Welch, A.G., McClelland, D.B.L. and Watt, J.G. (1979). "Immunoglobulins: Characteristics and Uses of Intravenous Preparations". Proceedings of a Workshop Sponsored by the Bureau of Biologics, FDA and the National Heart, Lung and Blood Institute, Bethesda, Maryland, USA.

Foster, P.R. and Watt, J.G. (1980). "The CSVM Fractionation Process". in Methods of Plasma Fractionation. Edited by J.M. Curling, Academic Press, London. pp 17 - 31.

Foster, P.R., Dickson,A., and Watt J.G. (1981). "A Computer-Controlled, Continuous Flow Protein Fractionation Process". Second European Congress of Biotechnology, Eastbourne.

Foster, P.R., Dickson, A.J., McQuillan, T.A., Dickson, I.H., Keddie.S. and Watt, J.G. (1982). "Control of Large Scale Plasma Thawing for Recovery of Cryoprecipitate Factor VIII". Vox Sang. 42: 180 - 189.

Watt, J.G., Perry, R. and Cuthbertson, B. (1982). "Contamination of Plasma for Fractionation: A design Solution". Lancet (1): 909.

Watt, J.G. (1990) "Purification of Proteins of Low Value in High Volume" In Frontiers in BioProcessing, edited by S. Sikdar, M. Bier and P. Todd, CRC Press Baton Rouge.

Watt, J.G. (1991) "Mattresses and Cot Death". Lancet 337: 1285.