

CURRICULUM VITA

May 15, 2010

NAME AND PERSONAL DATA:

NAME: Girish J. KOTWAL

ACADEMIC DEGREES AND WHERE OBTAINED:

<u>Degree</u>	<u>Year</u>	<u>Specialization</u>	<u>Institution</u>
Ph.D.	1985	Biochemistry	McMaster University., Hamilton, Canada Thesis Title: Studies of the glycoprotein of Vesicular Stomatitis Virus (VSV)
M.Sc.	1978	Medical Biochemistry	Bombay University, Mumbai, India
B.Sc.	1976	Microbiology	Bombay University, Mumbai, India
B.Sc.	1975	Chemistry	Bombay University, Mumbai, India

ACADEMIC AND PROFESSIONAL EXPERIENCE :

1980-1984	Research and Teaching Assistant, McMaster Univ., Hamilton, Ont. CANADA
1984-1987	Visiting Fellow, Lab. of Viral Diseases, National Institutes of Health (NIH), Bethesda MD, USA
1987-1990	Visiting Associate, Lab. of Viral Diseases, National Institutes of Health (NIH), Bethesda, MD, USA
1990-1993	Assistant Member, Division of Molecular Virology, and Member Institutional Animal Care and User Committee (IACUC) Research, Cincinnati, OH, USA
1993-1999	Tenure-Track Assistant Professor, Department of Microbiology and Immunology, University of Louisville School of Medicine, Louisville, KY, USA
1999-2001	Associate Professor, Department of Microbiology and Immunology, University of Louisville School of Medicine, Louisville, KY, USA, 2001 Sabbatical Year to U. Cape Town.
2002- 2005	Adjunct Associate Professor, Department of Microbiology and Immunology, University of Louisville School of Medicine, Louisville,

KY, USA

- 2001-2006 Senior International Wellcome Trust Fellow for Biomedical Sciences in South Africa and Professor of Med. Virology University of Cape Town
- 2002- Founder and Honorary President of Kotwal Bioconsulting, Inc., KY, USA
- 2004-2006 Permanent Professor and Chair of Medical Virology and Head of the Division of Medical Virology, University of Cape Town Medical School.
- 2002- 2006 Member Institute for Infectious Diseases and Molecular Medicine,UCT
- 2004- Adjunct Professor of Medicine, U. of Massachusetts, USA.
- 2005- Founder and Honorary Acting President of InFlamed, Inc. Louisville, KY USA.
- 2009- Adjunct Professor of Traditional Chinese Medicine, Henan University, Zhengzhou, China.
- 2009 Visiting Professor, Coordinator and Instructor, Pharmaceutical Biotechnology Course, 4th quarter, Sullivan University College of Pharmacy, Louisville, KY 40205
- 2010- Professor, Pharmaceutical Sciences, Sullivan University College of Pharmacy, Louisville, KY, USA
- 2010 Honorary Forum Fellow The Courier Journal

PROFESSIONAL SOCIETIES:

- Member American Association of Colleges of Pharmacy (AACP), 2010-
- Member American Association for the Advancement of Sciences (AAAS), 1991-present
- Elected Member of the American Association for the Study of Liver Diseases (AASLD), 1993-
- Member of the American Society of Microbiology (ASM), 1993-
- Member American Heart Association (AHA), 1995-
- Member International Society for Interferon and Cytokine Research (ISICR), 1994-
- Member American Association of Immunology (AAI), 1996-
- Member International Society for Infectious Diseases, 1996-
- Member Federation of American Societies for Experimental Biology, 1996-
- Member Society for Leukocyte Biology, 1997-
- Member American Society of Virology, 1998-
- Member Society of Neuroscience, 1999-
- Member International Complement Society, 2000-

Some of the above memberships have been placed in inactive status

Elected Member of the South African Academy of Sciences, 2003-

EDITORIAL BOARDS, ADVISORY COUNCILS AND COMMITTEES

- 1993 Judging Panel member for medical student presentation on Medical School Research Day

- 1994- Member of the Graduate Admissions Committee, Faculty Performance Evaluation Committee and Equipment & Space Committee, Department of Microbiology and Immunology, University of Louisville School of Medicine, Louisville, KY
- 1994- Ad Hoc Reviewer for Infectious Diseases related grants of Veterans Affairs.
- 1995 Member junior faculty recruitment committee
- 1995- Ad hoc Reviewer for Six manuscripts submitted to Journal of Immunology
- 1995 & 97 Ad hoc reviewer of manuscripts for the Journal Gene
- 1997 Ad hoc Reviewer for the journal Life Sciences
- 1997 Member Grand Awards Judging Panel at the INTEL Int. Science Fair.
- 1997 Chair, Session on Interferon and Interferon therapy in Diseases at the symposium on Interferons and cytokines: Basic Science and clinical aspects., KFSHRC, Riyadh, Saudi Arabia
- 1998 Ad hoc reviewer for the journal Molecular Brain Research
- 1998 Ad hoc reviewer for the Journal of Leukocyte Biology, Pediatric Research
- 1998 Chair of the workshop on Immune evasion by pathogens at the International Congress of Immunology, New Delhi, India November, 05,
- 1999 Editor, Encyclopedia of LifeSciences., Nature publishers.
- 1998 Ad Hoc Reviewer for Virology
- 1999 Participated a summer program delivering lectures to the science teachers from JCPS.
- 2000 Chair, Neuroimmunology Section at the Frontiers in Spinal Cord Research, Louisville, KY, USA
- 1999 Chair, Department of Microbiology and Immunology Equipment committee
- 2001 Chair, Workshop on interaction of the immune system with CNS at the Int. Congress of Immunology, Stockholm, Sweden, July.
- 2001 Chair, IUBMB special meeting, workshop on HIV pathogenesis
- 2001- Member Health Sciences Research Committee, UCT
- 2002- Executive board Member of Acorn Technologies, Cape Town, South Africa
- 2002- Member advisory panel of the Cape Biotech Initiative/Trust
- 2002 Ad hoc reviewer J. Virology, Virus Research
- 2003 Member Director's Management Advisory Group (DMAG)., IIDMM
- 2004 Ad Hoc reviewer MRC South Africa, Member of the panel of scientific advisors for Poliomyelitis Research Foundation (PRF), South Africa. Member Special Emphasis panels of the NIH Center for scientific review, USA.
- 2001-2004 Various Selection committees for faculty of Health Sciences, UCT
- 2003 Member, organizing Committee, Cape Biotech 2003 conference, 17-18 Nov , Chair Human Health Session.
- 2004- Editorial Board of Current Alzheimer's Research
Ad hoc reviewer HIV Vaccine Research and Design Program, NIH
- 2004 -2006 Chair , Res. and Membership Selection and evaluation Committee, IIDMM
- 2005 Co-Convenor 3rd Annual Africa Genome Conf, Mar. 21-24, 2005, Nairobi, Kenya.
- 2005 Convenor First International Conference on Natural Products and Molecular Therapy, Cape Town, South Africa, Jan. 12-14, 2005.

- 2006 Organizing Committee of the First Structural Biology Symp. South Africa.
- 2006 Chair, Natural therapies in dementia Session, Nairobi, Kenya
- 2006 Ad Hoc Reviewer number of journals
- 2007 Chair, A session on Immune correlates of HIV, Budapest, Hungary.
- 2007 Ad Hoc Reviewer number of journals
- 2008 Chair, Session 12 World Summit of Antivirals (WSA), Kunming, China.
- 2008 Ad Hoc reviewer number of Journals
- 2009 Chair, Special session on Influenza A (H1N1), second WSA, Beijing, China.
- 2009 Ad Hoc reviewer number of journals.

AWARDS AND NAMED LECTURESHIP:

1. American Society of Virology Travel awards 1982,1990, 1996, 1999.
2. International Travel Award of the International Complement Committee 1993.
3. International Travel award American Association of Immunologists, 1998
- 4.. Senior Wellcome Trust International Fellow for Biomedical Science in South Africa 2001-2006/
5. Award for Research and Industry, University of Louisville, 2005.
5. Bill and Melinda Gates Foundation Travel Award for participating in Keystone conference on Influenza and viral pathogenesis, 2006

UPTODATE BIBLIOGRAPHY:

Pubmed listed 90 publications

Recent publications 2008-2010

Kulkarni AP, Randall P, Murthy KH, Kellaway LA and Kotwal GJ (2010) Investigation of interaction of vaccinia virus complement control protein and curcumin with complement components C3 and C3b using quartz crystal microbalance with dissipation monitoring technology. **Open Biochemistry journal, 4:9-21**

Ghebremariam YT Engelbrecht G, Tyler M, Lotz Z, Govender D, Kotwal GJ, Kahn D. Vaccinia virus complement control protein (VCP) improves Kidney structure and function following ischemia reperfusion injury in rats. (2010) **J. Surg. Res.** 159(2):747-754.

Thorgersen EB, Pharo A, Haverson K, Axelsen AK, Gaustad P, Kotwal GJ, Sfyroera G, Mollnes TE. Inhibition of complement and CD14 attenuates the Escherichia coli-induced inflammatory response in porcine whole blood. **Infect Immun.** 2009 Feb;**77(2):725-32**

Mathew A, O'Bryan J, Marshall W, Kotwal GJ, Terajima M, Green S, Rothman AL, Ennis FA. Robust intrapulmonary CD8 T cell responses and protection with an attenuated N1L deleted vaccinia virus. **PLoS ONE**. 2008 Oct 2;3(10):e3323.

Kulkarni AP, Pillay NS, Kellaway LA, Kotwal GJ. Intracranial administration of vaccinia virus complement control protein in Mo/HuAPP^{swe} PS1^{dE9} transgenic mice at an early age shows enhanced performance at a later age using a cheese board maze test. **Biogerontology**. 2008 Dec;9(6):405-20. Epub 2008 Aug 5.

Kalaria RN, Maestre GE, Arizaga R, Friedland RP, Galasko D, Hall K, Luchsinger JA, Ogunniyi A, Perry EK, Potocnik F, Prince M, Stewart R, Wimo A, Zhang ZX, Antuono P; World Federation of Neurology Dementia Research Group. Alzheimer's disease and vascular dementia in developing countries: prevalence, management, and risk factors. **Lancet Neurol**. 2008 Sep;7(9):812-26. Epub 2008 Jul 28.

Pillay NS, Kellaway LA, Kotwal GJ. Early detection of memory deficits and memory improvement with vaccinia virus complement control protein in an Alzheimer's disease model. **Behav Brain Res**. 2008 Oct 10;192(2):173-7. Epub 2008 Apr 7.

Kotwal GJ. Genetic diversity-independent neutralization of pandemic viruses (e.g. HIV), potentially pandemic (e.g. H5N1 strain of influenza) and carcinogenic (e.g. HBV and HCV) viruses and possible agents of bioterrorism (variola) by enveloped virus neutralizing compounds (EVNCs). **Vaccine**. 2008 Jun 6;26(24):3055-8.

Publications prior to 2008

1. Pillay, N, Kellaway, L., and Kotwal, GJ. Vaccinia virus complement control protein significantly improves sensorymotor function after severe head injury. **Brain Res**.1153:158-165 (2007)

2. Amandeep Kaur, Sukhdev Singh Kamboj, Jatinder Singh, Rajinder Singh, Melissa Abrahams, Girish J. Kotwal, and A.K. Saxena Purification of 3 monomeric monocot mannose-binding lectins and their evaluation for antipoxviral activity: potential applications in multiple viral diseases caused by enveloped viruses **Biochem. Cell Biol**. 85(1): 88–95 (2007).

3: Habte HH, Kotwal GJ, Lotz ZE, Tyler MG, Abrahams M, Rodrigues J, Kahn D, Mall AS. Antiviral Activity of Purified Human Breast Milk Mucin. **Neonatology**. 2007 Mar 14;92(2):96-104 [Epub ahead of print]

4: Thorgersen EB, Ghebremariam YT, Thurman JM, Fung M, Nielsen EW, Holers VM, Kotwal GJ, Mollnes TE. Candidate inhibitors of porcine complement. **Mol Immunol**. 2007 Mar;44(8):1827-34. Epub 2006 Nov 15.

5: Abdul Ajees A, Gunasekaran K, Volanakis JE, Narayana SV, Kotwal GJ, Murthy HM. The structure of complement C3b provides insights into complement activation and regulation. **Nature**. 2006 Nov 9;444(7116):221-5. Epub 2006 Oct 15.

6: Kotwal GJ. Avian Influenza in Humans--First Annual Conference. Latest advances on prevention, therapies and protective measures. 29-30 June 2006, Paris, France. **IDrugs**. 2006 Sep;9(9):625-6. No abstract available.

7: Liszewski MK, Leung MK, Hauhart R, Buller RM, Bertram P, Wang X, Rosengard AM, Kotwal GJ, Atkinson JP. Structure and regulatory profile of the monkeypox inhibitor of complement: comparison to homologs in vaccinia and variola and evidence for dimer formation. **J Immunol**. 2006 Mar 15;176(6):3725-34.

8: Pillay NS, Kellaway LA, Kotwal GJ. Administration of vaccinia virus complement control protein shows significant cognitive improvement in a mild injury model. **Ann N Y Acad Sci**. 2005 Nov;1056:450-61.

9: Kulkarni AP, Kellaway LA, Kotwal GJ. Herbal complement inhibitors in the treatment of neuroinflammation: future strategy for neuroprotection. **Ann N Y Acad Sci**. 2005 Nov;1056:413-29.

10: Gomes Pereira NA, Juliano MA, Carmona AK, Sturrock ED, Kotwal GJ. Cloning and expression of a functionally active truncated N-glycosylated KSHV ORF4/KCP/kaposica in the methylotrophic yeast *Pichia pastoris*. **Ann N Y Acad Sci**. 2005 Nov;1056:388-404.

11: Ballard M, Scarpato R, Kotwal GJ, Barale R. In vitro mutagenicity studies of the antiretrovirals AZT, Didanosine, and 3TC and a plant antiviral extract Secomet-V derived from the *Trifolium* species. **Ann N Y Acad Sci**. 2005 Nov;1056:303-10.

12: Kotwal GJ, Kaczmarek JN, Leivers S, Ghebremariam YT, Kulkarni AP, Bauer G, De Beer C, Preiser W, Mohamed AR. Anti-HIV, anti-poxvirus, and anti-SARS activity of a nontoxic, acidic plant extract from the *Trifolium* species Secomet-V/anti-vac suggests that it contains a novel broad-spectrum antiviral. **Ann N Y Acad Sci**. 2005 Nov;1056:293-302.

The above publication was extensively investigated both by the journal and the University and clarification had to be submitted to the Editors of the journal but after careful consideration, the editors decided neither to retract the paper nor necessary to publish the clarification.

13: Ghebremariam YT, Smith SA, Anderson JB, Kahn D, Kotwal GJ. Intervention strategies and agents mediating the prevention of xenorejection. **Ann N Y Acad Sci**. 2005 Nov;1056:123-43.

- 14: Ghebremariam YT, Odunuga OO, Janse K, Kotwal GJ.
Humanized recombinant vaccinia virus complement control protein (hrVCP) with three amino acid changes, H98Y, E102K, and E120K creating an additional putative heparin binding site, is 100-fold more active than rVCP in blocking both classical and alternative complement pathways. **Ann N Y Acad Sci.** 2005 Nov;1056:113-22.
- 15: Kulkarni AP, Ghebremariam YT, Kotwal GJ. Curcumin inhibits the classical and the alternate pathways of complement activation. **Ann N Y Acad Sci.** 2005 Nov;1056:100-12.
- 16: Abrahams MR, Zhang Z, Chien S, Skern T, Kotwal GJ.
The vaccinia virus N1L ORF may encode a multifunctional protein possibly targeting different kinases, one of which influences ATP levels in vivo. **Ann N Y Acad Sci.** 2005 Nov;1056:87-99.
- 17: Zhang Z, Abrahams MR, Hunt LA, Suttles J, Marshall W, Lahiri DK, Kotwal GJ.
The vaccinia virus N1L protein influences cytokine secretion in vitro after infection. **Ann N Y Acad Sci.** 2005 Nov;1056:69-86.
- 18: Jha P, Smith SA, Justus DE, Kotwal GJ.
Vaccinia virus complement control protein ameliorates collagen-induced arthritic mice. **Ann N Y Acad Sci.** 2005 Nov;1056:55-68.
- 19: Thorbjornsdottir P, Kolka R, Gunnarsson E, Bambir SH, Thorgeirsson G, Kotwal GJ, Arason GJ. Vaccinia virus complement control protein diminishes formation of atherosclerotic lesions: complement is centrally involved in atherosclerotic disease. **Ann N Y Acad Sci.** 2005 Nov;1056:1-15.
- 20: Ganesh VK, Muthuvel SK, Smith SA, Kotwal GJ, Murthy KH. Structural basis for antagonism by suramin of heparin binding to vaccinia complement protein. **Biochemistry.** 2005 Aug 16;44(32):10757-65.
- 21: Pillay NS, Kellaway LA, Kotwal GJ.
Molecular mechanisms, emerging etiological insights and models to test potential therapeutic interventions in Alzheimer's disease. **Curr Alzheimer Res.** 2004 Nov;1(4):295-306. Review.
- 22: Reynolds DN, Smith SA, Zhang YP, Mengsheng Q, Lahiri DK, Morassutti DJ, Shields CB, Kotwal GJ. Vaccinia virus complement control protein reduces inflammation and improves spinal cord integrity following spinal cord injury. **Ann N Y Acad Sci.** 2004 Dec;1035:165-78.
- 23: Kulkarni AP, Kellaway LA, Lahiri DK, Kotwal GJ. Neuroprotection from complement-mediated inflammatory damage. **Ann N Y Acad Sci.** 2004 Dec;1035:147-64. Review.

- 24: Billings B, Smith SA, Zhang Z, Lahiri DK, Kotwal GJ.
Lack of NIL gene expression results in a significant decrease of vaccinia virus replication in mouse brain. **Ann N Y Acad Sci.** 2004 Dec;1030:297-302.
- 25: DiPerna G, Stack J, Bowie AG, Boyd A, Kotwal G, Zhang Z, Arvikar S, Latz E, Fitzgerald KA, Marshall WL. Poxvirus protein NIL targets the I-kappaB kinase complex, inhibits signaling to NF-kappaB by the tumor necrosis factor superfamily of receptors, and inhibits NF-kappaB and IRF3 signaling by toll-like receptors. **J Biol Chem.** 2004 Aug 27;279(35):36570-8. Epub 2004 Jun 23.
- 26: Ganesh VK, Smith SA, Kotwal GJ, Murthy KH.
Structure of vaccinia complement protein in complex with heparin and potential implications for complement regulation. **Proc Natl Acad Sci U S A.** 2004 Jun 15;101(24):8924-9. Epub 2004 Jun 3.
- 27: Kotwal GJ, Abrahams MR. Growing poxviruses and determining virus titer. **Methods Mol Biol.** 2004;269:101-12. Review.
- 28: Lahiri DK, Chen D, Ge YW, Farlow M, Kotwal G, Kanthasamy A, Ingram DK, Greig NH. Does nitric oxide synthase contribute to the pathogenesis of Alzheimer's disease?: effects of beta-amyloid deposition on NOS in transgenic mouse brain with AD pathology. **Ann N Y Acad Sci.** 2003 Dec;1010:639-42.
- 29: Reynolds DN, Smith SA, Zhang YP, Lahiri DK, Morassutti DJ, Shields CB, Kotwal GJ. Vaccinia virus complement control protein modulates inflammation following spinal cord injury. **Ann N Y Acad Sci.** 2003 Dec;1010:534-9.
- 30: Scott MJ, Burch PT, Jha P, Peyton JC, Kotwal GJ, Cheadle WG. Vaccinia virus complement control protein increases early bacterial clearance during experimental peritonitis. **Surg Infect (Larchmt).** 2003 Winter;4(4):317-26.
- 31: Kotwal GJ. HIV treatment and eradication in South Africa. **J R Soc Med.** 2004 Jan;97(1):1-2. No abstract available.
- 32: Jha P, Smith SA, Justus DE, Kotwal GJ. Prolonged retention of vaccinia virus complement control protein following IP injection: implications in blocking xenorejection. **Transplant Proc.** 2003 Dec;35(8):3160-2.
- 33: Smith SA, Sreenivasan R, Krishnasamy G, Judge KW, Murthy KH, Arjunwadkar SJ, Pugh DR, Kotwal GJ. Mapping of regions within the vaccinia virus complement control protein involved in dose-dependent binding to key complement components and heparin using surface plasmon resonance. **Biochim Biophys Acta.** 2003 Aug 21;1650(1-2):30-9.

- 34: Kahn D, Smith SA, Kotwal GJ. Dose-dependent inhibition of complement in baboons by vaccinia virus complement control protein: implications in xenotransplantation. **Transplant Proc.** 2003 Jun;35(4):1606-8.
- 35: Anderson JB, Smith SA, van Wijk R, Chien S, Kotwal GJ. Vaccinia virus complement control protein inhibits hyperacute xenorejection in a guinea pig-to-rat heterotopic cervical cardiac xenograft model by blocking both xenoantibody binding and complement pathway activation. **Transpl Immunol.** 2003 Apr-Jun;11(2):129-35.
- 36: Jha P, Kotwal GJ. Vaccinia complement control protein: multi-functional protein and a potential wonder drug. **J Biosci.** 2003 Apr;28(3):265-71. Review.
- 37: Anderson JB, Smith SA, van Wijk R, Chien S, Kotwal GJ. Vaccinia virus complement control protein ameliorates hyperacute xenorejection by inhibiting xenoantibody binding. **Transplant Proc.** 2002 Dec;34(8):3277-81. No abstract available.
- 38: Lahiri DK, Kotwal GJ, Farlow MR, Sima A, Kupsky W, Sarkar FH, Sambamurti K. The role of the carboxyl-terminal fragments of amyloid precursor protein in Alzheimer's disease. **Ann N Y Acad Sci.** 2002 Nov;973:334-9.
- 39: Kotwal GJ, Lahiri DK, Hicks R. Potential intervention by vaccinia virus complement control protein of the signals contributing to the progression of central nervous system injury to Alzheimer's disease. **Ann N Y Acad Sci.** 2002 Nov;973:317-22. Review.
- 40: Smith SA, Kotwal GJ. Immune response to poxvirus infections in various animals. **Crit Rev Microbiol.** 2002;28(3):149-85. Review.
- 41: Hicks RR, Keeling KL, Yang MY, Smith SA, Simons AM, Kotwal GJ. Vaccinia virus complement control protein enhances functional recovery after traumatic brain injury. **J. Neurotrauma.** 2002 Jun;19(6):705-14.
- 42: Smith SA, Krishnasamy G, Murthy KH, Cooper A, Bromek K, Barlow PN, Kotwal GJ. Vaccinia virus complement control protein is monomeric, and retains structural and functional integrity after exposure to adverse conditions. **Biochim Biophys Acta.** 2002 Jul 29;1598(1-2):55-64.
- 43: Anderson JB, Smith SA, Kotwal GJ. Vaccinia virus complement control protein inhibits hyperacute xenorejection. **Transplant Proc.** 2002 Jun;34(4):1083-5. No abstract available.
- 44: Srisatjaluk R, Kotwal GJ, Hunt LA, Justus DE. Modulation of gamma interferon-induced major histocompatibility complex class II gene expression by *Porphyromonas gingivalis* membrane vesicles. **Infect Immun.** 2002 Mar;70(3):1185-92.

- 45: Smith SA, Kotwal GJ. Virokines: novel immunomodulatory agents. **Expert Opin Biol Ther.** 2001 May;1(3):343-57. Review.
- 46: Al-Mohanna F, Parhar R, Kotwal GJ. Vaccinia virus complement control protein is capable of protecting xenoendothelial cells from antibody binding and killing by human complement and cytotoxic cells. **Transplantation.** 2001 Mar 27;71(6):796-801.
- 47: Kotwal GJ. Approaches of the diagnosis of hepatitis viruses. **Mol Biotechnol.** 2000 Nov;16(3):271-89.
- 48: Murthy KH, Smith SA, Ganesh VK, Judge KW, Mullin N, Barlow PN, Ogata CM, Kotwal GJ. Crystal structure of a complement control protein that regulates both pathways of complement activation and binds heparan sulfate proteoglycans. **Cell.** 2001 Jan 26;104(2):301-11.
- 49: Smith SA, Mullin NP, Parkinson J, Shchelkunov SN, Totmenin AV, Loparev VN, Srisatjaluk R, Reynolds DN, Keeling KL, Justus DE, Barlow PN, Kotwal GJ. Conserved surface-exposed K/R-X-K/R motifs and net positive charge on poxvirus complement control proteins serve as putative heparin binding sites and contribute to inhibition of molecular interactions with human endothelial cells: a novel mechanism for evasion of host defense. **J Virol.** 2000 Jun;74(12):5659-66.
- 50: Jonczyk EA, Daly J, Kotwal GJ. A novel approach using an attenuated recombinant vaccinia virus to test the antipoxviral effects of handsoaps. **Antiviral Res.** 2000 Feb;45(2):149-53.
- 51: Kotwal GJ. Poxviral mimicry of complement and chemokine system components: what's the end game? **Immunol Today.** 2000 May;21(5):242-8. Review.
- 52: Keeling KL, Hicks RR, Mahesh J, Billings BB, Kotwal GJ. Local neutrophil influx following lateral fluid-percussion brain injury in rats is associated with accumulation of complement activation fragments of the third component (C3) of the complement system. **J Neuroimmunol.** 2000 Jun 1;105(1):20-30.
- 53: Mahesh J, Daly J, Cheadle WG, Kotwal GJ. Elucidation of the early events contributing to zymosan-induced multiple organ dysfunction syndrome using MIP-1alpha, C3 knockout, and C5-deficient mice. **Shock.** 1999 Nov;12(5):340-9.
- 54: Daly J, Lahiri DK, Kotwal GJ. Examination of the interactions of the amyloid precursor protein carboxyl terminus to intracellular protein: possible role in apoptosis. **Prog Neuropsychopharmacol Biol Psychiatry.** 1999 Jul;23(5):861-75.

- 55: Kotwal GJ. Virokines: mediators of virus-host interaction and future immunomodulators in medicine. **Arch Immunol Ther Exp** (Warsz). 1999;47(3):135-8. Review.
- 56: Daly J 4th, Kotwal GJ. Pro-inflammatory complement activation by the A beta peptide of Alzheimer's disease is biologically significant and can be blocked by vaccinia virus complement control protein. **Neurobiol Aging**. 1998 Nov-Dec;19(6):619-27.
- 57: Lian RH, Kotwal GJ, Hunt LA, Wilson MA, Justus DE. Dextran sulfate inhibits IFN-gamma-induced Jak-Stat pathway in human vascular endothelial cells. **Cell Immunol**. 1999 Mar 15;192(2):140-8.
- 58: Daly J 4th, Lahiri DK, Justus DE, Kotwal GJ. Detection of the membrane-retained carboxy-terminal tail containing polypeptides of the amyloid precursor protein in tissue from Alzheimer's disease brain. **Life Sci**. 1998;63(23):2121-31.
- 59: Kotwal GJ, Miller CG, Justus DE. The inflammation modulatory protein (IMP) of cowpox virus drastically diminishes the tissue damage by down-regulating cellular infiltration resulting from complement activation. **Mol Cell Biochem**. 1998 Aug;185(1-2):39-46.
- 60: Howard J, Justus DE, Totmenin AV, Shchelkunov S, Kotwal GJ. Molecular mimicry of the inflammation modulatory proteins (IMPs) of poxviruses: evasion of the inflammatory response to preserve viral habitat. **J Leukoc Biol**. 1998 Jul;64(1):68-71. Review.
- 61: Shchelkunov SN, Safronov PF, Totmenin AV, Petrov NA, Ryazankina OI, Gutorov VV, Kotwal GJ. The genomic sequence analysis of the left and right species-specific terminal region of a cowpox virus strain reveals unique sequences and a cluster of intact ORFs for immunomodulatory and host range proteins. **Virology**. 1998 Apr 10;243(2):432-60.
- 62: Kotwal GJ. Microorganisms and their interaction with the immune system. **J Leukoc Biol**. 1997 Oct;62(4):415-29. Review.
- 63: Adams G, Kuntz S, Rabalais G, Bratcher D, Tamburro CH, Kotwal GJ. Natural recovery from acute hepatitis C virus infection by agammaglobulinemic twin children. **Pediatr Infect Dis J**. 1997 May;16(5):533-4. No abstract available.

64: Miller CG, Shchelkunov SN, Kotwal GJ.

The cowpox virus-encoded homolog of the vaccinia virus complement control protein is an inflammation modulatory protein. **Virology**. 1997 Mar 3;229(1):126-33.

65: Liu PV, Kotwal GJ. Secretonac: a novel nucleic acid secreted in abundance by *Pseudomonas aeruginosa*. **Mol Microbiol**. 1996 Nov;22(3):593-4. No abstract available.

66: Miller CG, Cook DN, Kotwal GJ. Two chemotactic factors, C5a and MIP-1alpha, dramatically alter the mortality from zymosan-induced multiple organ dysfunction syndrome (MODS): C5a contributes to MODS while MIP-1alpha has a protective role. **Mol Immunol**. 1996 Oct;33(14):1135-7.

67: Lian RH, Kotwal GJ, Wellhausen SR, Hunt LA, Justus DE.

IFN-gamma-induced MHC class II gene expression is suppressed in endothelial cells by dextran sulfate. **J Immunol**. 1996 Jul 15;157(2):864-73.

68: Miller CG, Justus DE, Jayaraman S, Kotwal GJ. Severe and prolonged inflammatory response to localized cowpox virus infection in footpads of C5-deficient mice: investigation of the role of host complement in poxvirus pathogenesis. **Cell Immunol**. 1995 May;162(2):326-32.

69: Kotwal GJ. Purification of virokines using ultrafiltration. **Am Biotechnol Lab**. 1994 Sep;12(10):76-7. No abstract available.

70: Kotwal GJ, Garfield M, Kuramoto KI, Hong AL, Coligan JE, Baroudy BM. A novel approach to diagnosis of acute HCV infection in an immunosuppressed transplant recipient. **Clin Diagn Virol**. 1993 Aug;1(3):195-200. No abstract available.

71: Kotwal GJ. Routine laboratory diagnosis of hepatitis C virus infection. **J Hepatol**. 1993;17 Suppl 3:S83-9.

72: McKenzie R, Kotwal GJ, Moss B, Hammer CH, Frank MM.

Regulation of complement activity by vaccinia virus complement-control protein. **J Infect Dis**. 1992 Dec;166(6):1245-50.

73: Kotwal GJ, Baroudy BM, Kuramoto IK, McDonald FF, Schiff GM, Holland PV, Zeldis JB. Early Detection of HCV antibodies using a synthetic peptide comprising a structural epitope. **Proc Natl Acad Sci U S A**. 1992 May 15;89(10):4486-9.

74: Kotwal GJ, Rustgi VK, Baroudy BM. Detection of hepatitis C virus-specific antigens in semen from non-A, non-B hepatitis patients. **Dig Dis Sci.** 1992 May;37(5):641-4.

75: Isaacs SN, Kotwal GJ, Moss B. Vaccinia virus complement-control protein prevents antibody-dependent complement-enhanced neutralization of infectivity and contributes to virulence. **Proc Natl Acad Sci U S A.** 1992 Jan 15;89(2):628-32.

76 Kotwal GJ, Isaacs SN, McKenzie R, Frank MM, Moss B. Inhibition of the complement cascade by the major secretory protein of vaccinia virus. **Science.** 1990 Nov 9;250(4982):827-30.

77: Isaacs SN, Kotwal GJ, Moss B. Reverse guanine phosphoribosyltransferase selection of recombinant vaccinia viruses. **Virology.** 1990 Oct;178(2):626-30.

78: Kotwal GJ, Hugin AW, Moss B. Mapping and insertional mutagenesis of a vaccinia virus gene encoding a 13,800-Da secreted protein. **Virology.** 1989 Aug;171(2):579-87.

79: Kotwal GJ, Moss B. Vaccinia virus encodes two proteins that are structurally related to members of the plasma serine protease inhibitor superfamily. **J Virol.** 1989 Feb;63(2):600-6. Erratum in: **J Virol** 1990 Feb;64(2):966.

80: Kotwal GJ, Moss B. Analysis of a large cluster of nonessential genes deleted from a vaccinia virus terminal transposition mutant. **Virology.** 1988 Dec;167(2):524-37.

81: Kotwal GJ, Moss B. Vaccinia virus encodes a secretory polypeptide structurally related to complement control proteins. **Nature.** 1988 Sep 8;335(6186):176-8.

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Role of glycosylation in transport of vesicular stomatitis virus envelope glycoprotein. A new class of mutant defective in glycosylation and transport of G protein. **J Biol Chem.** 1986 Jul 5;261(19):8936-43.

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100. Kulkarni AP, Kellaway LA and Kotwal GJ.2007. Natural Neuroprotective Agents As Therapeutics for CNS diseases. **Encyclopedia of Neuroscience** (John Wiley publishers) in press.
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b. Abstracts (1988-1999)

Kotwal, G.J., A. Hugin., P. Earl and B. Moss. 1988. Mapping, sequencing and functional analysis of two secretory proteins of vaccinia virus. Abstracts of the VII International Meeting on Poxvirus/Iridovirus, Heidelberg, Germany, p.69.

Kotwal, G.J., S.N. Isaacs and B. Moss. 1990. Vaccinia virus major secretory protein is an

inhibitor of the classical complement cascade. Abstracts of the VIIIth International Congress of Virology, Berlin, Germany, Abstract #W65-2.

Kotwal, G.J., R. Blasco, S.N. Isaacs and B. Moss. 1991. Serine protease inhibitors encoded by vaccinia virus inhibit tissue plasminogen activator activity. Abstracts of the third International Workshop on Mol. and Cell. Biol. of plasminogen activator, Elsinore, Denmark, p34.

Kotwal, G.J., R. McKenzie, S.N. Isaacs, M.M.Frank, A. Davis, III, and Bernard Moss. 1992. Vaccinia virus complement-control protein (VCP) can regulate the complement cascade at multiple sites. Abstracts of the IX Int. Meeting on Poxvirus/Iridovirus, Les Diablerets, Switzerland, p149.

Jayaraman, S., S.N. Isaacs, B. Moss and G.J. Kotwal. 1992. Development of an animal in vivo model to determine the precise effects of vaccinia virus complement control protein (VCP). Abstracts of the IX Int. Meeting on Poxvirus/Iridovirus, Les Diablerets, Switzerland, p150.

Jayaraman, S. and G. J. Kotwal. 1993. In vivo studies of VCP. Abstracts of the XV Int. Complement Workshop published in Mol. Immunol., Kyoto, Japan, p. 20.

Kotwal, G. J. 1994. Poxvirus encoded proteins involved in the evasion of host defense. Abstracts of the IRIS Symp. on Mol. Mechanisms of Microbial Pathogenesis, Sienna, Italy, p 1.

Lian, R. H., G. J. Kotwal, L. A. Hunt and D. E. Justus. 1995. Inhibition of INF- γ -induced expression of MHC class II molecules by dextran sulfate in endothelial and fibroblast cell lines. 9th International Congress of Immunology, San Francisco, California, Abstract #1825, p. 308.

Miller, C.G., and G. J. Kotwal. 1995. In vivo regulation of host complement by a viral complement inhibitor. 9th Int. Congress of Immunol., San Francisco, CA Abstract #3226, p.544.

Adams, G., S. Kuntz, G. Rabalais, G. Marshall, P. J. Dailey, J. C. Wilber, C. H. Tamburro, and G. J. Kotwal. 1996. Recovery from HCV infection by compromised children. Abstracts of the 7th International Congress for Infectious Diseases, Hong Kong, Abstract # 107.005, p 259.

Adams, G., S. Kuntz, P. J. Dailey, Z. P. Guo, M. W. Yu, and G. J. Kotwal. 1996. Viral clearance and recovery from HCV infection in immunocompromised children with agammaglobulinemia. Abstracts of the Xth International Congress of Virology, Jerusalem, Israel, Abstract #PW47-10, p 230.

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fragment of beta APP using a vaccinia virus T7-EMC coupled transcription-translation system. Abstracts of the Society of Neuroscience 26th Annual Meeting, Washington, DC. Abstract #80.6, p. 189.

Daly, J., E. Patel, D. E. Justus, W. Markesbury, and G. J. Kotwal. 1996. Production of the amyloid precursor protein C-terminus using a vaccinia virus expression system. Abstracts 96th General Meeting of the American Society for Microbiology, New Orleans, USA, Abstract # H-270, p 531.

Kotwal, G. J., J. Chan, M. Tseng, L. A. Carr, D. E. Justus and J. Daly. 1996. Intracellular detection of the C-Terminal containing APP polypeptides in brain tissue. Abstracts of the Society of Neuroscience 26th Annual Meeting, Washington, DC, Abstract #204.2, p. 502.

Kotwal, G. J., A. Jonczy, J. Daly, J. 1996. Development of an assay using recombinant vaccinia virus to test the antiviral effects of hand soaps. Abstracts of the 7th International Congress for Infectious Diseases, Hong Kong Abstract # 19.006, p 38.

Kotwal, G.J., D. E. Justus, and C. G. Miller. 1996. In vitro and in vivo regulation of complement activity by a potent viral immunomodulator. Abstracts of the 7th International Congress for Infectious Diseases, Hong Kong, Abstract # 110.003, p 275.

Kotwal, G. J., A. Jonczy, and J. Daly. 1996. A new approach using an attenuated recombinant vaccinia virus to test the antiviral effects of handsoaps. Abstracts of the Xth International Congress of Virology, Jerusalem, Israel, Abstract #PW18-31, p 153.

Kotwal, G.J., D.E. Justus, and C.G. Miller. 1996. Virus-host interactions in the immunomodulation of the inflammatory response elicited by poxviruses. Abstracts of the Xth International Congress of Virology, Jerusalem, Israel, Abstract #PW33-2, p. 199.

Liu, P.V. and G. J. Kotwal. 1996. Secretonac-A novel nucleic acid secreted by Pseudomonas aeruginosa. Abstracts of the 7th International Congress for Infectious Diseases, Hong Kong, Abstract # 109.010, p 270.

Miller, C.G., D. E. Justus, and G. J. Kotwal. 1996. In vivo regulation of complement activity during cowpox virus infection. Abstracts of the XI Poxvirus and Iridovirus Meeting, Toledo, Spain, p 207.

Mahesh, J., C. G. Miller, D. Wickel, M. Cook, J. C. Peyton, W. G. Cheadle, and G. J. Kotwal. 1997 Elucidation of the mechanism of action of MIP-1 alpha and C5a in regulating the lethality of zymosan-induced MODS. Abstracts of the 4th International Congress on the Immune Consequences of Trauma, Shock and Sepsis-Mechanisms and Therapeutic Approaches. Shock 7 Suppl.:74, Abstract #293.

Miller, C. G., D. E. Justus, and G. J. Kotwal. 1997. Cowpox virus IMP modulates the inflammatory response by restricting mononuclear cell infiltration. Abstracts of the 4th International Congress on the Immune Consequences of Trauma, Shock and Sepsis-Mechanisms and Therapeutic Approaches. Shock 7 Suppl.:74, Abstract #290.

Kotwal, G.J., S. Kuntz and C.H. Tamburro. 1997. Longterm followup of the hepatitis C virus infected patients on alpha interferon therapy, combination therapy and no therapy. Abstracts of the symposium on interferons and cytokines:Basic aspects and clinical aspects, Riyadh, Saudi Arabia, Dec. 1997, p16

Howard, J. M., Totmenin, A.V., Shchelkunov, S.N. and Kotwal, G.J. 1998. Cloning of the IMP of CPV-Brighton, sequencing, multiple alignment and the evolutionary relationship to other homologs in orthopoxviruses. Abstracts of the XIIth International Poxvirus Symposium, St. Thomas, Virgin Islands, USA. June 6-10, 1998, p28

Kotwal, G.J., C.G. Miller and D.E. Justus. 1998. Elucidation of the early events to preserve viral habitat following poxviral infection. Abstracts of the XIIth International Poxvirus Symposium, St. Thomas, Virgin Islands, USA. June 6-10, 1998, p59

Kotwal, G.J. 1998. Development of an in vivo model to study viral modulation of host inflammatory response. Abstracts of the 17th Annual Meeting of the American Society of Virology, Vancouver, British Columbia, July 11-15, p 80.

Kotwal, G.J, D.E. Justus, K. Keeling and J. Daly. 1998. In vivo model for the evaluation of complement activation by Abeta. 6th International Conference on Alzheimer's Disease and related Disorders, Amsterdam, Netherlands, 18-23 July, Neurobiol. of Aging v19, Abstract #532.

Daly, J., D.K. Lahiri, and G.J. Kotwal. 1998. Presence of membrane-retained carboxy-terminal fragments of the amyloid precursor protein in brain cells from a Alzheimer's Disease subject. 6th International Conference on Alzheimer's Disease and related Disorders, Amsterdam, Netherlands, 18-23 July, Neurobiol. of Aging v19 Abstract #1136.

Kotwal, G.J., C.G. Miller and D.E. Justus. 1998. Evasion of the consequences of complement activation by IMP during cowpox virus infection serves to preserve viral habitat. Abstract of the XVII International Complement workshop, Rhodes, Greece, 11-16 October, Mol. Immunol. v35 No. 6-7, Abstract #136.

Keeling, K., J. Mahesh, R. Hicks and G.J. Kotwal. 1998. Study of the role of complement in contributing to neutrophil influx in models for multiple organ dysfunction syndrome (MODS). Abstract of the XVII International Complement workshop, Rhodes, Greece, 11-16 October, Mol. Immunol. v35 No. 6-7, Abstract #137.

Kotwal, G.J., D.E. Justus, K. Keeling and J. Daly. 1998. Evaluation of complement activation by Abeta in vivo. Abs. of the 10th Int. Congress of Immunol., New Delhi, India, 1-6 Nov., p412.

Cheadle, W.G. and G. Kotwal. 1998. Immune depression after major trauma: A major determinant of infectious morbidity and death. Abstracts of the 10th International Congress of Immunology, New Delhi, India, 1-6 November, p508.

Kotwal, G.J. 1999. AIDS Education: the underutilized, potent, proven, protective vaccine against HIV. Proceedings of the 7th Int. Conf. on AIDS, Cancer, and Related Problems, St. Petersburg, Russia, May 24-28, Russian Journal of HIV/AIDS and Related Problems T. 3, No. 1, p144.

Kotwal, G.J., V. Ioparev, A. Totmeinin, J. Esposito and S.N. Shchelkunov. 1999. Monkeypox virus, an emerging Poxvirus, Encodes for a smaller homolog of a multi-functional poxviral complement control protein. Proceedings of the 7th International Conference on AIDS, Cancer, and Related Problems, St. Petersburg, Russia, May 24-28, Russian Journal of HIV/AIDS and Related Problems T. 3, No. 1, p 164.

Kotwal, G.J., R. Parhar, D. Reynolds, K. Keeling, D. Justus and F. A. Mohanna. 1999. Multiple evasion mechanisms by a poxviral complement control protein. XIth International Congress of Virology, Sydney, Australia, 9-13 August, p151.

Reynolds, D.E., K.L. Keeling and G.J. Kotwal. 1999. Vaccinia virus complement control protein blocks MIP-1 alpha mediated chemotaxis of human monocytes. 1999 Annual Meeting of the International Society for Interferon & Cytokine Research (ISICR), September 5-9, Paris, France, J. Int. & Cytokine Res. v19, S1, p 61.

Srisatjaluk, R.J. Doyle, G.J. Kotwal and D.E. Justus. 1999. Porphyromonas gingivalis membrane vesicles inhibit IFN-gamma-induced MHC class II expression. Soc. for Leukocyte biology 15th International Congress, Churchill College, United Kingdom, September 22-26, J. Leukoc. Biol. , supplement 1999, abstract 41.

Kotwal, G.J., R. Parhar, D. Reynolds, K. Keeling, R. Srisatjaluk, D.E. Justus and F. Al-Mohanna. 1999. Down-regulation of complement and chemokine mediated innate host response by a poxviral complement regulatory protein with heparin binding activity. Soc. for Leukocyte biology 15th International Congress, Churchill College, United Kingdom, September 22-26, J. Leukoc. Biol. , supplement 1999, abstract 135.

Keeling, K.L., B. Billings, J. Mahesh, R.R. Hicks and G.J. Kotwal. 1999. Local inflammation and remote organ dysfunction following lateral fluid-percussion brain injury in rats. Proc. Soc. for Neuroscience 29th Ann. meeting, Miami, FL, USA, Oct. 23-28, abstract #126.11.

Reynolds, D.N., Zhang, Y-P, C.B. Shields, D.J. Morassutti and G.J. Kotwal. 1999. Study of the inflammatory response following spinal cord injury. Proc. Soc. for Neuroscience 29th Ann. meeting, Miami, Fl, USA, Oct. 23-28, abstract #537.4.

e. Presentations

Invited Seminars (1992-2003)

Department of Microbiology and Immunology, University of Louisville, October 16, 1992 Regulation of complement activity at multiple sites by the vaccinia virus complement control protein (VCP).

Department of Hepatology, Mount Sinai Hospital Research Center, New York City, January 25, 1993, "Molecular diagnosis of HCV."

Division of Viral Hepatitis, New York Blood Center, New York City, January 26, 1993, "Advances in HCV diagnosis."

Genelabs, San Antonio, Texas, March 1993, "Routine Laboratory Diagnosis of HCV."

Department of Microbiology and Immunology, University of Louisville, December 09, 1993, "Biological and clinical aspects of hepatitis C virus."

Department of Medicine and Pediatrics, Washington University, St. Louis, May 1994, "Poxviral evasion of the complement system."

Role of complement in poxvirus pathogenesis. Gordon Research Conference on Viruses and Animal Cells, New Hampshire, June 1995.

International Laboratory of Molecular Biology for Tropical Disease Agents, University of California, Davis, July, 1995, "Virokines and viroceptors as mediators of viral Star Wars."

Department of Psychiatry, Indiana University Medical School, Indianapolis, IN November, 1995, "Use of vaccinia virus in the understanding of the molecular pathogenesis of viral infections and CNS disorders."

Biogen, Cambridge, MA, June 1996, "Immunomodulation of the inflammatory response by a conserved poxviral complement control protein."

Department of Anatomical Sciences and Neurobiology, University of Louisville School of Medicine, November 1996, "Use of poxviruses in the understanding of inflammation and Alzheimer's Disease."

Institute of Molecular Virology, Munich, Germany, March 4, 1997, "Viral interactions with the host immune system."

Department of Dermatology, University of Geneva, Geneva, Switzerland, March 11, 1997, "Use of poxviruses to understand inflammation and Alzheimer's Disease."

Centro Nacional De Biotechnologia, Madrid, Spain, March 17, 1997, "Modulation of inflammation by poxviruses."

INSERM, Lyon, France, March 19, 1997, "Immune responses to viral infections."

Universite Paris V Rene Descartes. Paris, France, April 17, 1998, Viral immunomodulation of host immune response.

The Terry Fox Laboratory, Vancouver, Canada, July 10, 1998. Undersanding the end game of viral evasion of host immune response.

Department of Biological Sciences, Tata Institute of Fundamental Research, Bombay (Mumbai), India, October 20, 1999. Virokines and Viroceptors: protectors of viral habitat.

Center for Advanced Study in Zoology, Banares Hindu University, Varanasi, India, October 27, 1998. Virokines and Viroceptors as mediators of Immune evasion of Host defense and possible future therapeutics.

Universidad Evangelica de El Salvador, San Salvador, El Slavador, March 15, 1999. Role of complement related inflammation in Alzheimer's Disease. Role of vaccinia virus complement control protein in down regulation of inflammatory response in Alzheimer's Disease.

Institute of Immunology, Helsinki, Finland, May 21, 1999. Modulation of complement activation in Alzheimer's Disease by vaccinia virus complement control protein.

Division of Virology, Institute of Biomedical and Life Sciences, University of Glasgow, Scotland, September 21, 1999. Evasion of host defense by a conserved poxviral inflammation modulatory protein.

Department of Clinical Veterinary Medicine, University of Cambridge, England, September 22, 1999. Vaccinia virus complement control protein: Amultifunctional immunomodulatory protein involved in the evasion of host inflammatory response.

Pirbright Animal Health Institute, Woking, England, September 24, 1999. Development of animal models to evaluate the therapeutic potential of vaccinia virus complement control protein.

Institute of Immunology, Oslo, Norway, April 2000. Viral evasion of host defense.

Department of Obstetrics and Gynaecology, March 06, 2003, University of Cape Town, Cape Town, South Africa

Keynote/Invited presentations at symposia

Molecular diagnosis of HCV. V International Symposium on viral hepatitis. Madrid, Spain, Jan. 1992.

Strategies for immunomodulation and evasion by microbes: important consideration in the development of live vaccines. Symposium in Immunology VII, Barcelona, Spain, March 21-22, 1997.

Interferon therapy in viral hepatitis. Symposium on Interferons and Cytokines: Basic Science and Clinical Aspects, Riyadh, Saudi Arabia, December 9-10, 1997.

Viral immunomodulation of cytokine response. Symposium on Interferons and Cytokines: Basic Science and Clinical Aspects, Riyadh, Saudi Arabia, December 9-10, 1997.

Assessment of a novel poxviral complement control protein in models for infection, trauma and Alzheimer's Disease. International symposium on Complement in human Diseases, New Delhi, India, 29-31 October 1998.

Evaluation of the therapeutic potential of a viral immunomodulatory protein. Second Virology Symposium of the International Centre for Genetic Engineering and Biotechnology, New Delhi, India, 9-11 November 1998.

Employing viral evasion strategies for modulating inflammation contributing to CNS injury and xenotransplant rejection. Joint UCT, UWC, US and MRC 4th annual Astra Zeneca Research Day, Thursday 25 October 2001, Cape Town, South Africa.

Viral Defense Molecules Encoded by viral Genomes for evasion of host Defense, The Human genome and Africa 19-22 March 2003, Cape Town, South Africa.

Role of complement mediated inflammation in Neurodegeneration Disorders at the 10th Federation of Asian & Oceanic Biochemists and Molecular Biologists, Bangalore, India, December 7-11, 2003

2003-2007

Invited Presentations were made in Tian Jin China (World AIDS Day, 2006, Scotland (University of Edinburgh, 2007 and 2008), Nairobi, Kenya (Africa Genome Conference, 2005, Dementia in Developing world, 2007) South Africa (Virology meeting 2003 and 2005, Astra Zeneca Research day 2003, IIDMM 2004) , USA (UNASS 2005 and NIAID Rocky Mountain Labs 2005), Paris, France (Institute Pasteur Influenza Conference 2006), Budapest Hungary (Conference on Immune Correlates of Protection 2007), Egypt (Africa Genome Conference 2004), India (Wellcome Trust Fellows Conference 2004, Indian Society of Neuroscience Silver Jubilee conference, 2007).

12. RESEACH FUNDING

National Institutes of Health Grant AI-23482, "Immunobiology of genital HSV-2 infection in guinea pigs:" D. I. Bernstein , P.I.; G. J. Kotwal, Co-I; \$909,585, April 1, 1991 - June 30, 1996.

University of Louisville Graduate School Research Grant, "Overexpression of vaccinia virus-encoded complement regulatory protein," G. J. Kotwal, P. I., \$3,700, Jan. 1 - June 30, 1994.

University of Louisville Graduate School Research Grant, "Expression of the APP of Alzheimer's disease in the vaccinia virus T7-EMC system," G. J. Kotwal, P. I., \$3,000, 1995.

University of Louisville School of Medicine Research Committee Award, "Elucidation of the mechanism for the evasion of host defense," G. J. Kotwal, P. I., \$8,490, 1995 - 1996.

University of Louisville School of Medicine Research Committee Grant, "Regulation of -interferon induced MHC class II proteins in human cells by dextran sulfate," D. E. Justus, P.I., G. J. Kotwal, Co-I., L. A. Hunt, Co-I., \$8,900, Nov. 1, 1995- Oct. 31, 1996.

University of Louisville Graduate School Project Completion Grant, "Expression of the APP of Alzheimer's disease in the vaccinia virus T7-EMC system," G. J. Kotwal, P. I., \$3,800, 1996.

Jewish Hospital Foundation Grant, "Evaluation of dextran-sulfate for its potential use in preventing allograft rejection," D. E. Justus, P.I., G. J. Kotwal, Co-I., L. A. Hunt, Co-I., \$40,000, May 1996 - May 1999.

NIH R29 grant, “Immunoregulation by soluble IL-4 receptor”, R. Fernandez, PI, G.J. Kotwal, consultant, \$349,877 (Direct), \$161,000 (Indirect), Dec. 01, 1994-Nov. 30, 1999.

NSF-EPSCoR Program for Structural Biology. L. Hersh, P.I.; G. J. Kotwal, Project Director, Determination of three dimensional structure of the vaccinia virus complement control protein, \$50,000, (from total of \$3,000,000 for entire program), 1996-98.

University of Kentucky Foundation/KSCHIRB Subcontract, The role of complement in head trauma. G.J. Kotwal, PI, \$138,040, 1998-2001.

KY SPINAL CORD AND HEAD INJURY RESEARCH BOARD, The effect of Immunomodulation of spinal cord injury. G.J. Kotwal, PI, \$275,000 direct plus \$27,500 indirect, 1999-2002.

Department of VA Merit Review Application. Surgical Peritonitis:Local Peritoneal and Remote Organ Responses. William G. Cheadle, PI, G.J. Kotwal, Co-I, \$633,500, 1998-2003.

Sr. Wellcome Trust Fellowship, Structure-function Relationship of vaccinia virus complement control protein. G.J. Kotwal, PI, Rand 6 million (approx. \$1 million) total, 2001-2006.

Wellcome Trust Instrumentation grant for state of the art protein purification facility Rand 1 million, 2002-2005.

University of Cape Town Equipment Committee grant R212,000 to purchase equipment to develop a state-of-the art biosafety level 3 facility.

University of Cape town Equipment Committee grant R557,000 (\$100,000) to purchase Q-sense equipment to study protein-protein interactions.

National Institutes of Health (NIH) 1R01AI070940-01AI grant to study Mechanisms of Vaccinia virus Innate Immune Inhibition. Period of support 2007-2012, PI William Marshall, Girish J. Kotwal Consultant, percent effort 10%.

National Institutes of Health (NIH) 1R21AI069167-01A2 grant to study Inhibiting the inhibitor: Small molecule screening with smallpox N1L. Period of support 2007-2009, PI Neal Silverman, Girish J. Kotwal, Consultant, percent effort 5%.

TEACHING

a. Classroom teaching and course direction

MBIO 601 Medical Microbiology

(Fall semester, 8 credit hours; required introductory course for Ph.D. and M.S. students)

Immunology section: D.E. Justus, L. A. Hunt & G. J. Kotwal, co-directors

Virology section: L. A. Hunt, director; G. J. Kotwal, G. S. Marshall

Lecture titles:

- Complement and cytokines (fall 1995)
- Transplantation and Rejection (fall 1996,1997, 1998)
- Genetic Immunodeficiencies (fall 1997, 1998)
- Autoimmunity (fall 1997, 1998)
- Microbial evasion of host defense (fall 1997, 1998)
- Hepatitis viruses (fall 1994,95, 96 and 97)
- Hepatitis viruses clinical correlation (fall 1994, 1995, 1996, 1997 and 1998)
- Poxviruses and recombinant vaccinia viruses and immune evasion by viruses (fall 1994, 1995 1996, 1997, 1998, 1999, 2000)

MBIO 631 Dental Microbiology and Immunology

(Fall semester, 3 credit hours)

Virology section: L. A. Hunt, director; G. J. Kotwal

Lecture title: -Hepatitis viruses (fall 1994, 1995, 1996, 1998,1999,2000); autoimmunity (fall 1998)

MBIO 658 Cellular and Molecular Immunology

(Spring semester, alternate years ['96,'98], 3 credit hours; advanced course for required for Ph.D. students) D.E. Justus, L. A. Hunt & G. J. Kotwal, course co-directors; S. R. Wellhausen

Lecture Titles:

- Intracellular signaling mechanisms in lymphoid cell activation
- Cytolytic mechanisms of CTLs and NK cells
- Complement pathways & complement regulatory proteins
- Immune responses against tumors
- Mechanisms of apoptosis in the immune system
- transgenic and knockout mice
- Modern vaccine design & immunization
- HLA & TCR genes in autoimmunity
- cellular and molecular mechanisms of autoimmunity

MBIO 670 Fundamental Virology

(Spring semester, 1994, 3 credit hours; advanced course required for Ph.D. students) L.A.

Hunt, course director, G.J. Kotwal **Lecture titles:** 1.) Biology of hepatitis B and D viruses

2.) New hepatitis viruses: HCV, HEV, 3) Biology of poxviruses:smallpox, vaccinia.

MBIO 670 Molecular Virology

(Spring semester, alternate years [96 , 98], 3 credit hours; advanced course required for Ph.D. students) L. A. Hunt, course director; G. J. Kotwal, course co-director

Lecture Titles:

- Hepadnaviruses (hepatitis B virus)
- Hepatitis D virus & viroids
- Flaviviruses: hepatitis C virus and yellow fever virus
- Caliciviruses: Hepatitis E virus and Norwalk viruses
- Poxviruses: structure and life-cycle.
- Virokines & viral evasion of the host immune system
- Recombinant vaccinia viruses and live-attenuated vaccines
- Recombinant baculoviruses for production of subunit viral vaccines

MBIO 600 Special Projects in Microbiology

(Fall 1996, Spring 1997, fall 1997, spring 1998, fall 1998 and spring 1999 semesters) 1 credit hour each; laboratory exercises, demonstrations & conferences in virology, immunology & bacteriology; required for Ph.D. students): G. J. Kotwal, course director.

MBIO 606 Seminar

(Spring 1996 and fall 1997 semester, 1 credit hour; Discussion of the most recent journal articles in Microbiology and Immunology): G.J. Kotwal course director for discussion of journal club articles.

Module on viral evasion of host defense taught to Honours students in Infectious Diseases at UCT 2001,2002 and 2003.

Module on protein expression and purification taught at UCT in the Carnegie funded MSC structural Biology program 2003

b. Training of Graduate Students

Dissertation Director/primary advisor in training of the following former graduate students

Cathie Miller, Ph.D. 1997 (Graduate Dean's citation). "Elucidation of the *in vivo* role of the cowpox virus inflammation modulatory protein." Current status: Postdoctoral Research Fellow, Wistar Institute & Department of Microbiology, Univ. of Pennsylvania, Philadelphia, PA, USA. Currently Assistant Professor at Ford Foundation Research Center, Detroit Michigan., USA

Jyothi Mahesh, M.S. 1997. "Elucidation of the role of MIP-1 and C5a in regulating the cellular changes associated with the lethality of zymosan-induced multiple organ dysfunction syndrome." Status after completion: Research Assistant, Division of Cardiology, Department of Medicine, University of Louisville School of Medicine, Louisville, KY, USA.

Sean T. Kuntz, M.S. 1997. "Evaluation of the utility of RT-PCR in the diagnosis and monitoring of disease progression and treatment of HCV infection." Current status: Laboratory Manager, Division of Cardiology, Department of Pediatrics, University of Florida, Gainesville, FL, USA. .

James Daly, IV, Ph.D. 1998. Role of the amyloid precursor protein carboxyl-terminus in the pathogenesis of Alzheimer's Disease. Current status: Postdoctoral fellow, Department of Microbiology and Immunology and Student of Law at Louis D. Brandies law School, Louisville, KY, USA. Summer job. Procter and Gamble Legal Dept.. Currently patent attorney at Jenkins Wilkins and Taylor, North Carolina

Jeremy Howard, M.S. 1998. Nucleotide sequence of the cowpox viral inflammation modulatory protein and purification of the vaccinia viral complement control protein from natural infection and pichia pastoris yeast expression system. Current Status: Research Assistant, Procter and Gamble Research Center, Cincinnati, USA

Kristen Keeling, B.A., Ph.D. 2001; Vaccinia virus complement control protein enhances functional recovery following head injury. Current status project Manager, Dept. of Pathology, University of Louisville School of Medicine, Louisville, KY 40202, USA

David Reynolds, B.S. , Ph.D. 2003, Immunomodulation of spinal cord injury Current Status, Dept of Surgery, University of Louisville, Louisville, KY 40202, USA and full time medical student.

Maj. Jamie Anderson, D.V.M., Ph.D. 2001. Role of VCP in xenotransplantation. Current Status: Branch Chief Respiratory organisms, USAMRIID, USA, currently Lt. Colonel.

Scott Smith, Ph.D. 2002. Structure-function studies of the vaccinia virus complement control protein Current status: part-time post doc and full time medical student.

Yu Li, M.Sc. 2001 Gene therapy using lentivirus vectors. Current status: Research Associate Amersham Pharmacia, Chicago, USA

Barry Billings, M.S. 2001 In vivo characterization of a neurovirulence factor encoded by vaccinia virus Current Status. Research Associate. Department of Pediatrics, University of Louisville, USA, Studying Dentistry.

Jeanette Neuman, M.Sc. 2003 University of Cape Town and Berlin University, Germany

Purushottam Jha, Ph.D. 2003 Modulation of complement in rheumatoid arthritis. Current status. Post doctoral fellow Department of Ophthalmology, UofL, Louisville, KY, USA.

Zhouning Zhang, Ph.D. 2005, University of Louisville School of Medicine, Louisville, KY 40202, USA.

Jeanette Neuman, M.Sc. 2003 University of Cape Town and Berlin University, Germany

Melissa Abrahams, M.Sc. 2005. University of Cape Town, South Africa

Neuza Gomes Perreira M.Sc. 2005. University of Cape Town, South Africa

Nirvana Pillay, Ph.D. 2006. University of Cape Town, South Africa.

Michelle Nderu, B.Sc. (Hons) 2005. University of Cape Town, South Africa

Phillipa Randall, B.Sc. (Hons) 2006. University of Cape Town, South Africa

Pumza Phillips, B.Sc. (Hons) 2006 University of Cape Town, South Africa.

Yohannes Ghebremariam, Ph.D. 2006 University of Cape Town, South Africa

Erica Pettersson, M.Sc, 2006 University of Cape Town and University of Kalmer, Sweden

International Persons hosted

Ms Soad Saleh from KFSHRC, Saudi Arabia (1999)

Ms Jennifer Chen, Cornell, USA (2003)

Prof. Timothy Skern (2005)

Post doctoral personnel

(1) James Daly, Ph.D., (1999), (2) Ming Yan-Yang, M.D. (2000- 2001). (3) Santosh Sinha , Ph.D. (2001). (4) Srihari Arjunwadkar, Ph.D. (2001-2002).(5) Dr. Odutayo Odunuga (2003-2004), 6.) Dr. Makobetsa Khati (2004-). 7.) Dr. Shailaja Rao (2001-2003).

Dissertation co-director for the following former graduate student

Dr. Rebecca Lian 1996 . “IFN-gamma-induced MHC class II gene expression is suppressed in endothelial cells by dextran sulfate”. Currently at the Terry Fox Cancer Research Institute, Vancouver, BC, Canada as a post doctoral research fellow.

Served on dissertation advisory committee of the following ex-Ph.D. students

- 1.) Dr. Brian Thornton (1995)
- 2.) Dr. Mengtao Li (1995)
- 3.) Dr. Lisa Williams (1996)
- 4.) Dr. Yuhe Ma, M.D. (1996)
- 5.) Dr. Paula Chilton (1996)
- 6.) Dr. Pat Coxon (1997)

- 7.) Dr. Chris Whitehouse (1997)
- 8.) Dr. Rachapin Srisatjaluk (2001)

PRESENTATIONS TO MEDICAL RESIDENTS OF DIVISION OF RESPIRATORY AND ENVIRONMENTAL MEDICINE (1995-1997)

Topic covered: Complement and Pulmonary Diseases. Immune consequences of Trauma, Shock and Sepsis.

HIGH SCHOOL SCIENCE MENTORING ACTIVITIES FOR WOMEN AND MINORITIES

Provided projects, laboratory training and preparation for science fair competition and symposia to the following two students from Manual High School, Louisville, KY

- 1.) Ms Ann E. Jonczy
- 2.) Ms Dionna Owens

Ms Ann E. Jonczy won the first prizes in the Microbiology Category, awarded and separately judged by the Navy, Air Force and the University of Louisville at the regional science fair. This prize included free tuition for the first year at U of L.

Ms Dionna Owens a minority student received an A grade in the science project conducted in her mentor's lab. and is pursuing college education (Depaw, IN) in Science and received about \$20,000/ year in scholarships.

DIRECTION OF SUMMER RESEARCH PROGRAM WITH FUNDS FROM NSF & EPSCoR

Students trained in the summer of 1997

- 1.) Ms Elizabeth Ann Jonczy
- 2.) Ms Kristen Keeling, B.A.
- 3.) Ms Jyothi Mahesh, M.S.
- 4.) Ms Melissa Hiser.

LABORATORY TRAINING OF FORMER MINORITY MEDICAL STUDENT

1994-1995 Damon Davis, M.D. (U of L graduate 1997)

U.S. PATENT APPLICATIONS PUBLISHED AND ISSUED (To be updated)

1.) Kotwal, G.J. and Moss, B.(Filed August 20,1988). Synthetic anti-complement protein. U.S. Patent 5,157,110 (Issued October 20, 1992)

2.) Kotwal, G.J. and Moss, B. (Filed December 16, 1988). Gene encoding serine protease inhibitor. U.S.Patent number 5,151,509 (Issued September 29, 1992).

3.) Kotwal, G.J. and Moss, B. (Filed July 01, 1992). Synthetic anti-complement protein and the gene encoding same U.S. patent number 07/906,983 (Issued Feb. 1993).

4.) Kotwal GJ and Daly J. Application of a viral complement inhibitory protein in the treatment and diagnosis of Alzheimer's Disease United States Patent 7084106

EUROPEAN PATENT APPLICATION FILED AND PUBLISHED

Kotwal, G. J. and Baroudy, B. (1992). Basic structural immunogenic polypeptides having epitopes for HCV, antibodies polynucleotide sequences and vaccines. International patent application published under the patent cooperation treaty (PCT).

PATENTS FILED AND PENDING

Kotwal, G.J., Parhar, R. and Al-Mohanna, F. (1999) Novel therapeutic use of viral inflammation modulatory protein in blocking xenograft rejection.

Kotwal, G.J. and Hicks, R. (2000) Use of an antiinflammatory poxviral protein to improve functional recovery following head trauma injury.

Kotwal, G. J. (2003) Use of a vaccinia virus complement control protein to preserve spinal cord integrity following injury.

Kotwal, G. J. and Purushottam, Jha (2003) Use of vaccinia virus complement control protein in treatment rheumatoid arthritis.

Kotwal et al.; Therapeutic Method (Composition and Methods for Reducing Central Nervous System Damage); U of L Ref No: 01008				
<i>F&R Ref (17541-)</i>	<i>Serial No.</i>	<i>Filing Date</i>	<i>Status</i>	<i>Action</i>
026P01	60/306,671	07/20/2001	Expired	NA
026001	10/199,979	07/19/2002	Pending	Response to Final Office Action and RCE filed 7/11/2007

Kotwal; Treatment of Spinal Cord Injury; U of L Ref No: 04004				
<i>F&R Ref (17541-)</i>	<i>Serial No.</i>	<i>Filing Date</i>	<i>Status</i>	<i>Action</i>
031P01	60/500,667	09/05/2003	Expired	NA
031WO1	PCT/US04/028794	09/03/2004	Expired	NA
031US1	10/570,402	03/03/2006	Pending	Awaiting 1 st Office Action

Kotwal et al.; Treatment of Rheumatic Diseases; U of L Ref No: 04005				
<i>F&R Ref (17541-)</i>	<i>Serial No.</i>	<i>Filing Date</i>	<i>Status</i>	<i>Action</i>
032P01	60/500,666	09/05/2003	Expired	NA
032WO1	PCT/US04/028936	09/03/2004	Expired	NA
032US1	10/570,621	03/03/2006	Pending	Awaiting 1 st Office Action

Kotwal et al.; Alzheimer's Disease; U of L Ref No: 80708				
<i>F&R Ref (17541-)</i>	<i>Serial No.</i>	<i>Filing Date</i>	<i>Status</i>	<i>Action</i>
033P01	60/116,328	01/19/1999	Expired	NA
033WO1	PCT/US00/01115	01/19/2000	Expired	NA
033US1	09/889,624	11/07/2001	Issued	U.S. Patent No. 7,084,106