

# Curriculum Vitae

## **HUSSEIN A. MASOUD, Ph.D.**

(Professor of Microbiology)

Department of Biological Sciences.

Faculty of Science.

The University of Jordan.

Amman-Jordan.

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### **Personal:**

Date of birth: July 21<sup>st</sup>, 1957.

Place of birth: Amman, Jordan.

Citizenship: Jordanian.

Marital status: Married, 3 children

### **Research:**

**Highly motivated to study surface antigens of pathogenic bacteria, in order to conjugate the polysaccharide antigens to protein carriers. The resulting glycoconjugates can be used as candidates to develop protective vaccines and/or specific diagnostic antibody reagents. Also, highly interested to prepare new adjuvants to stimulate the immune system to produce antibodies against antigens.**

### **Experience:**

**Sept. 1997-  
present**

**The University of Jordan  
Faculty of Science  
Department of Biological Sciences**

Lecturer Sept. 1997 - Nov. 1998

Assistant Professor Nov. 1998 - Sept. 2003

Associate Professor Sept. 2003 - Oct. 2008

Professor Oct. 2008 - present

### **Academic work**

#### **I. Taught Courses:**

a. Undergraduate courses:

1. General Biology (1<sup>st</sup> year level)
2. Practical General Biology (1<sup>st</sup> year level)
3. General Microbiology (3<sup>rd</sup> year level)
4. Microbial Biotechnology (4<sup>th</sup> year level)
5. Applied Microbiology (4<sup>th</sup> year level)

b. Diploma course:  
Immunology

- c. Graduate Courses:
1. Advance Microbiology
  2. Microbial Physiology
  3. Microbial Ecology

II. Supervised several graduate students and participated in examination committees for several graduate students.

### **Research Work**

- I. Survey studies and serotyping of human and animal pathogenic bacteria in Jordan such as *Salmonella gallinarum (pullorum)*, *S. enteritidis*, *Pseudomonas aeruginosa*, and *Escherichia coli*. Determine the most prevalent strains, of such pathogenic bacteria, in Jordan using serological and PCR techniques. Isolation of the most important surface antigen of the bacteria (lipopolysaccharide (LPS)) in pure form. Study the biological properties and the chemical composition of the LPS. Furthermore, conjugation of the antigenic O-chain polysaccharides from LPSs of the most prevalent strains to protein carriers. These glycoconjugates can be used as candidates to develop protective vaccines and/or diagnostic antibody reagents.
- II. Preparation and development of new adjuvants and study the efficiency of the new adjuvants compared to the commercially available ones in order to stimulate the immune system to produce antibodies against antigens.
- III. The structural characterization of the LPS molecules from various strains and mutants of *Haemophilus influenzae* with Dr. James C. Richards, National Research Council, Ottawa, Canada.

**Feb. 2006-  
Dec. 2006**                      **National Research Council of Canada, Ottawa.  
Institute for Biological Sciences.  
Section of Structural Immunochemistry.**

Visiting Scientist in the bacterial pathogenesis group in the Laboratory of Dr. James Richards (The Director General of Institute for Biological Sciences).

1. Worked on the conjugation of the oligosaccharide from LPS of *Moraxella catarrhalis* serotype A mutant *lgt2* to CRM<sub>197</sub> protein.
2. In collaboration with Campagnari group (Department of Microbiology and Immunology, State University of New York at Buffalo, Buffalo, USA), Structural characterization of LPS from various mutants of *Moraxella catarrhalis* in order to understand the biosynthetic pathway for the core oligosaccharide.
3. Structural characterization of the core oligosaccharide from LPS of *Burkholderia capacia* serotype O4.

**Sept. 1996-  
Aug. 1997**                      **National Research Council of Canada, Ottawa.  
Institute for Biological Sciences.  
Section of Structural Immunochemistry.**

Research Officer in the bacterial pathogenesis group.

Worked on structural characterization of the endotoxins from nontypable *Haemophilus influenzae*. Also, worked on extraction and conjugation of the bacterial oligosaccharide antigens to carrier proteins.

**Sept. 1991-  
Aug. 1996.**                      **National Research Council of Canada, Ottawa.  
Institute for Biological Sciences.  
Section of Structural Immunochemistry.**

Research Associate with Dr. M. B. Perry & Dr. J. C. Richards.

1. Isolation and structural characterization of the specific capsular polysaccharide of *Rhodococcus equi* serotype 7.
2. Isolation and structural characterization of the rough type LPS (lipid A & core regions of the endotoxin) from the pathogenic bacteria *Moraxella catarrhalis*.
3. In collaboration with Dr. R. Moxon (Institute of Molecular Medicine, John Radcliffe Hospital, Oxford, UK), LPSs (endotoxins) of several wild strains and their derived mutants from the pathogenic bacteria *Haemophilus influenzae* type B (Eagan) were isolated and their detailed chemical structures were elucidated, in order to understand the relationship between chemical structure and biological properties.
4. Preparation of several glycoconjugates by attaching oligosaccharides derived from LOSs of *M. catarrhalis* and *H. influenzae* to protein carriers. These glycoconjugates could be used as candidates to develop

protective vaccines and/or specific diagnostic antibody reagents.

5. Structural elucidation of the O-chain polysaccharide from *E. coli* O17.
6. Structural characterization of the capsular polysaccharide of *Burkholderia pseudomallei* strain 304B.

**Aug. 1990-  
Aug. 1991.**                    **Department of Microbiology.  
University of Guelph, Canada.**

Postdoctoral Fellow with Prof. J. S. Lam. Research was conducted at the National Research Council of Canada with Dr. J.C. Richards & Dr. E. Altman.

Isolation and characterization of the endotoxin core oligosaccharides from two mutants (A28 and R5) derived from the opportunistic pathogen *Pseudomonas aeruginosa* serotype O6.

**Sept. 1989-  
School.**                    **Department of Periodontics, Dental  
Aug. 1990.**                    **University of Texas, San Antonio, Texas, USA.**

Postdoctoral Fellow with Dr. S. Holt.

Structural characterization of the lipid A from the pathogenic bacteria *Actinobacillus actinomycetemcomitans* and determination of its lethal toxicity on mice.

**1985-1989**                    **Department of Microbiology.  
University of Freiburg, Freiburg, Germany.**

Teaching:            Assisted teaching practical courses in microbiology.

### **Education:**

University of Freiburg, Freiburg, Germany.  
Faculty of Biology.  
Department of Microbiology.  
Ph.D. degree, July 1989.

The dissertation title “Chemical and biological studies on lipopolysaccharides of *Rhodocyclus gelatinosus* and *Sphaerotilus natans*, and on two “haptenic “ polysaccharides of *Rhodocyclus gelatinosus*”. The

Ph.D. work was conducted in Max-Planck-Institute for Immunobiology, Freiburg, Germany, under supervision of Dr. Hubert Mayer.

University of Freiburg, Freiburg, Germany.  
Faculty of Biology.  
Department of Microbiology.  
Equivalent exam to the German "Diploma" in Biology, Sept. 1986.

University of Jordan, Amman, Jordan.  
Faculty of Agriculture.  
Department of Plant Protection.  
M.Sc. degree, June 1983.  
The M.Sc. thesis title “ Bioassay and chemical analysis of dicofol residue on cucumber under plastic houses and plastic tunnels in the Jordan Valley”, under supervision of Prof. Ibrahim Nazer.

University of Jordan, Amman, Jordan.  
Faculty of Agriculture.  
Department of Plant Production and Protection.  
B.Sc. degree, June 1980.

### **Training:**

1. Attended a training workshop for new staffs at the University of Jordan ( Sept., 1998).
2. Two computer courses in Algonquin College, Ottawa, Canada. (Fall & spring semesters 1996-1997).

### **Scholarships:**

1. University of Jordan for M.Sc. Study (1980-1982).
2. German academic exchange service (DAAD) for Ph.D. study (1984-1989).

### **Scientific & Academic Activities:**

#### **Department of Biological Sciences Committees:**

1. Supervisor and co-advisor of several M. Sc. Students.
2. Supervised many 4<sup>th</sup> year students in their research projects.
3. Participated in several M. Sc. defense committees.
4. Participated in preparing graduate student exams (qualifying Ph. D. exam and comprehensive M. Sc. exam).
5. Member in several departmental committees: the 1<sup>st</sup> year

students committee (2001-2002), graduate students committee (1997-1998), curriculum committee for bachelor degree in biology (1999-2000 & 2001-2002), safety committee in the department (1997-1998 & 1998-1999), representative for the Department of Biological Sciences in the Faculty of Science Council (1999-2000), biology building and instrumentation committees (2002-2003, 2003-2004, 2004-2005, and 2005-2006), animal house committee (2003-2004, 2008-2009), graduate student committee (2004-2005) and member of the communication with the society committee and scientific day committee (2003-2004 and 2004-2005).

### **University Committees:**

1. Committee member for establishment of biotechnology center, supported by Hamdi Mango Center for Scientific Research, University of Jordan, Amman-Jordan.
2. Member of the organization committee for Jordanian Conference of Biology and Medical Laboratory Sciences. The University of Jordan.
3. Committee member in the workshop in the field of biotechnology with experts from Cornell University, Strategic Studies Center, University of Jordan.
4. Animal house and instrumentations committee.

### **Other Committees:**

1. Contributed in developing the curriculum for graduate program in biotechnology, Faculty of Agricultural Technology, Al-Balqa' Applied University, Salt, Jordan (May 1999).
2. Evaluation of research projects in the field of microbiology.

### **Awards:**

1. Prize from late king Hussein in 1980, for the academic achievements during B.Sc. study (Ranked the first in B.Sc.).
2. Prize from late king Hussein in 1983, for the academic achievements during M.Sc. study (Ranked the first in M.Sc.).
3. The Hisham Hijawi Award for Applied Sciences in the field of "Agriculture, Water and Environment" for the year 2001, Amman-Jordan.

### **Invited Seminars:**

1. Harvard University, Medical School, March 1995.
2. McGill University, Microbiology Department, August 1997.

### **Meetings:**

1. Endotoxin Meeting, San Diego, California, USA, May 1990.
2. Gordon Research Conference, Telton, New Hampshire, USA, June 1991.
3. Carbohydrate Meeting, Ottawa, Canada, July 1994.
4. The Jordanian Conference of Biological and Medical Laboratory Sciences, University of Jordan, Amman-Jordan, Sept. 2001.
5. Fourth Northern Lights Fall Conference "Infection and Immunity", Ottawa, Ont. Canada. Oct. 10-13. 2006.

### **Publications:**

1. Schwingel, J. M., Edwards, K. J., Cox, A.D., **Masoud, H.**, Richards, J. C., St Michael, F., Tekwe, C. D., Sethi, S., Murphy, T. F., Campagnari, A. A. The Use of *Moraxella catarrhalis* Lipooligosaccharide Mutants to Identify Specific Oligosaccharide Epitopes Recognized by Human Serum Antibodies. (2009) *Infect. Immun.* 77:4548-58.
2. **Masoud, H.**, Perry, M. B., Brisson, J-R., Uhrin, D., Li, J. and Richards, J.C. Structural Elucidation of the Novel Core Oligosaccharide from LPS of *Burkholderia cepacia* serogroup O4. (2009) *Glycobiology* 19: 462-471.
3. **Masoud, H.** Khyami-Horani, H. and Alshawabkeh, K. Characterization of *Salmonella* Lipopolysaccharide Isolated From Poultry Farms in Jordan. (2009) *Dirasat, Agricultural Sciences*, 36: 30-37.
4. **Masoud, H.**, Uhrin, D., Moxon, E. R. and Richards, J.C. Identification of a Novel Structural Motif in the Lipopolysaccharide of the *galE/galK* Double Mutant of *Haemophilus influenzae* Strain Eagan. (2008) *Carbohydr. Res.* 343: 2763-2770.
5. Abu-Baker, N., **Masoud, H.** and Jaber, B. Synthesis, Characterization, and Immunological Properties of LPS-Based Conjugate Vaccine Composed of O-Polysaccharide from *Pseudomonas aeruginosa* Bound to recombinant exoprotein A.(2008) *Dirasat, Pure Science*, 35: 110-122.
6. Schwingel, J. M., St. Michael, F., Cox, A. D., **Masoud, H.**, Richards, J. C. and Campagnari, A. A. A Unique Glycosyltransferase Involved in the

Initial Assembly of *Moraxella catarrhalis* Lipooligosaccharides (2008) Glycobiology 18: 447-455.

7. **Masoud, H.**, Moxon, E. R. and Richards, J.C. Structural Elucidation of the Major Hex-4 Lipopolysaccharide Glycoform from the *IgtC* Mutant of *Haemophilus influenzae* Strain Eagan. (2008) Carbohydr. Res. 343: 1424-1434.
8. **Masoud, H.**, Moxon, E. R. and Richards, J.C. Structural Elucidation of Lipopolysaccharide Core Oligosaccharides From *lic1* and *lic1/lic2* Mutants of *Haemophilus influenzae* Type b Strain Eagan. (2008) Can. J. Microbiol. 54: 281-290.
9. Al-Zeer, M. and **Masoud, H.** LPS Based Conjugate Vaccines Composed of O-Polysaccharide from *Pseudomonas aeruginosa* IATS 6 and 11 Bound to a Carrier Protein. (2007) World J. Microbiol. Biotechnol. 23:1541-1549.
10. Shoumali, L., **Masoud, H.**, Khlaif, H., Migdadi, H. and Masoud, S. Serological and molecular Characterization of *Pseudomonas aeruginosa* Jordanian Clinical Isolates compared with the Strains of International Antigenic Typing Scheme. (2007) Diagnostic Microbiol. Infect. Dis. 58:393-398.
11. **Masoud, H.** LPS-Based Conjugate Vaccines Composed of Saccharide Antigens of Smooth-Type *Salmonella enteritidis* and Rough-Type *S. gallinarum* 9R Bound to Bovine Serum Albumin. (2007) Scand. J. Infect. Dis. 39: 315-322.
12. Shehabi, A.A., **Masoud, H.**, and Maslamani, F. A. B. A Common Antimicrobial Resistance Patterns, Biotypes and Serotypes Found among *Pseudomonas aeruginosa* Isolates From Patient's Stools and Drinking Water Sources in Jordan. (2005) J. Chemother. 17: 179-183.
13. **Masoud, H.**, Martin, A., Thibault, P., Moxon, E. R., and Richards, J. C. Structure of Extended Lipopolysaccharide Glycoforms Containing Two Globotriose Units in the *Haemophilus influenzae* Serotype b Strain, RM7004. (2003) Biochemistry 42:4463-75.
14. **Masoud, H.**, Preparation, Characterization, and Serological Properties of the Detoxified Lipopolysaccharide from *Salmonella urbana* Conjugated to Protein (2001) Mu'tah Lil-Buhuth Wad-Dirasat 16:41-58.
15. Cox, A., **Masoud, H.**, Thibault, P., Brisson, J.-R., van der Zwan, M., Li, J., Perry, M. B., and Richards, J. C., Structural

Analysis of the Lipopolysaccharide from the nontypable *Haemophilus influenzae* Strain SB33 (2001) Eur. J. Biochem. 268: 5278-5286.

16. **Masoud, H.**, A New Strategy for Conjugation of O-Polysaccharide Surface Antigen Isolated from Lipopolysaccharide of the Pathogenic *Escherichia coli* O:157:H7 to Bovine Serum Albumin (2000) Dirasat, Med. Biol. Sci. 27: 117-127.
17. Risberg, A., **Masoud, H.**, Martin, A., Richards, J. C., Moxon, E. R., and Schweda, E. K. H., Structural Analysis of the Lipopolysaccharide Oligosaccharide Epitopes Expressed by a Capsule-Deficient Strain of *Haemophilus influenzae*Rd (1999) Eur. J. Biochem. 261:171-180.
18. **Masoud, H.**, Perry, M. B., Schollaardt, T., and Ho, M., Characterization of the Antigenic Exopolysaccharide of *Burkholderia (Pseudomonas) pseudomallei* Strain 304B (1997) J. Bacteriol. 179:5663-5669.
19. **Masoud, H.**, Martin, A., Krajcarski, D., Moxon, E. R., and Richards, J. C., Structure of Variable and Conserved Lipopolysaccharide Oligosaccharide Epitopes Expressed by *Haemophilus influenzae* Serotype b Strain Eagan (1997) Biochemistry, 36: 2091-2103.
20. Hood, D. W., Deadman, M. E., Allen, T., **Masoud, H.**, Martin, A., Brisson, J.-R., Fleischmann, R., Venter, J. C., Richards, J. C., and Moxon, E. R., Use of the Complete Genome Sequence Information of *Haemophilus influenzae* Strain Rd to Investigate Lipopolysaccharide Biosynthesis (1996) Molecular Microbiol. 22: 951-965.
21. **Masoud, H.** and Perry, M. B., Structural Characterization of the O-Antigenic Polysaccharide of *Escherichia coli* Serotype O17 Lipopolysaccharide (1996) Biochem. Cell Biol. 74: 241-248.
22. Auriola, S., Thibault, P., Sadovskaya, I., Altman, E., **Masoud, H.**, and Richards, J. C., Structural Characterization of Lipopolysaccharides from *Pseudomonas aeruginosa* Using Capillary Electrophoresis-Electrospray Ionization Mass Spectrometry and Tandem Mass Spectrometry, In: Biochemical and Biotechnological Application of Electrospray Ionization Mass Spectrometry, A. P. Snyder Edition, PP 149-165, ACS Publication 619 (1996).
23. Kelly, J., **Masoud, H.**, Perry, M. B., Richards, J. C., and Thibault, P., Separation and Characterization of O-Deacylated

Lipopolysaccharides and Glycans Derived from *Moraxella catarrhalis* Using Capillary Electrophoresis-Electrospray Mass Spectrometry and Tandem Mass Spectrometry (1996) Anal. Biochem. 233: 15-30.

24. **Masoud, H.**, Sadovskaya, I., de Kievi, T., Altman, E., Richards, J. C. and Lam, J. S., Structural Elucidation of the Lipopolysaccharide Core Region of the O-Chain-Deficient Mutant Strain A28 from *Pseudomonas aeruginosa* Serotype 06 (International Antigenic Typing Scheme)(1995) J. Bacteriol. 177:6718-6726.
25. **Masoud, H.**, Altman, E., Richards, J. C. and Lam, J. S., General Strategy for Structural Analysis of the Oligosaccharide Region of Lipooligosaccharides. Structure of the Oligosaccharide Component of *Pseudomonasaeruginosa* IATS Serotype 06 Mutant R5 Rough-type Lipopolysaccharide (1994) Biochemistry 33: 10568-10578.
26. **Masoud, H.**, Perry, M.B., Jean-Robert Brisson, Dusan Uhrin, and Richards, J.C., Structural Elucidation of the Backbone Oligosaccharide from the Lipopolysaccharide of *Moraxella catarrhalis* Serotype A (1994) Can. J. Chem. 72: 1466-1477.
27. **Masoud, H.**, Perry, M.B. and Richards, J.C., Characterization of the Lipopolysaccharide of *Moraxella catarrhalis*: Structural Analysis of the Lipid A from *M. catarrhalis* Serotype A LPS (1994) Eur. J. Biochem. 220: 209-216.
28. Dasgupta, T., de Kievit, T. R., **Masoud, H.**, Altman, E., Richards, J. C., Sadoskaya, I., Speert, D. P. and Lam, J., S., Characterization of Lipopolysaccharide-Deficient Mutants of *Pseudomonas aeruginosa* Derived from Serotypes O3, O5, and O6 (1994) Infect. & Immun. 62: 809-817.
29. **Masoud, H.**, Richards, J. C., Structural Elucidation of the Specific Capsular Polysaccharide of *Rhodococcus equi* Serotype 7 (1994) Carbohydr. Res. 252: 223-233.
30. **Masoud, H.**, Weintraub, S., Wang, R., Cotter, R. and Holt, S., Investigation of the Structure of Lipid A from *Actinobacillus actinomycetemcomitans* Strain Y4 and Human Clinical Isolate PO 1021-7 (1991) Eur. J. Biochem. 200: 775-779.
31. **Masoud, H.**, Neszmelyi, A. and Mayer, H., Chemical Investigation of the O-Specific Chain of the *Sphaerotilus natans* ATCC 13338 Lipopolysaccharide (1991). Arch. Microbiol. 156: 176-180.

32. **Masoud, H.**, Urbanik Sypniewska, T., Lindner, B., Weckesser, J. and Mayer, H., The Structure of the Lipid A Component of *Sphaerotilus natans* (1991) Arch. Microbiol. 156: 167-175.
33. **Masoud, H.**, Mayer, H., Kontrohr, T., Holst, O. and Weckesser, J., The Structure of the Core Region of the Lipopolysaccharide from *Rhodocyclus gelatinosus* Dr<sub>2</sub> (1991) System. Appl. Microbiol. 14: 222-227.
34. **Masoud, H.**, Lindner, B., Weckesser, J. and Mayer, H., The Structure of the Lipid A Component of *Rhodocyclusgelatinosus* Dr<sub>2</sub> Lipopolysaccharide (1990) System. Appl. Microbiol. 13: 227-233.
35. Mayer, H., Bhat, U.R., **Masoud, H.**, Radziejwska Lebrecht, J., Wideman, C. and Krauss, J.H., Bacterial Lipopolysaccharides (1989) Pure & Appl. Chem. 61 (7): 1271-1282 (Review).
36. Mayer, H., **Masoud, H.**, Urbanik Sypniewska, T. and Weckesser, J., Lipid A Composition and Phylogeny of Gram-negative Bacteria (1989) Bull. JFCC 5: 19-25 (Review).
37. Nazer, I. K. and **Masoud, H. A.**, Residues of Dicofol on Cucumber Grown under Plastic Covers in Jordan (1986) J. Environ. Sci. Health. B21 (5):387-399.

