

WVU SCHOOL OF DENTISTRY
MICROBIOLOGY 791T

SPECIAL PROBLEMS IN GRADUATE DENTAL MICROBIOLOGY (M.S.)
Oral Biofilms: Significance from Head to Toe, Birth to Death
An International Perspective

COURSE FOCUS: Tailored-Comprehensive Oral Care (T-COC): From Birth to Death

Programs
Endodontics
Orthodontics
Periodontics
Prosdodontics

The Faculty: John G. Thomas, PhD, HCLD (ABB)
And Invited National and International Guest Lecturers

Professor, Department of Pathology
Adjunct Professor, Dept. of Microbiology, Cell Biology, and Immunology
West Virginia University School of Medicine
Adjunct Professor, West Virginia University School of Pharmacy
Clinical Professor, Department of Periodontology,
West Virginia University School of Dentistry
Director, International Tri-University Biofilm Research Consortium
Visiting Professor, Cardiff University, Wales, UK
Visiting Professor, National University of Singapore, Singapore

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COURSE FOCUS: TAILORED-COMPREHENSIVE ORAL CARE (T-COC)
FROM BIRTH TO DEATH.
A GLOBAL PERSPECTIVE.

Syllabus: A complete syllabus will be constructed as the course is developed. It will include:

1. Weekly Presentations with References
2. Case Presentations
3. Library Electronic Resource Utilization
4. Previous Board Questions

Method of Instruction: Web Based Multi-media. Although a didactic format will be emphasized, case presentations, problem solving, and self-study with specific projects (see below) will be included. Utilization of laboratory methods, demonstrations, and computer-programs to complement will be highlighted. Assignments will include material on the Internet.

A global perspective will be incorporated using Collaborative faculty at Cardiff University and the National University of Singapore (NUS), and elsewhere. We will integrate global presentations.

It will also emphasize oral care, birth to death.

Web Resources:

1. Mini-Micro Educational Series

Seven 30 minute PowerPoint, with voice, presentations.

Updates in Dental, Medical, Microbiology, and Nursing topics

<http://www.hsc.wvu.edu/som/Pathology/Thomas/Educational-Resources/TheMicroMiniSeries.aspx>

1. Biofilms: Architect of Survival
2. Biofilms: Architect of Chronic Diseases Head to Toe
3. A Comprehensive Engineered Ventilator-Endotrach-Lung (VEL) Model
4. Diagnostic Microbiology, Pathology and Biofilms
5. Rediscovering the Benefit of "Microbial Engineering": Probiotics
6. Putting the Pieces Together: The Link between Oral Care, Biofilms, and Pneumonia
7. Defining the Impact of Microbes in Chronic Wounds: A Biofilm Reactor
8. Prebiotics & Probiotics: Old Fad with New Interventions
9. A Biofilms Procaryotic Tumors? Or... Are Tumors Eucaryotic Biofilms?
10. Ten Universal Microbial Principles: Anti-Koch (Under Construction)

2. Biofilms Made Easy: "A Picture Tutorial"

An Introduction to Biofilms: Structure, Medical/Dental/Microbiological impacts, via 100 PowerPoint images with corresponding description.

<http://www.hsc.wvu.edu/som/Pathology/Thomas/PDFS/Educational-Resources/Biofilms-For-Everyone-Booklet.pdf>

3. Microbiology Pocket Electronic Handbook (PDF)

A Microbiology Internet Guide, includes: Antibiotics and Pharmacology, Susceptibility Profiles, Oral Microbiology, and Normal Flora

<http://www.hsc.wvu.edu/som/Pathology/Thomas/Educational-Resources/Microguide.pdf>

4. Dental Microbiology Pocket Electronic Handbook with Instructional Dental Case Presentations

A) A computation of published reviews for management, utilizing Dental Antibigrams from the WV Mountain State Oral-Facial Microbiology Laboratory (Oral Infections Anti-Infective Management)

B) Six Instructive Cases for Periodontal Disease (P. 5)

C) Five Instructive Cases for Endodontic Disease (P.17)

<http://www.hsc.wvu.edu/som/Pathology/Thomas/PDFS/Educational-Resources/Oral-Infections-AntiInfective-Mngt-&-Cases.pdf>

5. Online Courses (with Certificate)

John G. Thomas's West Virginia Microbiology Annual Fall Symposium (Movie)

The annual complete 2-day Course, including all five speakers through PowerPoint and audio presentations for each faculty, with sort options per presentation.

<http://www.hsc.wvu.edu/som/Pathology/Thomas/Online-Courses/>

Featured Workshops:

1) 19th Annual Clinical Microbiology Seminar (Sept. 2008)

2) 20th Annual Clinical Microbiology Seminar (Sept. 2009)

3) 21st Annual Clinical Microbiology Seminar (Sept. 2010)

4) 22nd Annual Clinical Microbiology Seminar (Oct 2011)

Cost is \$70 for a 2 week availability <http://wvcommerce.wvu.edu>

Select Clinical Microbiology Seminars: Fill Basket

6. FAQ's (Frequently Asked Questions)

Use the scroll bar, left hand side, to ask questions. This is linked to Dr. Thomas' email for quick response. Other questions and responses are continuously posted.

Tours:

Microbiology Laboratory, WVUH

ICU/NICU, WVUH

Biofilm Research Laboratory for Translational Studies in Medicine, Dentistry and Industry.

Projects: In addition to understanding oral microbes and diseases via standard methods, the class will be proactive and learn through developing creative clinically useful instructional tools. These will include:

1. Dental Microbiology Handbook
 - a. Periodontal
 - b. Endodontal
 - c. Orthodontal
 - d. General
2. Link: ICU/VAP to Oral Hygiene
3. Importance of Probiotics
4. Long-Term Care Facilities/ Skilled Nursing Facilities (Nursing Homes): VAP Incubators

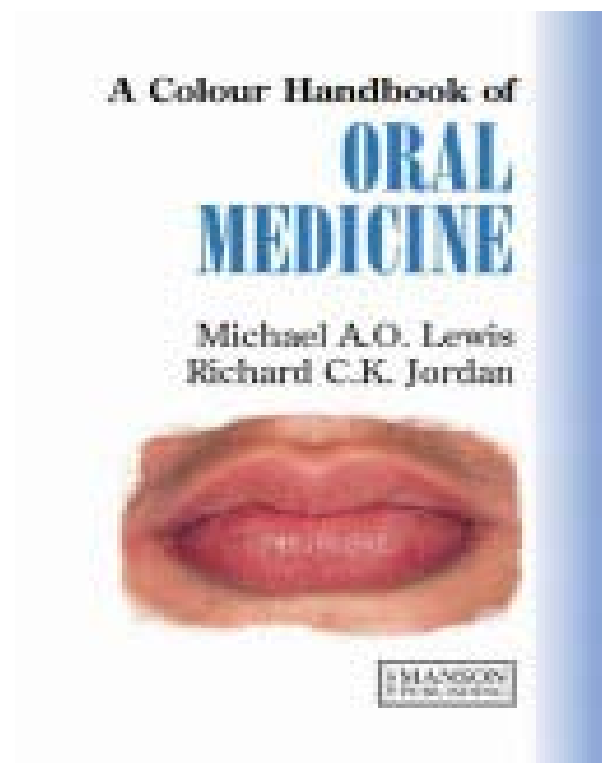
Course Objectives: This web-based course will focus on the emerging and advancing information based on microbial-host interaction at the cellular level. Although course content will emphasize oral microbes, the greater scope of oral pathogens and systemic disease will be discussed. The appropriate use of antibiotics and their complement to immune function will also be updated. We will construct the “perfect pathogen” and discuss its Pathogenicity in light of the heterogeneous, anaerobic ecosystem that compresses the oral biofilms. We will also expand the growing link between oral biofilms and systemic diseases, focusing on the vented ICU patient; we will also advance the concepts of Probiotics as “Replacement Therapy.”

Course Grade: 25% – Class Projects:

1. Bluebook
2. Website

25% – Final Exam: One question
50% – Class Participation through web-based interactions

Web-based Text: www.hsc.wvu.edu/som/pathology/thomas/



Text Book:

- M Lewis & R Jordan. *A Colour Handbook of Oral Medicine*.

Additional Resources:

- Paul E. Kolenbrander, Ph.D. *Oral Microbial Communities: Genomic Inquiry and Interspecies Communication*. ASM Press 2011.

Specific Texts by Department

Speakers, Assoc. Faculty, Contributors, and References
791T

I. National

1. Clay Walker, Ph.D., Periodontology, University of Florida, Gainesville, FL
2. Larry Golub, DDS, Ph.D., Periodontology, Stoney Brooke, SUNNY, Long Island, NY
3. Bruce Pasteur, Ph.D., Forsythe Dental, Harvard University, Boston, MA.
4. Sharokh Shabahang, DDS, MS, Ph.D., Dept of Periodontology, Loma Linda University, CA
5. Nadine Fydryszewski, Ph.D., School of Public Health, UMDNJ, Rutgers University, Stratford, NJ
6. Arthur Hefte, DDS, PhD, Associate Dean, School of Dentistry, Marquette University, Milwaukee, WI.
7. Robert Martindale, MD, Chief, Dept of Surgery, Oregon Health and Sciences University, Portland, OR.
8. Robert Genco, DDS, Ph.D., Director Emeritus, Dept of Periodontology, University of Buffalo, NY.

II. International

1. David Williams, Ph.D., Cardiff School of Dental Medicine, Wales, UK.
2. Philip Preshaw, DDS, New Castle University, England
3. Heine Niyo, DDS, Ph.D., National University of Singapore and University of Melbourne, Australia
4. Duncan Yu, Ph.D., Johnson & Johnson, Asia Pacific Region
5. Mike Lewis, DDS, Ph.D., Dean, School of Dental Medicine, Cardiff University, Wales
6. Chris Sissons, Ph.D., Professor, Christ Church, New Zealand
7. Laurence J. Welsh, DDS, PhD, Head, School of Dentistry, University of Queensland, Australia
8. Jonathan Leichter, DMD, Dept of Oral Science, School of Dentistry, Otago University, New Zealand

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SPECIAL PROBLEMS IN GRADUATE DENTAL MICROBIOLOGY (M.S.)

Oral Biofilms: Significance from Head to Toe, Birth to Death

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Topic List

Module I. General Microbial Host Interactions (WHO)

Module II. Biofilm and Pathogenicity (WHAT)

Module III. Oral Microbiology: Specific Diseases & Microbes (HOW)

Module IV. Oral-Systemic Diseases

Module V. Immunology: Oral Immune Response

Module VI. Antibiotics, Resistance, and Probiotics

Module VII. Diagnostics: Molecular Medicine Enters Oral Care

Module VIII. WVUH Rounds and Translational Research

Module IX. Infection Control: Environmental/Office Practice

Module X. Global Microbiology: Differences and Similarities

Module XI. Class Review, Projects, and Examinations

MICROBIOLOGY 791T
Topics Outline by Module

Module I.

General Microbial Host Interactions (WHO)

	Week	Date
“We Live in a Microbial World”	1	1-12
A. Normal Flora	2	1-19
B. Pathogenesis, individual examples Triangle of Infectious Diseases: Short Term (<i>Strep.</i>) Intermediate Term (Mycobacterium) Long Term (HIV-1)		
C. Tri-Phasic	3	1-26
D. Bi-Phasic: Wounds		
E. Urogenital		
F. Virology: Structure and Function	4	2-2

Power Points:

Key Questions

Chapter Review Questions

Correlating References

1. Arthur Hefte, DDS, PhD, Associate Dean, School of Dentistry, Marquette University.
2. David Williams, Ph.D., Cardiff School of Dental Medicine, Wales, UK.
3. Mike Lewis, DDS, Ph.D., Dean, School of Dental Medicine, Cardiff University, Wales

JGT Website Pages

1. Microbiology Pocket Electronic Handbook (PDF)
2. Mini-Micro Educational Series: 10 – Universal Microbial Principles: Anti-Koch

Module II.

Biofilm and Pathogenicity (WHAT)

5

3-2

- A. History
- B. Definition
- C. Architecture in 3-D (*need glasses)
Structure = Function
- D. Pathogenicity: Ratio (BF: P) (Stages)
- E. Diseases – Wound Healing
- F. Tumors and Cancer

Power Points:

Key Questions

Chapter Review Questions

Correlating References

David Williams, Ph.D., Cardiff School of Dental Medicine, Wales, UK

JGT Website Pages

1. Biofilms Made Easy: “A Picture Tutorial”
2. Mini-Micro Educational Series: 1 – Biofilms: Architect of Survival
3. Mini-Micro Educational Series: 2 – Biofilms: Architect of Chronic Diseases Head to Toe

Other:

*3-D Glasses

Module III.

Oral Microbiology: Specific Diseases & Microbes (HOW)

A. Gingivitis	6	2-9
B. Periodontics	7	2-16
C. Endodontics		
D. Orthodontics		

Power Points:

Key Questions

Chapter Review Questions

Correlating References

1. Clay Walker, Ph.D., Florida
2. Larry Golub, DDS, Ph.D., Stoney Brooke, Sunny, Long Island
3. Sharokh Shabahang, DDS, MS, Ph.D., Loma Linda University
4. Philip Preshaw, DDS, University of (7 Bridges)
5. Mike Lewis, DDS, Ph.D., Dean, School of Dental Medicine, Cardiff University, Wales
6. Chris Sissons, Ph.D., Christ Church, New Zealand

JGT Website Pages

1. Mini-Micro Educational Series: 2 – Biofilms: Architect of Chronic Diseases Head to Toe
2. Microbiology Pocket Electronic Handbook (PDF)
3. Dental Microbiology Pocket Electronic Handbook with Instructional Dental Case Presentations

Other:

CE Courses:

- Sunstar America
- PerioSTAT/PerioShield
- J&J (Listerine)

Module IV.

Oral-Systemic Diseases

8

2-23

Collateral Damage/Consequences

- A. The Big 5... and Growing
- B. VAP, MV, and Nursing Homes (Long Term Care)
- C. Diabetes, Obesity, and others
- D. WVU & Pitt – COHRA I & II
- E. Wounds: Oral vs. Distal
Perio = Chronic Wounds
- F. OMS – Oral Microbial Signature (vs. Enterotype)
- G. Our Endoclear Study – Molecular Diagnosis (HOMIN)

Power Points:

Key Questions

Chapter Review Questions

Correlating References

1. Sharokh Shabahang, DDS, MS, Ph.D., Loma Linda University
2. Mary Marazita, Ph.D., School of Dentistry, University of Pittsburgh

JGT Website Pages

1. Mini-Micro Educational Series: A Comprehensive Engineered Ventilator-Endotrach-Lung (VEL) Model
2. Mini-Micro Educational Series: Putting the Pieces Together: The Link between Oral Care, Biofilms, and Pneumonia
3. Mini-Micro Educational Series: Defining the Impact of Microbes in Chronic Wounds: A Biofilm Reactor

Other:

Module V.

Immunology: Oral Immune Response

9

3-9

- A. Oral Immunology: Components
- B. General Response: Age Defined
- C. Disease Specific

Power Points:

Key Questions

Chapter Review Questions

Correlating References

1. Larry Golub, DDS, Ph.D., Stoney Brooke, Sunny, Long Island
2. Philip Preshaw, DDS, University of (7 Bridges)
3. Duncan Yu, Ph.D., Johnson & Johnson

JGT Website Pages

Other:

Module VI.

Antibiotics, Resistance, and Probiotics

10

3-16

- A. Intervention and Management
- B. Stewardship of Normal Flora – NF=An Organ System
- C. Antibiotics and Pharmacokinetics
- D. Therapy and Emerging Resistance
- E. Oral/Dental Antibigram
- F. Electronic Surveillance (TSN, CDC)
- G. Probiotics
- H. CMT's
- I. Tailored Comprehensive Oral Care (T-COC)

Power Points:

Key Questions

Chapter Review Questions

Correlating References

JGT Website Pages

1. Mini-Micro Educational Series: Rediscovering the Benefit of "Microbial Engineering": Probiotics
2. Mini-Micro Educational Series: Prebiotics & Probiotics: Old Fad with New Interventions
3. Microbiology Pocket Electronic Handbook (PDF)

Other:

HealthMap, Antibigram

Module VII.

Diagnostics: Molecular Medicine Enters Oral Care	11	3-23
A. Morphotypes: G, S, Probes	12	4-6
B. Culture, Flow Cytometry		
C. Vitek – Microbial ID		
D. Blood Cultures		
E. Demonstrations/Rotations (WVUH Clinical Microbiology)		
F. Molecular Probes/Microarray (HOMIM)		
G. Diagnostics: Algorithms for Risk Stratification (Computer Work Station)		
H. New: MALDI-TOF & BARDOT		
I. Google Health Maps and GIDEON (Global Infectious Diseases and Epidemiology Network)		

Power Points:

Key Questions

Chapter Review Questions

Correlating References

1. Clay Walker, Ph.D., Florida
2. Bruce Pasteur, Ph.D., Forsythe Dental, Harvard

JGT Website Pages

1. Microbiology Pocket Electronic Handbook (PDF)
2. Dental Microbiology Pocket Electronic Handbook with Instructional Dental Case Presentations
3. Micro-Mini Series: Diagnostic Microbiology, Pathology and Biofilms
4. Antibiotic Selection using Pharmaco-Economics Form: Linking X, Y, and Z
5. Blood Culture Signature: Time to Detection
6. Selected Antibiograms

Other:

Module VIII.

WVUH Rounds and Translational Research

13

4-13

- A. ICU/NICU
- B. Pharmacy: Group Rotation
- C. Laboratory – WVUH Microbiology
Research – JGT
- D. Develop Rotation Event (a la Table III)
- E. Nursing Homes: “Incubators for VAP?”
Problems & Solutions
ROI (Return on Investment)

Module IX.

Infection Control: Environmental/Office Practice

14

4-20

- A. Case Presentation: “We Live in a Microbial World” Use of Google Health Map www.healthmap.org and GIDEON www.gideononline.com
- B. Vaccinations
- C. CDC/ Probiotics/ Survey
- D. Blood Borne Pathogens

Power Points:

Key Questions

Chapter Review Questions

Correlating References

JGT Website Pages

Other:

Module X.

Global Microbiology: Differences and Similarities

15

4-27

- A. International Perspectives (We are different)
- B. Travel Log
- C. ROI
- D. The West Virginia Young and Old –
NICU and Long Term Care/ Nursing Homes (ROI)

Module XI.

Class Review, Projects, and Examinations

15

4-27

Power Points:

Key Questions

Chapter Review Questions

Correlating References

JGT Website Pages

Other: