Teaching:
The Method to My Madness

Matt Mellema DVM PhD DACVECC
UC Davis School of Veterinary Medicine
Why am I here?

- Good fortune
  - Right place at the right time
  - Great mentors
  - Highly functional teams
  - A leadership team that provides opportunities
  - Enthusiasm for the subject

- The Teaching Academy movement
Active Learning
- Game-based learning
- Flipping the process

New Technology
- Tools, not gimmicks
- Qstream
- Soapbox
- Confusion barometer

Critical Thinking
- Evidence
- Inference
- Assumption
- Leadership
- PBL
- PROCESS

Advocate Creativity
- Leadership
- Problem solving
- Personal growth
- Ownership

Foster Excellence
- Reject adequacy
- Defy mediocrity
- Lead by example
Active Learning
Game-Based Learning

"Tell me and I forget. Teach me and I remember. Involve me and I learn."

-- Benjamin Franklin

Please select a Team.

a. Wales (1a1a + 1a1b) n=17
b. Winterfell (1a2a + 1a2b) n=17
c. Transylveinia (1b1a + 1b1b) n=16
d. Trinidavis and Vetago (1b2a + 1b2b) n=17
e. “There is a country called Djibouti” (2a1a + 2a1b) n=17
f. Apathydonia (2a2a + 2a2b) n=16
g. Fibrillistan (2b1a + 2b1b) n=18
h. Ataxic Sea Urchins (2b2a + 2b2b) n=17

Split S₂

- Delayed activation of the pulmonic valve may split S₂ into two distinct sounds
- Physiologic splitting may also occur due to variations in venous return with respiration
Active Learning
Game-Based Learning
Active Learning
Flipping the process

UCD-SVM_TissueBuilder (Beta_v4)
- Matt Mellema
- Fern Tablin
- Justin Ross
Active Learning

Flipping the process
Technology

Tools, not gimmicks
Technology

Tools, not gimmicks
Critical Thinking
_Not cynical thinking_

- Delphi Consensus Statement
  - Purposeful, self-regulatory judgment
    - Results in the following:
      - Interpretation
      - Analysis
      - Evaluation
      - Inference
      - Explanation

- Lead by example
- Avoid assumptions
  - Be clear about what they are

_The sign above my desk at UCD_
_The plural of anecdote is not data_
Critical Thinking

Not cynical thinking

My life-altering assumption (1992)
(St. Louis, MO)
Critical Thinking
*Not cynical thinking*

• Focuses on critical thinking alters the teaching paradigm (community of inquiry)
  • *Not* “what do I know?”
  • *Rather* “by what process have I come to know these things?”

![Teaching as Inquiry Diagram]

- **Teaching Inquiry**: What strategies (evidence-based) are most likely to help my students learn this?
- **Teaching**:
  - **Learning**: What happened as a result of the teaching, and what are the implications for future teaching?
- **Focusing Inquiry**: What is important (and therefore worth spending time on), given where my students are at?
- **Learning Inquiry**: Is there something I need to change?
  - **Next steps for learning**
Critical Thinking

Problem-based learning (PBL)

- Focuses on critical thinking and personal/team-based inquiry
- Big, ill-defined, challenging problems
Advocate Creativity

- Leadership
- Problem solving
- Personal growth
- Ownership

Thinking Skills

- Enquiry
  - predict & anticipate
  - pose & define problems
  - ask relevant questions
  - test conclusions & improve ideas

- Information processing
  - plan & research
  - locate & collect
  - sort
  - classify
  - compare & contrast
  - sequence
  - analyse part-whole relationships
  - use precise language
  - reasons for opinions & actions
  - infer and deduct
  - explain your thoughts

- Reasoning
  - judge value
  - judge and decide from reasons or evidence

- Evaluation
  - evaluate information
  - have confidence in judgement
  - develop criteria
  - suggest hypotheses
  - generate & extend ideas

- Creative
  - look for innovative outcomes
  - apply imagination
Recurrent respiratory tract infections

Must be distinguished from Persistent or recurrent non-infectious diseases

Defined as Two or more episodes of respiratory tract infections within a 12 month period

Can occur in Immunocompetent patients or Immunocompromised patients

Potential pathogens Viral, Bacterial, Fungal, Protozoal, Parasitic, Atypical bacterial

Diagnosed via Culture, Serology, Fecal exam, PCR, Viral isolation, Cytology

Contributing factors Immune status, Environment, Genome, Pathogen virulence, Pathogen resistance, Anatomy, Aspiration risk

Immunocompromise can result from Generalized immunodeficiency, Impaired mucosal immunity, Combined immunodeficiency, Impaired innate immunity, Impaired adaptive immunity, Compromised respiratory defenses

Examples of Immunocompromised conditions:
- Acquired or heritable: Retroviral infection, Latrogenic (chemo), Complement deficiency, Selective IgA deficiency, Ciliary dyskinesia, Cyclic neutropenia, Leukocyte adhesion deficiency, SCID, CVID
- Hereditary: Atypical or opportunistic pathogens

Examples of Potential pathogens:
- Viral
- Bacterial
- Fungal
- Protozoal
- Parasitic
- Atypical bacterial

Examples of Vaccination:
- Resp. pathogens
- Deworming
- Screening tests
- Environment

Vaccine routes Systemic, Mucosal

Pathogen type
- Inflammation varies with

Immunocompetent vs. Immunocompromised

Sterile inflammatory infiltrates
- aka pneumonitis
- Lymphocytic (e.g. HP)
- Histiocytic (e.g. Histiocytosis X)
- Eosinophilic (e.g. PIE)
- Mixed

Non-inflammatory infiltrates
- Neoplasia

Fever, Sneezing, Coughing, Crackles, Wheezes, Weight loss, Inc. resp effort, Lethargy, Ocular discharge, Nasal discharge, Dec. breath sounds, Cyanosis, Obtundation

Clinical signs

Inflammation varies with Pathogen type, Immune status

Concept Mapping
Advocate Creativity

About half as much tension

Maximum wall tension

T = PR

Much less wall tension

Very little wall tension

Same pressure in all regions according to Pascal's principle.
Foster excellence

• Never skip orientation
• Team approach
• Set high standards
• Promote accountability
• Lead by example
• **Do not** short change assessment

“Excellence is doing ordinary things extraordinarily well.“

- John W. Gardner
Dedication

• All the good things in my life are dedicated to three *extraordinary* women:
  • Janet Aldrich DVM (UCD):
    • Who taught me to think like a clinician
  • Stephanie Shore PhD (Harvard):
    • Who taught me to think like a scientist
  • Linda Mellema DVM (my house):
    • Who forces me to think about things other than medicine and science