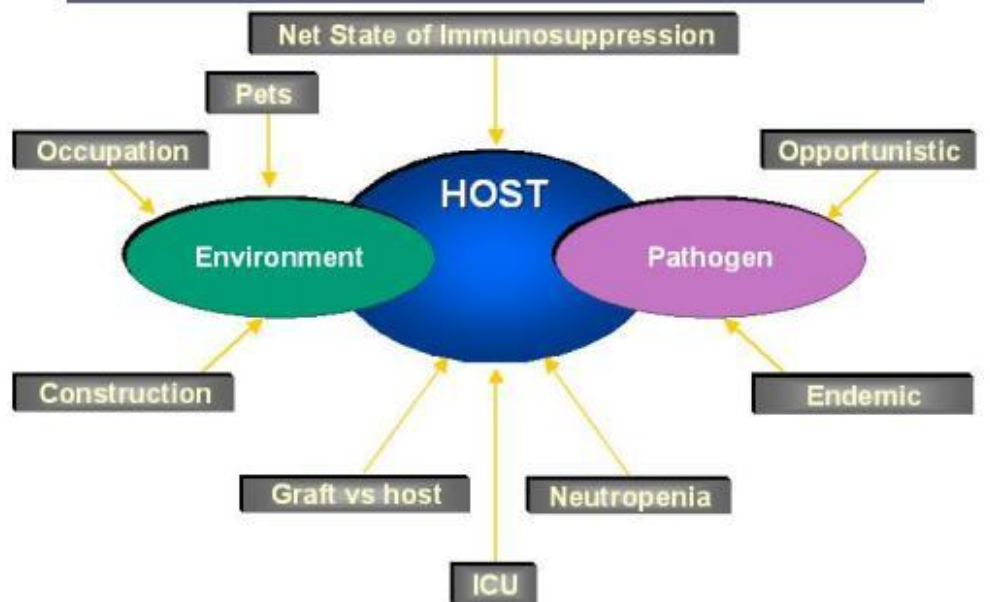


1. Course Review 2004: Approach to Infections

Approach to Infections



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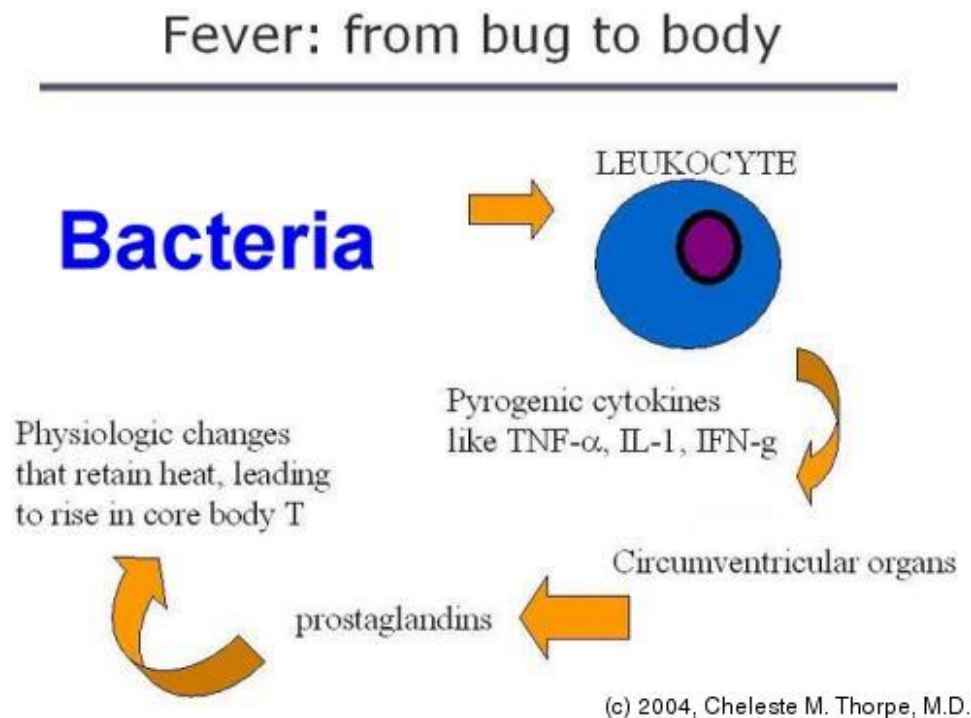
2. Body Temperature

Body Temperature

- "Normal" temperature is a range, with typical variation of 36.3-37.5°C, or 97.3-99.5 F orally, and a diurnal variation (higher in afternoon)
- Body T depends on site of measurement—rectal T usually about 1° F higher than oral T

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3. Fever: from bug to body



4. Fever of unknown origin (FUO)

Fever of unknown origin (FUO)

- T > 101 F or 38.3 C noted on multiple occasions over a 3 week period.
- Unknown cause after a reasonable intensive diagnostic evaluation over a period of approximately 1 week.
- Classic ID problem—must think of both infectious and non-infectious etiologies

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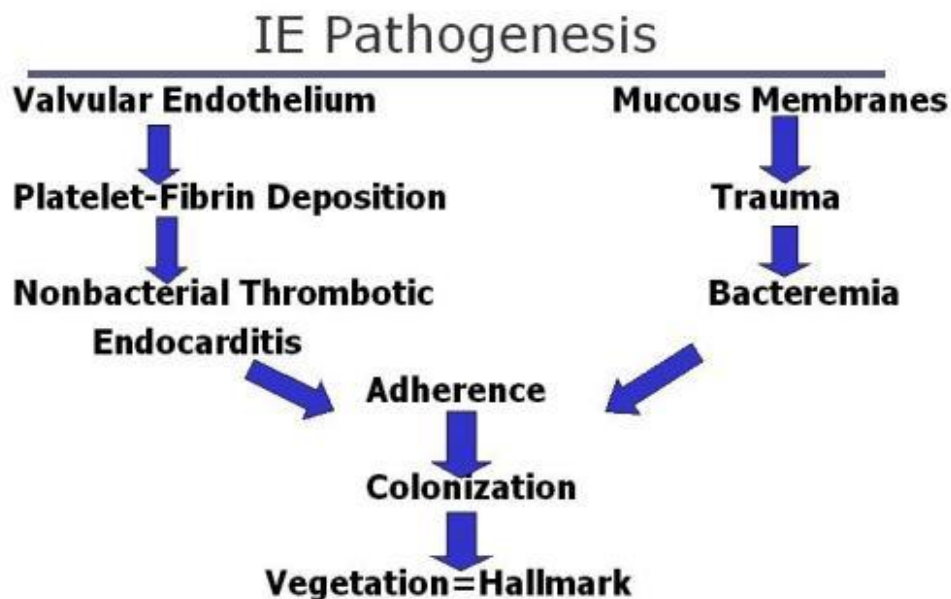
5. Blood Stream Infections: Entry

Blood Stream Infections: Entry

- Direct inoculation
 - Vascular catheters, IVDU
 - Brushing teeth, dental work
 - Defecation
- Translocation from other infected site

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6. IE Pathogenesis



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7. Most Common Causes of IE

Most Common Causes of IE

- Acute
 - *Staphylococcus aureus*
- Subacute
 - Viridans streptococci
- Prosthetic valve
 - Early: *Staphylococcus epidermidis*
 - Late: Usual pathogens

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8. Consequences of Vegetation

Consequences of Vegetation

- Persistent bacteremia
- Host response
 - Proinflammatory cytokines
- Tissue destruction by microorganism
 - Valvular damage
- Vegetation fragmentation
 - "emboli" small or large
- Immune complex formation
 - Deposit in kidneys (glomerulonephritis)
 - Deposit in choroid plexus, spleen, skin

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9. IE: Treatment

IE: Treatment

- Antibiotic Therapy
 - General Principles
 - Bactericidal activity
 - High antimicrobial concentrations in the vegetation
 - Frequent dosing to prevent regrowth
 - Long-term treatment (usually 4-6 weeks)

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10. Pathophysiology of Osteomyelitis

Pathophysiology of Osteomyelitis

- Hematogenous spread
 - Children – distal femur, proximal tibia
 - Adults – axial skeleton
- Contiguous spread
- In association with vascular insufficiency

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11. Major Pathogens in Osteomyelitis

Major Pathogens in Osteomyelitis

Neonates:

- *S. aureus*, streptococci

Infants:

- *S. aureus*

Later in life:

- *S. aureus*
- "Mixed infections"

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12. Treatment of Osteomyelitis

Treatment of Osteomyelitis

INDIVIDUALIZE!

Medical and surgical modalities

Treatment "failures"

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13. Pathogenesis of Septic Arthritis

Pathogenesis of Septic Arthritis

Hematogenous spread

Direct inoculation

Contiguous infection

Rapidly destructive process

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14. Approach to Patient with Skin and Soft Tissue Infections

Approach to Patient with Skin and Soft Tissue Infections

- What is the appearance of the lesion?
- What is the epidemiology of the lesion?
- Who is the host?

See table in syllabus

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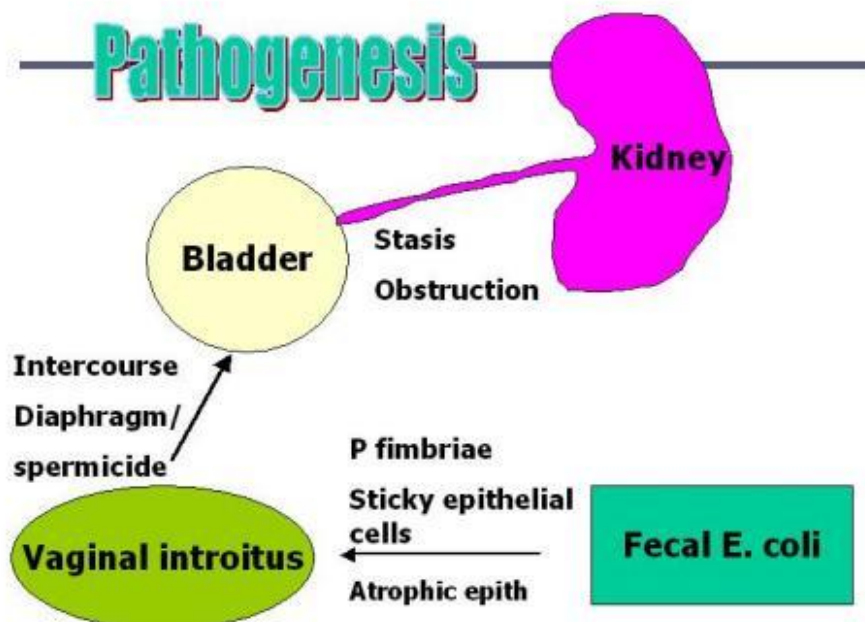
15. Small vs. Large Bowel Pathogens

Small vs. Large Bowel Pathogens

- Upper pathogens:
 - Produce toxins
 - Are viruses such as Norwalk agent or Rotavirus
 - Cause fluid and electrolyte loss \Rightarrow dehydration
 - Fever, systemic symptoms often absent
 - Fecal leukocytes usually not found
- Lower pathogens:
 - Invade mucosa
 - Shigella
 - Campylobacter
 - Associated with systemic symptoms
 - Small volume diarrhea that is often bloody
 - Fecal leukocytes reflect invasive nature of most pathogens

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16. Pathogenesis



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17.

Urinary Tract Treatments

Urinary Tract Treatments

- TMP-SMX or quinolone best
Superior to B-lactams - higher cure rates
Increasing resistance to TMP-SMX (20-30%)
- Cystitis: superficial – 3 days
- Pyelonephritis: invasive – 14 days

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18.

Urinary Tract Infections

Urinary Tract Infections

- *E. coli* most common pathogen
- Quinolones, TMP-SMX, superior
- Cystitis: superficial, short-course
- Relapse vs reinfection
 - Relapse: longer course, x-ray
 - Reinfections: D/C diaphragm; estriol cream; prophylactic antibiotics
- Know definition of complicated UTI

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19. Pneumonia Pathogenesis

Pneumonia Pathogenesis

- Know routes of infection
- Mechanisms of defense
- Factors impairing defense

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20. Pathogenesis of Pneumonia

Pathogenesis of Pneumonia

Setting	Pathogens	Host factors	Route of infn	Microbial factors
Community	Influenza A M. pneumoniae	Healthy, not immune	Inhalation	Adhesins
Pneumo- coccal	S. pneumoniae	Healthy, not immune N-P colonization ?viral infn	Aspiration	Capsule
Hospital	Gram-neg bacilli	Debilitated ↓ Clearance N-P colonization	Aspiration	None

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21.

Treatment of CAP

Treatment of CAP

- Outpatient
 - Macrolide (younger)
 - Quinolone (elderly)
 - Doxycycline
- Inpatient
 - β -lactam + macrolide
OR
 - Fluoroquinolone

Macrolides and quinolones active vs. "atypicals"
Fluoroquinolones active vs. pen-resistant pneumococci and gram-negatives

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22.

Prevention of Pneumonia

Prevention of Pneumonia

- CAP: vaccination
- Nosocomial: semirecumbent
 position

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23.

Tuberculosis

Tuberculosis

- Primary infection
 - Inhalation, lower lobe
 - Silent bacillemia seeds organs
 - CMI (healing, PPD +, Ghon complex)
- Recrudescence infection (4-8%)
 - Risk factors (↓ CMI, HIV)
 - Especially apex of lung

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24.

Tuberculin Skin Test (PPD)

Tuberculin Skin Test (PPD)

Know What it means and Why you do it

≥ 5 mm induration	≥ 10 mm induration	≥ 15 mm induration
HIV (poor CMI) High suspicion (close contact, fibrotic CXR)	High prevalence ↓ reactivity (steroids, malnutrition)	All others (low probability)

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25.

Tuberculosis

Tuberculosis

- TB in HIV
 - 8% reactivation per year
 - Often extrapulmonary
- "Atypical" mycobacteria
 - Not person-to-person (don't isolate pt)
 - Characteristic (M. marinum skin; MAC in HIV)

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26.

CNS Infections

CNS Infections

- Distinguish meningitis from encephalitis
- 3 types of CSF profiles
- Causes of bacterial meningitis
- Treatable encephalitis

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27.

CSF "Profiles"

CSF "Profiles"

Profile	Common Causes
Purulent (PMNs, low glucose) - acute	Bacterial
Lymphocytic low glucose* - subacute	TB, fungal, spirochetal Sarcoidosis; CA
Lymphocytic normal glucose	Viral

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28.

Risk Groups

Risk Groups

Neonate	Young adult	Older	Immuno-suppressed
E. coli Group B strep Listeria	Meningo Pneumo	Pneumo Meningo	Crypto Listeria

Traumatic: Pneumo, S. aureus, gram-neg

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29. Infections in Compromised Host

Infections in Compromised Host

- Immune defect and associated infections
- Common pathogens
 - CMV
 - Aspergillus
 - *Pneumocystis jiroveci (carinii)*
 - Nocardia

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30. Hospital Infections

Hospital Infections

- Nosocomial Infection Definition
- Steps for Prevention
- Risk Factors
- Impact

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31.

Vaccines

Vaccines

- Live attenuated
 - MMR
 - Varicella
 - Polio (Sabin)
- Potency
- Safety
- Practicality
- Killed
 - Polio (Salk)
 - Influenza
- Subcellular
 - Capsular polysaccharides
 - Surface proteins
 - Toxoids

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32.

Anthrax

Anthrax

B. anthracis

- Gram positive *spore* forming rod
- Toxin production when protective antigen combines
 - Edema factor
 - Lethal factor



Image courtesy of CDC

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33.

Smallpox

Smallpox

- What is it?
 - DNA virus
 - Humans are only reservoir
- Route of entry
 - Air droplets / aerosols from highly infectious viral shedding skin lesions



Image courtesy of CDC

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34.

Emerging Infections

Emerging Infections

- West Nile virus
 - RNA flavivirus
- Entry
 - Culex mosquito vector
- CNS Syndromes
 - Encephalitis
 - Meningitis
 - (meningo-encephalitis)
 - Polio-like syndrome
- SARS
 - Readily transmissible respiratory virus
 - Clinical features may be indistinguishable from influenza
 - Case fatality rate highest in elderly and those with comorbidities
 - HIGH index of suspicion

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35.

VISA

VISA

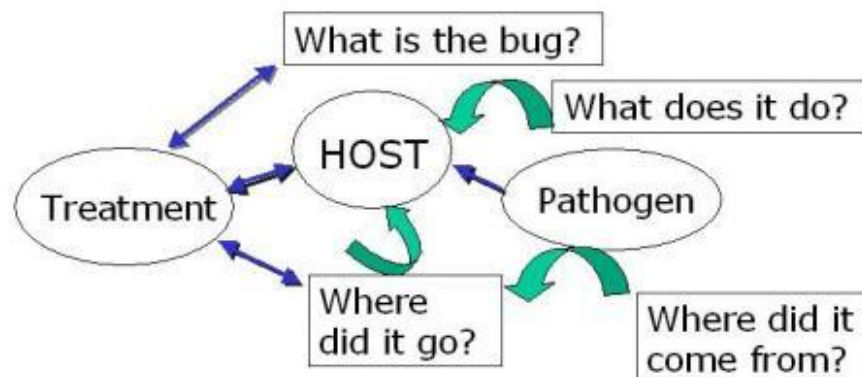
- Vancomycin Intermed: MIC \geq 8 μ g/ml
- Risk factors
 - Prior MRSA (ORSA) infection
 - Prior vancomycin exposure
- High fatality associated with infection

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36.

ID Pathophysiology Summary

ID Pathophysiology Summary



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