

# بهمني تعرف - د. نادر العرايضة

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\*\*Very important: this is not enough AT ALL either for studying or revising. It's just to entertain a little bit with micro 😊.

## Lecture 1

بهمني تعرف/خلي ببالك:

- The distinguishes between bacillus anthracis and bacillus cereus, like cereus are motile while anthracis are not. (check page 4 sheet 1 micro)
- Link between food poisoning (usually rice cooked by flash fry) of bacillus cereus → with open buffet.
- Spores of B. cereus could be found in soil, so they could contaminate vegetables grown there, then germinate in humans after eating.
- Vomiting type of B. cereus poisoning mainly associated with vomiting and nausea (من الاسم يعني مبین), while diarrheal type associated with diarrhea (very rare probability of vomiting/ no fever)
- Vomiting type (intoxication/ تسمم)
- Diarrheal type (infection/ عدوى).

- Botulinum toxin is highly toxic neurotoxin-Coded for by a **prophage/plasmid**.
- The first and fourth categories of botulism (Foodborne botulism and Adult infectious botulism) are the same (intoxication), while the third type (Infant botulism) is infection with spores (babies eat honey with spores).
- The gold standard for diagnosis of botulism is? Mouse lethality assay (bioassay).
- C. botulinum is not treated with antibiotics. Instead, we use anti-toxin.
- Canned food is main reason for C. botulinum intoxication, so make sure it's not bulged (منفوخة) or boil it for 20 minutes.
- Clostridia possess a peritrichous flagella (motile) except C. perfringens (non-motile).
- Gas gangrene and food poisoning are mainly caused by type A strains of C. perfringens humans. C strains could cause necrotizing enteritis or pigbel disease in children.

## Lecture 2

بهمني تعرف/خلي ببالك:

- The only case we give the patient vancomycin orally is? For CDL treatment. Well, why? because the problem is in the GI so it's better to absorb the drug.

- Fecal transplantation is the last choice to the patient when no drug has been working.
- CDL infection is infection control dilemma.
- Enterobacterial common antigen (ECA) is a specific surface antigen which all Enterobacteriaceae have.
- E. coli is lactose fermenter.
- ST (heat-stable toxin) is antigenic but not immunogenic, while LT (heat-labile toxin) is antigenic and immunogenic. So, people who got affected by LT enterotoxin E. coli might develop short live immunity.
- Enterohemorrhagic Escherichia coli (EHEC) the only one from the previous that causes **bloody diarrhea**, without invasion.
- Antibiotics are also contraindicated because they can induce stress on E. coli, leading to increased production of Shiga toxin.
- People who got infected with shiga-like toxin have the risk to develop hus syndrome.
- Inflammatory diarrhea → RBCs // bloody diarrhea → WBCs // with mucous → dysentery

### Lecture 3

بدى ياك تعرف انه بالذات بهاي المحاضرة الدكتور ما حكي هاي  
الجملة بس حطيت نوتس من المحاضرة:

- Sensor cells: detect the inflammatory inducers by expressing various innate receptors called pattern recognition receptors (PRRs) → they produce a variety of mediators that act directly in defense or further propagate the immune response.
- The epithelium above Peyer's patches includes microfold (M) cells, which are specialized IECs that allow luminal contents to pass through and encounter antigen presenting cells (APCs) below.
- M cells increase vulnerability to infection by serving as a point of entry for pathogens e.g. Salmonella enterica, Shigella Yersinia pestis. Pathogens can take advantage of M cells to infect the body.

### **Distinctive features of the mucosal immune system**

- Anatomically:
  1. Specialized antigen-uptake mechanisms, e.g., M cells in Peyer's patches, adenoids, and tonsils
- Effector mechanisms:
  1. Activated/memory T cells predominate even in the absence of infection
  2. Multiple activated 'natural' effector/regulatory T cells present
  3. Secretory IgA antibodies
- Immunoregulatory environment:
  1. Active downregulation of immune responses (e.g., to food and other innocuous antigens) predominates

## 2. Inhibitory macrophages and tolerance-inducing dendritic cells.

-The gut-associated lymphoid tissues (GALT) include the Tonsils, adenoids, appendix and specialized structures in the small intestine called Payer's patches (only found in small intestine), Isolated lymphoid follicles -they collect antigen from the epithelial surfaces of the gastrointestinal tract are found throughout the intestine.

-Payer's patches and Mesenteric lymph nodes contain discrete T cell areas. While the main lymphocytes in the isolated follicles (lymphoid nodules) are B cells.

-Actinobacteria: like bifidobacterium, the most common inhabitant bacteria in newborn babies.

-Proteobacteria: E. coli or proteus are the major commensal bacteria.

-Firmicutes and Bacteroides are the most common commensal bacteria in the gastrointestinal tract, constituting over 90% of our microbiome.

-Natural vaginal birth → baby will have lactobacilli and Bifidobacterium species of mother.

-Caesarean section → skin microbiota of mother like S. aureus.

-Bifidobacterium are the most common bacteria in infants that inhabit shortly after birth as child shifts from mother's milk to solid food.

-microbiota can defense against the pathogens by two ways: indirectly by competing for nutrients and receptors or directly

through the production of antimicrobial factors such as:  
bactericidin and lactic acid.

-Nutritional benefits of microbiota: Vitamin K, B12, Steroid metabolism (breaks down bile acids) Organic acid production, Food breakdown.

-Oral diseases caused by microbiota: Cavities and gingivitis disease Most common infectious disease worldwide.

-Pseudomembranous colitis: Follows antibiotic treatment (which alters gut microbiota), Caused by Clostridium difficile, Fecal transplants shown to improve outcome, The most Common cause of diarrhea after antibiotic use. Treated by oral vancomycin.

**-probiotics: are live microorganisms** such as Lactobacilli consumed orally Some protective benefits.

**-prebiotics: are compounds** such as Sugars and other foodstuffs are used to **alter** microbiota.

#### **Lecture 4:**

بهمني تعرف/خلي ببالك:

- Shigella sonnei most commonly in developed countries, while S. Flex in developing countries.

- Group A Shigella Dysenteriae 12 Serotypes, most imp. type 1 shiga, most severe disease.

**-shigellosis patients may show neurological manifestations such as seizures.**

- Opioids should be avoided in Shigella dysentery. Because opioids decrease shedding period; giving more time to bacteria to invade. SHOULD BE AVOIDED IN CASE OF BLOODY DIARRHEA (it masks the pain) as they can increase the risk of sepsis.

- haemolytic urimic syndrome could be caused by shigella infection.

-salmonella has two species: (enterica)—> infects humans and warm-blooded animals and ( bongori)—>infects coldblooded animals), and subspecies (e.g., typhi or enteritidis).

- Humans are the natural reservoir for S. enterica subsp. Typhi. Can be transmitted vertically (mother to fetus).

- This is the most common manifestation of salmonella infection in human.

-salmonella + hemolytic anemia in children—> osteomyelitis

-colonization happens in less than 5%, usually occurs in urethra or gallbladder, even it could be found in intestine or urinary system.

- IgA is an important limiting factor for establishing infection in gastrointestinal as well as respiratory tract.



-Blood culture results are usually negative, but stool culture results are positive for salmonellae and may remain positive for several weeks after clinical recovery.

- In Enteric Fever patient, there blood culture is positive (even urine culture is positive) while stool culture is negative.



*Best of luck <3*

