

Mycobacteria

Friday, February 27, 2015

5:18 PM

Mycobacteria

- Causative agents of tuberculosis and leprosy
- Waxy coat >> no gram stain >> resistant to disinfectants
- Acid-fast bacilli >> resist decolourisation
- Use Ziehl-Neelsen staining technique
 - a. Ziehl - Neelsen carbol fuchsin to the slide for five minutes while applying heat
 - b. Follow with a gentle wash with water to cool the slide
 - c. Acid alcohol is now added to decolourize the slide
 - d. Wash the slide in water again and counterstain with methylene blue for 1-2 minutes

Mycobacterium tuberculosis

- Chronic slow-progressing pulmonary infection; transmission by aerosol droplets
- Obligate aerobe, facultative intracellular parasite
- 4-6 weeks to see colonies on a plate
 - Lowenstein - Jensen medium
 - Use microscopy of sputum smears as first line of diagnosis
- Leading cause of death world-wide from a single infection (Bacteriology, Kenneth Todar, 2005)
 - Affects 1.7 billion/year
 - Declining in US
- Infection develops in stages

Primary Tuberculosis

- Aerosol inhalation >> bacteria multiplication in alveoli >> macrophage ingestion of bacilli and formation of first degree complex >> Foci of infection in lungs (may be spread to kidneys, bones, meninges) >> CMI is fully active, infection is stopped (majority of cases >> some bacilli survive, reactivation several years later)

Mycobacterium tuberculosis

- Post-primary tuberculosis

- Late reactivation of lesions in lungs, kidneys, bones etc.
- 5% of cases; higher in patients with AIDS
- Chronic infections

Immunity in Tuberculosis

- Cell mediated immunity is most important (T-cells)
- Mantoux test
 - Tuberculin solution is injected intradermally, wait 48-72 hours, check of induration
 - Record diameter of induration
 - >10mm positive
 - 5-9mm doubtful, maybe cross reaction with other Mycobacteria
 - <4mm negative
 - A positive test does not necessarily mean there is currently an active infection!!

Atypical Mycobacteria

- Occasionally isolated from patients with chronic?
- Pulmonary disease >> indistinguishable from TB
 - *M. kansasii*, *M. avium*, *M. intracellulare*
 - Higher resistance to anti-TB drugs
 - Give "doubtful" Mantoux test (5-9 mm)
- *M. marinum*: skin infections
- *M. fortuitum*: soft tissue abscesses
- All these infections are most typically seen in the immune-compromised

Mycobacterium leprae

- Causes leprosy
- 2 kinds:
 - Tuberculoid leprosy: visible nerve enlargement, few erythematous plaques, few bacilli in infected tissues, but many lymphocytes and granulomas; low infectivity
 - Lepromatous leprosy: no visible nerve enlargement, many erythematous nodules, many bacilli in infected tissue; high infectivity
- Rarely found in developed countries