Inflammation II - Notes
Thursday, April 17, 2008
1:00 PM

- Infection vs. Inflammation
  - Inflammation – response to infection, or necrosis, or foreign body, etc.
    - Early inflammation – fluid and cells (usually PMNs)
    - Late inflammation - macrophages
  - Infection – bacterial, causes inflammation, and inflammation can create opportunity for infection
    - Purulent pneumococcal meningitis - pus and hemorrhaging

- Granulomas – Caseating, Non-caseating, FB, Sarcoidosis, TB, Fungus, Histoplasmosis
  - If you spot a granuloma, determine if caseating (crumbled cheesy center) or non-caseating
    - Caseating – could be TB, fungus (aspergillus), or Histoplasmosis, among others
      - Aspergillus – can see 45° angle hyphae
      - Histoplasmosis – can stain, see dark flecks
      - TB – can stain, see acid-fast bacilli
    - Non-caseating – could be foreign body, or sarcoidosis
      - Foreign body – look for it in the center! Usually sutures
      - Sarcoidosis – unexplained, related to immune response

- Stains
  - H&E - regular stain; can show colonies of bacteria
  - Gram Stain
  - Silver stain - helpful w/ spirochetes --> syphilis
  - Acid Fast - mycobacteria tuberculosis (hot dog shaped)
    - Although the hpf slide may not show, don't rule out presence of bacteria
  - Fungi
    - H&E
    - Gridley carb stain
    - Silver stain

- Outcomes of Inflammatory Response
  - Resolution – everything looks awesome again, re-epithelialization (which can occur with any outcome)
  - Healing with scar formation – replaces necrotic tissue
    - Granulation tissue– new CT having new vessels (from vascular endothelial cells = angiogenesis) and proliferating fibroblasts making collagen --> KNOW FOR QUIZ
      - Early - inflammatory cells, fibroblast proliferation, angiogenesis; no collagen yet
    - Organization - process of forming granulation tissue; macrophages disappear as fibroblasts enter
      - Maturing scar - no inflammation; well organized collagen
      - 1-2 weeks later --> collagen deposition
  - Chronic inflammation - all aspects of inflammation persist
  - Abscess (PMNs) or granuloma (macrophages)

- Wound Healing
  - Inflammation – early (PMN) and late (macrophages)
  - Granulation Tissue Formation = organization
    - 1st Intention – wound closed already
    - 2nd Intention – wound open, need not only fibroblasts, but also myofibroblasts to pull closed!
      - Heals from the base to the surface, epithelium may look similar to 1st intention though
      - Wound contraction
  - Re-epithelialization – looks flat, rather than having rete ridge pattern
  - Remodeling – forming nice scar
  - Timeline
    - 24 hours – PMNs appear
    - 72 hours – Macrophages appear
    - 5-7 days – Organization (forming granulation tissue) in full swing, angiogenesis, incision filled
    - 2 weeks – Fibroblasts have made scar tissue
  - Local Factors – size, location, stress/mobility, blood supply, foreign/necrotic material, infection
  - Systemic Factors – malnutrition (protein lack), ascorbic acid deficiency (scurvy)
  - Complications – Collagen, Fibroblasts, Neuroma
    - Deficient Collagen – can lead to excess granulation tissue, dehiscence, hernia
- **Dehiscence** – previously closed wound re-opens; doesn’t mean repair starts over at day 1 though
- **Hernia** – weakened areas without adequate collagen may herniated (bowel)
- **Scurvy** - Vit C deficiency - can’t make collagen
  - **Excessive Fibroblasts** – can lead to *intra-abdominal adhesions* (lung/pleura or epi/pericardium too)
  - “Proud flesh” – granulation tissue expands beyond epithelium, necessitates surgical removal
  - **Traumatic Neuroma** – collection of nerve buds forms, not ordered in lines like regular peripheral nerves
  - **Excessive Collagen** – hypertrophic scar or **keloid** (huge collagen plates, not ordered in lines like scar)