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Inflammation II - Notes

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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^{o} 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 --> syphillis
  - 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 Inflammtory 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)