The Integument Pathology
Normal Skin

- Derma-” = Skin

- 3 layers
  - Epidermis = primarily composed of keratinocytes and scattered melanocytes
  - Dermis = consists of connective tissue
    - Supplies nutrients and fluid that diffuse into the epidermis from the blood vessels
    - Also contains nerves and glands
  - Subcutaneous tissue = adipose (fat)
Skin

- Epidermis contains melanocytes
  - Pigment producing cells
    - Melanin - dark pigment
      - Dependent upon genetic and environmental factors
      - Protects the skin from ultraviolet light
Skin

- Cells become flatter as they progress upward away from the dermis
  - Contain Keratin
    - Protein found in skin, hair and nails
    - Prevents loss of body fluids
- Eventually die from a lack of nutrients
- Constantly sloughed off from the surface a few weeks after being formed in the basal layer
Skin

- Dermis
  - Thick layer of connective tissue that includes elastic and collagen fibers
    - Strength
    - Support for nerves and blood vessels
Main Functions of Skin

- First line of defense against micro-organisms
- Prevents excessive fluid loss
- Controls body temperature
- Protection from UV radiation
- Sensation
- Synthesis and activation of vitamin D on exposure to small amounts of UV light
Facts to know

- Best barrier against infection is intact dry skin
  - Moist skin facilitates entry of bacteria

- Our skin is not sterile - covered with bacteria

- May be affected by systemic metabolic and immune diseases
Integument Pathology
Signs and Symptoms of Disease

- **Pruritus**
  - Itching
  - Most common symptom

- **Urticaria**
  - Hives
    - Smooth, elevated patches

- **Rash**
  - Generalized term for eruption of the skin

- **Blisters**
  - Fluid-containing elevated lesion of the skin
  - Clear watery or bloody contents

- **Xeroderma**
  - Excessive dryness
Things to Note About Skin Lesions

- Location
- Length of time the lesion has been present
- Any changes that have occurred over time
- Physical appearance
  - Color
  - Elevation
  - Texture
  - Type of exudate
  - Presence of pain
  - Pruritis (itching)
Pigmentation of the Skin

- Albinism
  - Lack of melanin production

- Vitiligo
  - Small areas of hypopigmentation

- Malasma
  - Patches of darker skin that may develop during pregnancy
Mechanical Trauma

- Blunt trauma
  - Caused by objects (ex. club, hammer)

- Contusion
  - “bruise”
  - Bleeding into the skin and soft tissue, because of disrupted blood vessels

- Laceration
  - A cut
Thermal Injury

- Heat injuries (Burns)
  - Extent of injury depends on mode of exposure, duration of exposure, the temperature, and site of injury
  - Clinical outcomes depends on
    - Depth of skin injury
    - Extent of body surface affected
  - Classified by
    - Superficial burn, superficial partial thickness burn, deep partial thickness burn, full thickness burn, subdermal burn
Burns

- **Superficial burns**
  - Affect epidermis
  - Erythema with minimal edema
  - Resolves in several days
  - No scarring

- **Superficial partial thickness burn**
  - Destroys epidermis and damage to part of dermis
  - Blood vessels intact
  - Blisters form
  - Heals in about 10 days
  - Minimal scarring
  - Danger of infection
Burns

- **Deep partial thickness burn**
  - Destroys epidermis and damage to more of dermis
  - Damage to nerve endings, blood vessels, hair follicles, sweat glands
  - Severe edema
  - Heals in 3-5 weeks
  - Danger of infection
  - Possible keloid scarring

- **Full thickness burn**
  - Destroys epidermis, dermis, and often subcutaneous fat
  - Eschar tissue
  - No sensation
  - Hair follicles destroyed
  - Do not heal well without surgical intervention
Burns

- Subdermal burns
  - Destroy epidermis, dermis, subcutaneous fat, muscle, bone
  - Require surgical intervention... possibly amputation
  - Skin grafting
  - May be lethal
Thermal Injury – Full thickness Burn

http://www.booneville.k12.ms.us/science/A&P/burn3rd.jpg
Thermal Injury

- Cold injuries
  - Less severe and less life threatening than burns
    - But...can lead to death by freezing
Electrical Injury

- Contact with unprotected or inadequately isolated electrical wires or lightening
  - Skin conducts electricity that creates heat in tissues
    - Essentially “electrical burn”
    - But...can pass beyond site of contact, into deeper tissues and interfere with internal organs
      - Electrical conduction system of the heart
      - Spinal cord
      - Blood vessels
      - Kidneys
Electrical Burn

Contact Dermatitis

- Exposure to an allergen or by direct chemical or mechanical irritation of the skin
- Causes acute or chronic inflammation

- Symptoms
  - Pruritis
  - Erythema
  - Edema
  - May progression to vesiculation, oozing, crusting, scaling
Contact Dermatitis
Allergic Dermatitis

- Exposure to a multitude of substances, including:
  - Metals, cosmetics, soaps, chemicals and plants

- Sensitization occurs on the first exposure and on subsequent exposures
  - Erythematous and pruritic area often covered with small vesicles
    - Manifestations of pruritic rash develop at the site a few hours after exposure
Eczema

- Characterized by edema in the epidermis, and inflammatory cell infiltrates in the dermis

- Chronic erythematous lesions covered with crusts, usually symmetrically located on the face, neck, extensor surfaces of the UE and LE and buttocks

- Characterized by pruritis (itching)
Eczema

- **Atopic dermatitis**
  - Most common type of eczema
  - Affects primarily children
  - Atopic = inherited tendency toward allergic conditions
- **Symptoms**
  - Red, oozing, crusting rash that becomes a dry, brownish color with time
  - Pruritis
Atopic Dermatitis

http://www.topnews.in/health/files/eczema1.jpg
Urticaria

- Hives
  - Commonly caused by ingested substances such as shellfish, or certain fruits or drugs
    - Subsequent release of histamine causes the eruption of hard, raised erythematous lesions on the skin, often scattered all over the body
    - Highly pruritic
Psoriasis

- Chronic inflammatory disorder of unknown origin with remissions and exacerbations
  - Exacerbations related to trauma and emotional stress

- Cellular proliferation increases leading to thickening of the dermis and epidermis
  - Epidermal shedding in 3-4 days rather than several weeks
  - Found on face, scalp, elbows and knees
    - Red papules that enlarge, silvery white plaque forms, bleeding points become apparent

- Now considered to be autoimmune
Psoriasis

http://www.slippery littlesuckers.com.my/cutenews/data/upimages/450px-Psoriasis_on_back.jpg
Furuncles

- Boils
  - An infection which begins in the hair follicle and spreads into the surrounding dermis
  - Initially, the lesion is firm, red, painful
    - Develops into large, painful mass that frequently drains large amounts of pus
  - 
  - Squeezing boils can result in the spread of infection by AUTOINOCULATION
Furuncles
Impetigo

- Common superficial infection
  - Characterized by small, pus filled pimples that rupture, to form yellowish-brown crusty masses with large red moist areas underneath

- Highly contagious infection
  - Spread by direct contact with hands, eating utensils, towels
Impetigo
Herpes Simplex (cold sores)

- Viral infection
- Primary infection may be asymptomatic but the virus remains in a latent stage in the sensory nerve ganglion of the trigeminal nerve
- Triggers for recurrence
  - Stress, infection from common cold, and sun exposure
Herpes Zoster (Shingles)

- Occurs years after the primary infection of chickenpox
- Usually affects one cranial nerve or one dermatome on one side of the body
  - Pain, paresthesia and vesicular rash develop in a line unilaterally
- Treatment: supportive treatment to relieve itching and neuralgic pain
- Medicines to slow/stop progression of symptoms
- More common in older individuals, people who are immunosuppressed
Herpes Zoster (Shingles)

Verrucae (Warts)

- Benign viral infections of the skin
- Caused by human papillomaviruses

- Plantar warts
  - On the sole of the foot
  - Appear as firm raise papule, develop a rough surface
    - White or tan in color and are often multiple
    - May be painful if pressure is applied
Cellulitis

- Rapidly spreading, inflammation of the dermis and subcutaneous tissue

- Risk increases when other disease/injury occurs
  - Impaired lymphatic drainage
  - Lymph node dissection
  - Saphenous vein harvesting after CABG
  - Diabetes, malnutrition
  - Edema, eczema, burns trauma
Cellulitis

- Symptoms
  - Erythema, edema, tender, warm
  - Most often seen in foot and lower leg

http://battlegames.files.wordpress.com/2008/12/cellulitis_leg-front.jpg
Malignant Melanoma

- Develops from melanocytes

- Dependent upon
  - Genetic factors
  - Exposure to sunlight
  - Hormonal influences
  - Pigmentation
  - Presence of multiple moles
Malignant Melanoma

- Often appears as a multicolored lesion with an irregular border
- Tumors are neither painful nor pruretic and therefore may not be noticed.
- Treatment: surgical excision
  - Chemo, radiation prn
- Prognosis:
  - Extremely malignant and invasive
  - Curable if detected early
  - Does spread quickly and can become life threatening at early stage
Kaposi’s Sarcoma

- Malignancy of vascular tissue that presents as skin disorder
- Common in immunosuppressed (AIDS) patients
  - May affect the viscera as well as the skin
  - Multiple skin lesions start as purplish areas on the face
    - Progress quickly to form large lesions on the upper body, may become painful
- Prognosis
  - Low malignant potential
    - But...may spread widely and cause death
  - Visceral involvement is most life threatening
Kaposi’s Sarcoma
Skin Ulcerations

- Caused by:
  - Arterial insufficiency
  - Venous insufficiency
  - Pressure areas
Arterial Insufficiency Ulcers

- **Etiology:**
  - Reduction in oxygen perfusion of tissue

- **Risk factors**
  - Heredity
  - Smoking
  - HTN
  - Diabetes
  - High cholesterol
  - Atherosclerosis

- Usually occur in LE
Venous Stasis Ulcers

- **Etiology:**
  - Impaired venous circulation
  - Usually have history of trauma to area

- **Risk factors:**
  - Heart disease
  - DVT
  - Obesity
  - Defects in valves of veins

- Usually occur in LE
Pressure (Decubitus) Ulcers

- **Etiology**
  - Prolonged pressure on tissues over underlying bony prominences resulting in ischemia

- **Risk factors**
  - Immobility
  - Poor nutritional status

- **Most susceptible to decubitus ulcers**
  - Sacrum
  - Ischial tuberosity
  - Lateral malleoli
  - Calcaneal area
  - Ribs
  - Scapulae
  - Greater trochanter
Scleroderma

- Diffuse connective tissue disease
  - Fibrosis of skin, joints, blood vessels, internal organs
  - Etiology: unknown
  - Symptoms: thickening and loss of elasticity of skin with progressive fibrosis of body organ systems
Diagnostic Tests
Diagnostic Tests

- A-B-C-D of diagnosis
  - Asymmetry
  - Borders
  - Color
  - Diameter

- Biopsy
  - Removal of a small area of skin
    - Used for the detection of malignant changes in tissue
Diagnostic Tests

- **Culture staining**
  - Skin scrapings or other procedures
    - Used to detect bacterial or fungal infections

- **Blood Tests**
  - To determine allergic or abnormal immune reactions

- **Patch or Scratch Tests**
  - To determine allergic or abnormal immune reactions
Interventions

- Stress management
  - To manage exacerbations

- Thermal and electrical injuries
  - Management of contractures
    - Position of comfort = position of contracture
  - Splinting
  - Exercise
  - Functional activities
Precautions

- Precautions with some treatment modalities
  - US gel
  - Mobilization creams
  - Topical agents that include alcohol
Which are contagious?

- Impetigo
  - standard Precautions

- Shingles
  - standard precautions
  - Isolation (contact) if you have not had chicken pox
Standard Precautions

- Treat all blood and body fluids as if they were contagious/infected
- Gloves
- Cover open wounds