Squamous and Basal Cell Carcinoma
Squamous and Basal Cell Carcinoma Significance

- Most common cancer in US
- 1% of all cancer deaths
- Fair-skin, sun, irradiation, prolonged UV light
- Excellent prognosis if early
- Deforming or fatal if neglected
External protection
- Minor trauma
- Microorganisms
- Temperature
- Water loss
- Sensation
  - Point, temperature, pressure, proprioception
- Heat regulation (vasomotor, sweat gland)
**Squamous and Basal Cell Carcinoma Embryology**

- **Ectodermal origin**
  - Epidermis, pilosebaceous and apocrine units, eccrine sweat glands, nail units

- **Neuroectoderm**
  - Melanocytes, nerves, sensory receptors

- **Mesoderm**
  - Macrophages, mast cells, Langerhans cells, Merkel cells, fibroblasts, blood vessels, lymph vessels, fat cells
Squamous and Basal Cell Carcinoma Anatomy

- Epidermis
  - 0.04 mm eyelids to 1.4 mm soles of feet
  - Stratified squamous, cornified
  - Keratinocytes, melanocytes, Langerhans cells, Merkel cells
Squamous and Basal Cell Carcinoma
Anatomy

- Dermis
  - 15–40 times thicker than epidermis
  - Collagen, elastic fibers, ground substance
  - Nerves, vessels, lymphatics, muscle pilosebaceous and apocrine units, eccrine sweat units
  - Fibroblasts, mast cells, histiocytes, Langerhans cells, lymphocytes
Squamous and Basal Cell Carcinoma Anatomy

- Dermis
  - Papillary
    - Thin upper zone
  - Reticular layer
    - Thick lower zone
    - Base of papillary to subcutaneous fat
Squamous and Basal Cell Carcinoma Etiology and Stimulators

- UV light direct correlation
- Sunny, light complexion, outdoor worker
- Electron excitation → damaging chemical reactions
- DNA synthesis and mitoses inhibited
- Effects reduced by hair, thick stratum corneum, and melanin
Squamous and Basal Cell Carcinoma
Etiology and Stimulators

- UV penetration is higher due to ozone hole
- Elevation: Higher less filtration of UV
- Latitude: Higher near equator
- Cloud cover: Up to 50% reduction
- Time of day, amount of time (50% +/- 3 hour away from peak exposure time)
- Water, sand, snow reflect UV and intensify
Squamous and Basal Cell Carcinoma Etiology and Stimulators

- More pigment protects against UVB
- Absorbs light and modulates amount delivered to dermis
- Exposure as child increases solar keratoses
Squamous and Basal Cell Carcinoma Immune System

- Low UVB exposure compromises immunologic defenses in skin
- High UVB exposure compromises overall response
- Infection, cancer, vaccination efficacy
- Black and white equally susceptible to immunologic effects of low UVB exposure
Squamous and Basal Cell Carcinoma Immune System

- Radiation elicits changes by ionizing cell constituents
- May produce a tumor after long latent period
- Xeroderma pigmentosum defective DNA repair following UV radiation
- Gorlin’s syndrome = multiple nevoid BCC
Squamous and Basal Cell Carcinoma Epidemiology

- SCC from scars, old burns, chemical carcinogens have much higher rate of metastases
- 100 people with single primary, 12 annually develop secondary primary
- Second primary has 140 x incidence of first
Actinic Keratosis

- Most common premalignant lesion
- Older, light complexioned
- Cumulative effects of UV light exposure
- Discrete, well-circumscribed, erythematous, maculopapular, dry, scaly, reddish to light brown
- Roughness due to parakeratotic scales
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Actinic Keratosis
  - Hyperkeratosis and parakeratosis, dyskeratosis and acanthosis prominent in epidermis
  - Actinic elastosis and basal degeneration of collagen in dermis
  - Lymphocytic infiltrate throughout
  - Sharp border b/w normal and abnormal epithelium distinguishes from others
  - Usually flat not “stuck–on” like SK
Squamous and Basal Cell Carcinoma
Premalignant Lesions

Actinic Keratosis
- Conservative treatment: Sun block, lanolin, vanishing cream
- Curettage and electrodessication for most
- Liquid nitrogen
- 5–FU in 1–5% concentration have largely replaced chemical peel and dermabrasion
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Actinic Keratosis
  - Progresses to SCC in 20–25%
  - Rarely metastasize
  - Little place for wide margins
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Bowen’s Disease
  - Older, sun and non-sun exposed areas
  - Carcinoma in situ (intraepithelial)
  - Skin or mucous membranes (mouth, anus, genitalia)
  - Men, years, solitary lesion, sharply defined, erythematous, dull, scaly plaque
  - Pruritis, crusting, oozing
  - Sunlight, arsenic, viruses, chronic trauma, heredity
Squamous and Basal Cell Carcinoma Premalignant Lesions

Bowen’s Disease

- Hyperkeratosis, parakeratosis, dyskeratosis, acanthosis, and disorder in epithelial layers
- Keratinized cells within prickle cell layer
- Hyperchromatic nuclei and increased mitoses
- No dermal invasion
- Inflammatory infiltrate in papillary dermis with multinucleated cells
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Bowen’s Disease
  - Excision (surgeons) or curettage / electrodessication (dermatologists)
  - Adequate excision due to ability to become SCC and metastasize
  - Topical therapy with 5-FU
  - Poor response to irradiation
Squamous and Basal Cell Carcinoma
Premalignant Lesions

Bowen’s Disease

- Excellent prognosis unless SCC develops
- More aggressive than from AK
- 7% incidence of bladder, bronchus, breast, and esophagus cancer
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Leukoplakia (= “white patch”)
  - Oral, vulvar or vaginal mucosa
  - Older male smokers, ill-fitting dentures
  - Elevated, sharply defined patchy areas of keratinization, lighter than surrounding tissue
  - Can appear verrucoid if chronic
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Leukoplakia (= “white patch”)
  - Pathology
    - Quartet: Hyperkeratosis, parakeratosis, keratosis, acanthosis
    - Cellular atypia in epidermis and inflammatory infiltrate in dermis
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Leukoplakia (= “white patch”)
  - Treatment
    - Small: Lip cream emollients or ointments
    - Stop smoking
    - Refit dentures / operative dentistry
    - Biopsy if persists (florid lesions biopsy soon)
    - Excision of mucosa if unresponsive
      - Lips = vermilionectomy or lip shave
    - 15–20% of untreated lesions become malignant (more aggressive than those from AK)
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Erythroplasia of Queyrat
  - Bowen’s of mucous membranes
  - Usually glans penis, uncircumcised, 40–50 yo
  - Solitary, multiple erythematous
  - Well circumscribed, moist, glistening, velvety
  - Conservative surgery / curettage / desiccation
  - Topical 5–FU
  - More aggressive than Bowen’s
Keratoacanthoma (= “self-healing SCC”)
- Sun-exposed sites, solitary > multiple
- ? Premalignant or low-grade SCC
- Fleshy, elevated, nodular, central hyperkeratotic core, RAPID growth
- Keratin shell crater, hyperplasia, dyskeratosis
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Keratoacanthoma
  - Numerous reports of resolution without therapy
  - Malignant potential with ulceration and tissue destruction also well-described
  - Early complete but conservative excision recommended
Squamous and Basal Cell Carcinoma Premalignant Lesions

- **Radiation Dermatitis**
  - Chronic acne, fungal scalp infection (50 yrs ago)
  - Dentists hands (hand held oral x-rays)
  - BCC or SCC can develop
  - In most severe conditions, even when malignancy cannot be proven, excision and resurfacing of most involved area is consideration
  - Diffuse scalp involvement needs total excision and coverage with latissimus dorsi free flap
Squamous and Basal Cell Carcinoma Premalignant Lesions

- **Xeroderma Pigmentosum**
  - Rare, incomplete sex-linked recessive gene
  - Endonuclease deficiency needed to repair sunlight damaged DNA
  - Early childhood onset
  - Extreme sensitivity to sunlight
  - Diffuse lentigos early, progressive drying and thinning of skin
  - In early adult life → SCC, BCC or melanoma
Squamous and Basal Cell Carcinoma Premalignant Lesions

- Xeroderma Pigmentosum
  - Diffuse lentigos early, progressive drying and thinning of skin
  - In early adult life → SCC, BCC or melanoma
  - Absolute protection from sun
  - Aggressive treatment of all developing tumors
  - Prognosis is dismal with death from metastases
Basal Cell Carcinoma

- Most common malignancy of whites
- From cells of basal layer of epithelium or from the external root sheath of hair follicle
- Directly related to sun exposure (UV light)
- Occur most where there is greatest concentration of pilosebaceous follicles
- Does NOT arise from preexisting lesions
- Cellular atypia is absent and mets are RARE
Basal Cell Carcinoma

- Nodular ulcerative carcinoma
  - Single, face, begin as small translucent papules that remain firm and exhibit telangiectasia, grow slowly, ulcerate, MOST common by far
- Superficial BCC
- Sclerosing BCC
- Pigmented BCC
- BC nevus syndrome
Basal Cell Carcinoma

- Nodular ulcerative carcinoma
- Superficial BCC
  - Often multiple, trunk, lightly pigmented, erythematous, patch-like, resemble eczema
- Sclerosing BCC
- Pigmented BCC
- BC nevus syndrome
Basal Cell Carcinoma

- Nodular ulcerative carcinoma
- Superficial BCC
- Sclerosing BCC
  - Yellow-white, ill-defined borders, resemble small patches of scleroderma, most frequent type to RECUR, see peripheral growth with central scarring
- Pigmented BCC
- BC nevus syndrome
Basal Cell Carcinoma

- Nodular ulcerative carcinoma
- Superficial BCC
- Sclerosing BCC
- Pigmented BCC
  - Brownish-black pigmentation with nodular ulcerative type features
- BC nevus syndrome
Basal Cell Carcinoma

- BC nevus syndrome (≡ Gorlin’s Syndrome)
  - Childhood onset, autosomal dominant, multiple
  - Associated with other anomalies (skin pits on palms of hands and soles of feet, epithelial jaw line cysts, splayed or bifid rib abnormalities, abnormal calcifications in dura, MR)
  - Benign tumors → puberty → degenerate
  - Treatment is close observation with aggressive treatment of all malignancies
Basal Cell Carcinoma

- Curettage biopsy
  - Local anesthesia, scrape with dermal curet
  - Tumor cell groups soft and easily removed
  - Normal underlying dermis is hard and difficult to remove
Basal Cell Carcinoma

- Shave biopsy
  - Upper half of dermis sampled with minimal deformity
  - Rarely a tumor is present so deeply that a shave biopsy does not reveal its presence
Basal Cell Carcinoma

Punch Biopsy
  ◦ 3–4mm diameter, sufficient for diagnosis
  ◦ Speculation that it may destroy the normal dermal barrier and allow extension into deeper structures
  ◦ No proof that this occurs
Excisional biopsy
- Treatment of choice for dealing with a primary BCC or a pigmented lesion
- Impractical for large tumors or when the borders are unknown
- Deep wedge biopsy may be indicated first for diagnosis and indication of depth
Basal Cell Carcinoma

- Proliferation of similar cells, oval, deep staining nuclei, scant cytoplasm
- Irregular masses of basaloid cells in dermis with the outermost cells forming a palisading layer on the periphery
- Surrounding stroma often has fibrous
Basal Cell Carcinoma

- Most treated by curettage and desiccation (C&D) or elliptical excision with primary closure
- Local control = cure
- Age, site, occupation, type of BCC
  - Older patients accept scar after C&D
  - Sclerosing more aggressive than nodular
  - Center of face, periauricular, forehead, scalp have high risk of recurrence
Basal Cell Carcinoma

- C&D
- Excision with margins and primary closure
- Closure with STSG or FTSG
- Closure with local flap
- Cryotherapy
- Irradiation
- Topical 5–FU
Basal Cell Carcinoma

- Prognosis excellent
- 150 cases of metastatic BCC documented
- Local control = cure
- Submucosal extension in lesions around piriform aperture or orbit decreases chance of cure significantly
Curettage and Desiccation (C&D)

- Field block or infiltration anesthesia with 1% lidocaine with epinephrine 1:200,000 is effective for most lesions
- Best suited for < 1 cm but many use up to 2 cm
- Best for nodular, ulcerative, exophytic
- Not good for morphea-type or recurrent BCC
- Not good where cartilage or bone is involved
Basal Cell Carcinoma

- Curettage and Desiccation (C&D)
  - Initial shaving preserves tissue for biopsy
  - Curet is used to remove tumor to firm dermis
  - Electrodestruction follows and curettage repeated and the cycle is repeated again
  - Change dressing daily
  - Eschar separates in 2–3 weeks, heals shortly after
Basal Cell Carcinoma

- Curettage and Desiccation (C&D)
  - Aesthetic result is usually excellent
  - Complications: Delayed healing, hypopigmentation, hypertrophic scar
  - Larger lesions need greater margin of normal tissue
  - Cure rate for 1º treatment of BCC < 2 cm is 95% and 90% for BCC > 2 cm
Basal Cell Carcinoma

- Surgical Excision with Margins
  - Primary, delayed, secondary closure depending on pathology and availability of frozen section diagnosis
  - When not required it can be elliptically excised along lines of least skin tension
  - When needed a margin <0.5 cm is included
    - Clear margins → undermine → close
Basal Cell Carcinoma

- **Cryotherapy**
  - Small: Liquid nitrogen freezes tumor and 5 mm area of normal tissue for 30 seconds
  - Immediate edema, exudation, necrosis, eschar
  - High cure rates when used correctly
  - Requires incisional biopsy before treatment
  - Local tissue destruction
Basal Cell Carcinoma

- Radiation Therapy
  - Low penetration irradiation to a tumor site in doses of 5000+R
  - Eyelids, nares, mouth (orifices)
  - Deltoid or sternal (scar from excision is undesirable)
  - Older with large tumor (unresectable or palliation)
  - Scars get worse (surgical scars get better)
Mohs Micrographic Surgery
- BCC most frequently treated with MMS
- Recurrence rate <1% for BCC and <2% for SCC
- Recurrence for recurrent tumors is 3–6% as compared to 20–50% with traditional treatment
- High risk: >2cm, poorly defined margins, aggressive subtype (infiltrating or morpheaform)
Basal Cell Carcinoma

- Mohs Micrographic Surgery
  - Anatomic areas that need tissue conservation (eyelid, periorbital, periauricular)
  - BCC most frequently attacks nose and is site with highest recurrence rate but 97–99% cure with MMS
Basal Cell Carcinoma

- Dermabrasion and Chemical Peel
  - Remove successive layers of skin
  - Little use for malignancies
  - Dermabrasion uses a diamond fraise wheel with high speed air driven rotor and local anesthesia
  - Most common error is inadequate depth
  - Covered with fine mesh gauze then a wet dressing of fluffed gauze as a scaffolding for epithelialization
  - Crust usually comes off in 7–8 days
Basal Cell Carcinoma

- **Interferon Alpha**
  - Intralesional treatment still under investigation

- **Carbon Dioxide Laser**
  - Usually used for superficial BCC
  - Considered when bleeding diathesis is present because bleeding is unusual
Recurrent BCC

- 5 year recurrence rate is 0–9% for primary tumors and 47% for recurrences
- Depends on size, location, sex, age, previous therapy
- Infiltrative, nodular with poorly defined border, sclerosing morpheaform BCC are most likely to recur because borders are difficult to see
Recurrent BCC
- Altered microscopic and clinical anatomy
- Fibrosis 2o to prior excision or radiation
- Defined as tumor within the immediate area of a previously removed BCC up to 5 years after initial removal with the same histopathology
Recurrent BCC

- Signs of recurrence:
  - Scarring with intermittent or non-healing ulceration
  - Scar that becomes red, scaled, or crusted
  - Enlarging scar with increased adjacent telangiectasia
  - Development of papule or nodule in the scar
  - Tissue destruction

- Biopsy
- MMS
Differential Diagnosis

- Trabecular (Merkel cell)
  - Epidermal, dermal or subcutaneous
  - Pathology resembles BCC
  - Contain small granules like those in the Merkel cell
  - Aggressive with metastases
  - Treatment: Surgery, ELND, radiation

- Adnexal Carcinoma
  - Uncommon, from sebaceous sweat glands
  - Grow slowly, recur locally and spread regionally
Squamous Cell Carcinoma

- From keratinizing or malpighian (spindle) cell layer of epithelium
- Older, men, fair, blue-eyed, North European
- Solar radiation (occupations) > chemicals, chronic ulcers, cytotoxic drugs, immunosuppressant drug treatment, dermatoses, discoid lupus, hidradenitis suppurativa
- Xeroderma pigmentosum, albinism
Squamous Cell Carcinoma

- Sun-exposed areas
- Inflammation and induration with thickening beyond the clinical lesion presage the malignant transformation of a precancerous lesion into SCC

- Types:
  - Slow-growing: Verrucous, exophytic, metastasizes
  - Rapid growing: Nodular, indurated, ulceration, invasive
Squamous Cell Carcinoma

- Squamous epithelial cells invade the dermis with well-differentiated keratinization
- Keratin pearls surrounded by epithelial cells
- If poorly differentiated keratinization and inflammation are minimal or absent
- Intercellular bridges are absent
- Poorly differentiated lesions may have a pseudoglandular appearance
Squamous Cell Carcinoma

- Small, isolated skin ulcerations treated conservatively for 2–3 weeks (ointment)
- Treatment depends on size and patient age
- Treatment options as for BCC (surgery/MMS)
- Older patients treated conservatively
- Recurrent lesion best treated by excision and grafting instead of a flap
Squamous Cell Carcinoma

- MMS good for difficult or recurrent lesions especially in medial canthal and alar regions
- Radiation can be effective in patients > 55 especially around eyes, nose and lips
- ELND are not necessary
Mohs Micrographic Surgery

- Good for genital tumors (v. amputation)
- Early SCC of digits without bony involvement especially in periungual region to avoid amputation without compromising cure
- Good for SCC in scar or radiation site due to high recurrence rate
- Good for SCC in perineural or scalp
Squamous Cell Carcinoma Prognosis

- 5–10% metastasize
- Marjolin’s ulcer or xeroderma lesions more prone to metastasize
- Scalp lesions where there was previous radiation are prone to metastasize
- Tendency for recurrence treated by any technique is twice that of BCC
Follow-up Treatment SCC

- Clinically examined every 6 months for 5 years
- 36% will develop second BCC in 5 years
- Early diagnosis and treatment are important in recurrent lesions
- SCC should be examined every 3 months for the first several years then indefinitely at 6 month intervals
Periodic Self Exam

- Prevention is the best weapon
- Curable disease if diagnosed early
- Full-length mirror, hand mirror, well-lit room
  - Examine body front and back in mirror then R and L sides
  - Bend elbows and look at forearms, back of upper arms and palms
  - Back of legs and feet, b/w toes, soles
  - Neck, scalp, back and buttocks with hand mirror
Philosophic Approach to Treating Skin Cancer

- **Biopsy or Not?**
  - Excisional based on clinical evidence OK if close primarily
  - Always submit pigmented lesions
  - 3 mm punch requires no closure

- **Frozen Sections?**
  - Most SCC and BCC treated without frozen sections
  - Recurrent disease, sclerosing BCC or critical site where 1 mm makes difference (consider MMS)
Philosophic Approach toTreating Skin Cancer

- Margins?
  - More exophytic need less margin
  - Oversimplification: BCC 5 mm and SCC 1 cm
  - Type, size, location, recurrent, age, closure

- Inadequate margins?
  - In general: Re-excise if at margin, observe if “close”

- Repair?
  - Most repaired primarily with local flap /STSG
  - Age, life expectancy, pathology, disfigurement

- Perineural and Mucoperiosteal Invasion?
  - More aggressive, needs wide extirpation
2 cm BCC is excised from shoulder of 50 yo man. Four days later, the permanent pathology report indicates that one surgical margin is “probably involved with tumor.” Which of the following is the most appropriate next step in management?

- Observation for 6 months for signs of recurrence
- Immediate re-excision of the involved margin
- Primary wound healing followed by excision of scar
- Radiation therapy
Estimated 30–65% of surgically treated BCC recur when the surgical margins appear to be microscopically involved with tumor. Recurrence is most frequent within the first 2 years after excision of primary.

Because of the low rate of recurrence and the lag time between excision and recurrence, the most appropriate management is primary wound healing followed by excision of scar. This is particularly important when the potential cosmetic complications limit removal of additional tissue. Many excisional wounds, as well as biopsy wounds, associated with BCC heal despite the presence of tumor cells along the margins. The resulting scar provides a clear marker for re-excision.
Mohs’ micrographic surgery is most appropriate in the management of which of the following types of BCC?

- Cystic
- Nodular
- Sclerosing
- Superficial
SCC and BCC and MMS

- Tumors in sites with high failure rates (orbit, ear, nose)
- Poorly delineated borders or from scar tissue
- Tumors larger than 2 cm or with aggressive features
- Morpheaform or sclerosing BCC
  - Pigmented
- In locations where maximizing tissue is important (eyelid)
- SCC with perineural invasion
- Microcystic adnexal carcinomas
- Dermatofibrosarcoma protuberans
- Desmoplastic melanomas