

"The eye does not see what
the mind does not know"

-Ancient Chinese proverb

[http://www.youtube.com/
watch?v=D-B52PV876I](http://www.youtube.com/watch?v=D-B52PV876I)
[.youtube.com/watch?v=D-
B52PV876I](http://www.youtube.com/watch?v=D-B52PV876I)

Things are not always as
they appear.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

1st patient of the day

- 69 y.o. white, male camp handy-man presents to the clinic after being referred by PMD.
- He complains of a pruritic, red rash involving the face and chest.
- No reported medications but the patient records reveals the patient has used Aricept and Efudex.
- HPI, PMH and FH do not reveal any further information.

DIAGNOSTICS T.L.A.N.T.A	Specimen ID: [redacted]
	Collected: 03/17/2009 Accession #: AT09-12110
	Received: 03/18/2009 Reported: 03/23/2009 at 1:39:15 PM <i>recd 3/24/09 12pm aw</i>
DERMATOPATHOLOGY REPORT	
RESULTS	
DIAGNOSIS: RIGHT SHOULDER, SHAVE: MALIGNANT MELANOMA	
[E(A): THIS NEOPLASM INVADDES TO A DEPTH OF 0.35 MM, AND IT WOULD BE CLASSIFIED AS A CLARK'S RETICULAR DERMIS IS INVOLVED. NO EVIDENCE OF ULCERATION OR LYMPHOVASCULAR INVASION IS SEEN. THERE IS FOCAL EVIDENCE OF REGRESSION. DR. RABB'S OFFICE WAS NOTIFIED ON 03/23/2009.	
CHEST, SHAVE: SPARSE PERIVASCULAR DERMATITIS	
[E(B): WHILE THIS MAY REPRESENT A SUBTLE MANIFESTATION OF A PRIMARY SPONGIOTIC PROCESS, ALLERGIC CONTACT DERMATITIS OR AN ID REACTION, I FAVOR A DIAGNOSIS OF A DRUG HYPERSENSITIVITY REACTION. CLINICAL CORRELATION IS RECOMMENDED.	
PATHOLOGIST: R. Wesley Wetherington, M.D., Electronically Signed <i>R. Wetherington, MD</i>	

Skin cancer statistics

- In the United States, this year there will be over one million basal cell carcinomas, 250,000 squamous cell carcinomas and over 62,000 melanomas diagnosed.
- Just think about how many are missed. Everyone in this room has seen skin cancer.
- The big three equal 1.3 million new cancers yearly. This equates to 1.6 million skin cancers of all types each year in the United States.
- One in five people will develop skin cancer in the United States, meaning over your career (30 years) over 48 million people will develop skin cancer in the United States.

-The Skin Cancer Foundation

Dermatology

- The study of skin, hair, nails and the diseases that effect them.
- What is this thing called skin?
- Skin= circa 1200 Old Norse-to Old English to describe the covering of an animal (Old Norse is a Germanic language that disappeared around 1300). -Wikipedia
- Cutis=From Latin meaning "skin"
- Dermis=intended to describe the lower layer of "true skin" that contains hair follicles, glands, nerves and blood vessels. -Etymology Dictionary

Healthy skin

- Consists of an epidermis comprised of five layers.
- A two layer dermis comprised of blood vessels, nerves, glands, hair follicles and fat.
- Subcuticular fat (By the way, people who eat lots of carotenoids have orange fat).

Skin deep

- Thinnest at eyelids ~.3 mm
- Thickest at the back-3mm
- The thickness of skin varies by race, location and skin conditions. The above depths are the extremes, reflecting the variation of thickness relative to location and skin type. -Emedicine dermatology

DEJ

- The dermo-epithelial junction is the anatomic heart of dermatopathology. This is where the dermatopathologist earns their bread and butter.
- This structure relates to wrinkles, fingerprints and a multitude of skin conditions. It is often imperative to evaluate the DEJ to describe skin cancers.
- Reteia (Latin for network) synonym of rete ridges-refer to the epidermal projections that help form the DEJ and interlock with the dermal papilla. -Merriam-Webster

Dermis

- Made of two distinct layers.
- Papillary region named in Latin for small nipple. This layer is responsible for the projections that create fingerprints and instrumental in temperature control.
- Reticular region is the thick collagen rich portion of the lower dermis that contains the majority of the nerves, vessels, glands, and hair follicles. -National Cancer Institute

What makes somebody "good" at dermatology?

- ⦿ There are a few keys to understanding dermatology. If these principles are not understood, no amount of education or exposure will result in significant mastery of the subject.
- ⦿ Learn the language, speak the language and precisely define the anatomy.

Traits of the best

- ⦿ You must evaluate the family and genetic history
- ⦿ Thorough and redundant history by the patient, nurse and yourself (none will ever be the same)
- ⦿ EXAMINE EVERYTHING! Head to toe. Intravaginal and retinal melanomas do exist.
- ⦿ Take photographs on serial exams. Time and an accurate historical account of the encounter will reveal the true pathology versus the red herrings.
- ⦿ Use different types of light. Natural versus limited spectrum indoor lighting. The visible spectrum is around 400-700 nanometers. THIS IS THE REASON THINGS MAY APPEAR DIFFERENT ON A CLOUDY DAY OR INDOORS!
- ⦿ Use a dermatoscope which magnifies and accents lesions using polarized light (perpendicular to field of view).
- ⦿ Feel the patient (a skin exam can not occur otherwise).
- ⦿ Establish a relationship with a great dermatopathologist.
- ⦿ Finally, all great dermatologists use the "biopsy."

What is a dermatopathologist?

- ⦿ A board certified dermatologist or pathologist with additional training in recognizing and diagnosing skin disease.
- ⦿ The tools of the dermatopathologist include microscopy, special stains and immunofluorescence microscopy.
- ⦿ There are over 1500 skin diseases with multiple variations and presentations.

-The American Society of Dermatopathology

Why do I care?

- ⦿ Largest organ in the body
- ⦿ Every exam involves the skin (Diaphoretic, toxic, lethargic, septic and any general appearance description)
- ⦿ Every provider evaluates skin, even radiologists see it and acknowledge it (missed foreign body is one of the most common liabilities in wound evaluations)
- ⦿ Every insurer acknowledges the skin (It is a system and a component of the physical exam)
- ⦿ Every lawsuit involves the skin "what did the patient look like when you last saw them nurse Smith?"
- ⦿ Every patient worries about the skin "Is this cancer?"

Skin Cancer

- ⦿ The most common cancers in the United States
- ⦿ BCC ranks number one
- ⦿ The head and neck have the highest prevalence of skin cancer.
- ⦿ Cancers of the head and neck are more likely to recur and metastasize.
- ⦿ BCC, SCC and melanoma make up 75-80% of skin cancers.
- ⦿ One in five Americans will develop skin cancer.

-The Skin Cancer Foundation

Skin functions

- ⦿ Skin weighs about 22-24 pounds in an adult or approximately 15 % of the total weight of a 70 kg adult.
- ⦿ It provides a barrier to trauma and reduces collateral damage (closed head injury studies reveal a protective role).
- ⦿ It is the largest organ of sensation.
- ⦿ It provides core temperature regulation.

Skin Phototypes

- In 1975, Thomas Fitzpatrick MD, PhD of Harvard University developed a system of rating skin based upon the complexion of skin and response to ultraviolet radiation.
- Fitzpatrick skin types one through six depicted below. A.K.A. "The Heidi Klum-Seal scale."



Atypical Skin Cancers The Other 20%

- Angiosarcomas
- Atypical fibroxanthomas
- Bartholin's gland cancer
- Bowenoid papillomatosis
- Cutaneous B-cell lymphoma
- Cutaneous T-cell lymphoma
- Dermatofibrosarcoma Protuberans
- Eccrine Porocarcinoma
- Kaposi's carcinoma
- Leiomyosarcoma
- Merkel cell carcinoma
- Microcystic adnexal carcinoma
- Mucinous carcinoma
- Paget's disease
- Penile intraepithelial neoplasia
- Sarcomatoid carcinoma
- Sebaceous gland carcinoma
- Trichoblastoma

Marra et al. (3)

Biopsy

- 1895, from Fr. *biopsie*, coined by Ernest Besnier (1831-1909) from Gk. *bi-* comb. form of *bios* "life" (see *bio-*) + *opsis* "a sight" (see *eye*). -Etymology Dictionary
- Simply: "To view life from within."

Types of Biopsies

- Punch (ranging from 1.0 mm to 8.0 mm)
- Shave and deep shaves (partial and full thickness techniques)
- Incisional and excisional biopsies
- Intent (to remove or diagnose), Diagnosis and cosmesis are the major factors in the type of biopsy selection.

The Biopsy kit

- Punch or transection blade
- Needle driver
- Curved or straight scissors
- Forceps (with or without teeth)
- Electrocautery
- Aluminum Chloride or Monsel's solution (ferric subsulfate)-most commonly used styptic agents

Styptic (Greek from *stuptikos* = to contract)

Anesthesia

- General
- Topical
- Local (injected)

Decisions regarding the type of anesthesia include but are not limited to: safety, age, time, complexity, location (i.e. Latin *id est* for that is) genitals, eyelids, and cost all play a role in the selection of anesthesia.

Anesthesia

- General anesthesia is the most expensive. This form of anesthesia is billed in anesthesia units and can range from \$2,000 to \$20,000 depending on the length, physical and geographic location of the procedure. The highest risks of complications and longest recovery time is all a factor. This is used as a last resort when the patient is unable to tolerate an in office procedure.
- Topical (EMLA, TAG, LET) cost is modest, but generally takes between 30-45 minutes to reach acceptable anesthesia.
- Injected (Lidocaine, Bupivacaine) The most common selection for typical in office procedures.
- Risks of anaphylaxis much lower with amide "caines."
- PABA and preservatives are the most common culprits for anaphylaxis.
- Alternatives- Diphenhydramine and saline

Site selection

- Location is important in the choice of biopsy technique selected.
- Pigment is important and will play a role in the post-procedure appearance of the scar.
- Thickness of the dermis and the depth of the procedure will effect the scar appearance.
- All biopsies leave a scar although it may not always be clinically apparent.

Post biopsy care

- Infection risk-MRSA (consider antibiotics, honey or vinegar)
- Scarring-valley type, pitting, bridging, spread, and hypertrophic scars may occur within weeks of the procedure.
- Keloids (derived from the Greek word to mean crab's claw) result from excessive fibroblast activity and increased collagen formation that may exceed the normal boundary of the scar.
- Hyperpigmentation-results from excessive melanin deposition.
- Hypopigmentation-damaged melanocytes produce less melanin and leave the skin with a lighter tone in the area damaged. This is a common complication from the use of cryotherapy.
- Neovascularization is the formation of new blood vessels and often gives the red, vascular appearance of a wound after a procedure.

Scar

- Scar is derived from the Greek word eschar which means place of fire.
- Cicatrix is a Latin synonym for a scar.



Keloids

- A keloid is a hypertrophic scar, but all hypertrophic scars are not keloids. This is because hypertrophic scars do not have to extend beyond the site of trauma.
- Most devastating of the scar types due to the fact they can be disfiguring.
- Treatment is often with intralesional steroids, immunomodulators (Aldara -off label), pulsed-dye lasers or other modalities.

Epidermis

- ◉ Literally Greek for "Upon the skin"
- ◉ The outermost portion of the skin unit.
- ◉ The first visible pathology is evident at this level.
- ◉ Five layers that can be defined histologically.
- ◉ Stratum corneum, lucidum, granulosum, spinosum, and basale.

Epidermis

- ◉ The epidermis is avascular and is nourished by diffusion through the dermis. This is important as it has an effect on healing and the appearance of the skin.
- ◉ The four common types of cells that make up the epidermis are keratinocytes, melanocytes, merkle cells, and Langerhans cells.

Keratinocytes

- ◉ An epidermal cell that produces keratin.
- ◉ Cells that produce keratin cover our glabrous (Latin for smooth-hairless skin), and hair bearing skin.
- ◉ Our hair and nails are primarily composed of keratin.

Squamous cells

- ◉ Squamous cells are keratinocytes and are found in the epidermis.
- ◉ Squamous cells refer to the layer of epithelium that lines our organs. This is the layer of skin that acts as chain mail and protects the underlying structures.
- ◉ The word is derived from the Latin "squama" which refers to scale. This makes sense in that these cells are scales that protect the underlying structures.
- ◉ Epithelial is from the Latin/Greek which means upon the teat (who figured).

Langerhans cells

- ◉ Named after the German physician/anatomist Paul Langerhans
- ◉ These cells are dendritic cells that function as (antigen presenting cells) . These cells function similar to macrophages when Colony stimulating factor activates them.

Langerhans cells

- ◉ HIV infection occurs when the virions (infectious form of a virus) invade and replicate within the Langerhans cells.
- ◉ These cells normally scavenge and survey for incoming viruses.
- ◉ Histiocytosis X (a.k.a. Langerhan's cell histiocytosis) is an uncommon disease that effects this cell line.

Langerhans cells in the epidermis



Merkel cells

- Named after the 19th century German anatomist [Friedrich Sigmund Merkel](#) (1872). -wikipedia
- Sensory cells (mechanoreceptors) that reside in the epidermis.
- Merkel cell carcinoma is derived from this cell line.
- This cancer is often misdiagnosed as basal cell carcinoma.
- The patient shows up year later with metastatic lesions. The diagnosis is difficult and without experience in recognition this will be missed.
- A diagnosis is only as good as the individual making it. Consider if your pathologist has made this diagnosis. If you do not, you are liable.

What is the most deadly skin cancer?

1. Malignant melanoma?
2. Lymphoma?
3. Merkel cell carcinoma?
4. Dermatofibrosarcoma protuberans?

Merkle Cell Carcinoma

- 30 times more rare than melanoma, but twice as deadly
- Often misdiagnosed as basal cell carcinoma
- Merkel cell polyomavirus found in 80% of lesions.
- "MCC kills approximately one in three patients compared to one in six mortality for melanoma."
-The Skin Cancer Foundation

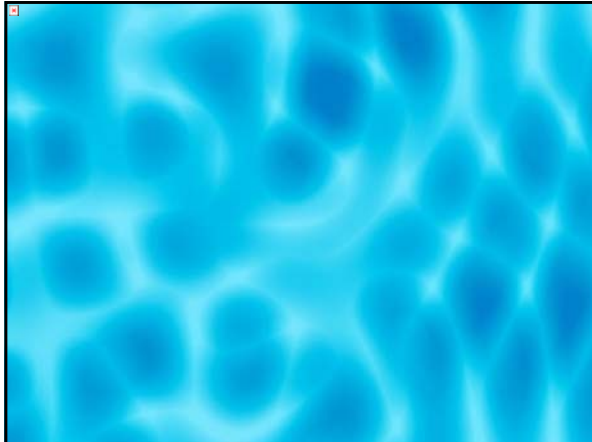
AEIOU Features of MCC

- Asymptomatic
- Expanding rapidly
- Immune suppression
- Older than 50
- Ultraviolet exposure

-The Skin Cancer Foundation

Melanocytes

- Reside in the basal layer of the epidermis.
- Skin contains on average between 1000-2000 melanocytes per square millimeter depending on the phototype (1-6).
- Melanocytes are oxidized during tanning (by exposure to UVB light). This results in melanogenesis and migration of the pigment upward through the epidermis. This is why a tan lasts and then fades after a few skin cycles (weeks).
- Melanocytes comprise 5-10% of the epidermis.(3)

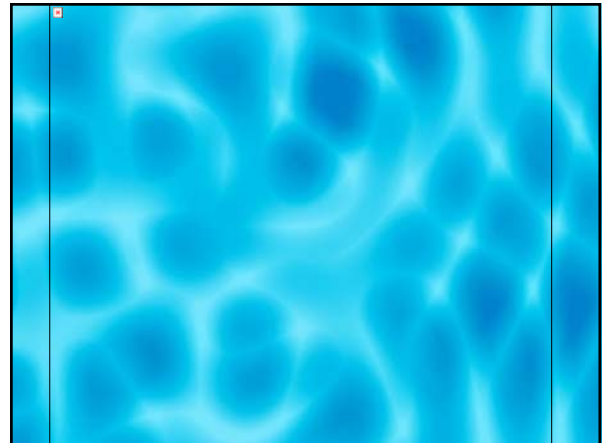


Melanogenesis

- The process of melanogenesis is the histological equivalent to the clinical finding of a tan.
- DNA damaged during this process results in the formation of CPD's (cyclobutane pyrimidine dimers). Thymine and cytosine bases are damaged resulting in a DNA point mutation.
© Chemistry courtesy of Wikipedia
- **THIS DNA DAMAGE IS THE REASON THAT SUNBURNS INCREASE THE RISK OF MALIGNANT MELANOMA.(5)**
- Most melanomas are the result of precedent ultraviolet radiation exposure. -The skin cancer Foundation

Exfoliation

- Early manuscripts described exfoliation by the Egyptians.
- The process of chemically or physically removing excess keratin and highly acidic corneocytes.
- Salicylic, malic, glycolic, citric acids, AHA, BHA, sea salts, sugars, pumice, loofahs et cetera (Latin "and...the rest.")
- Billions of dollars to the cosmetic industry.

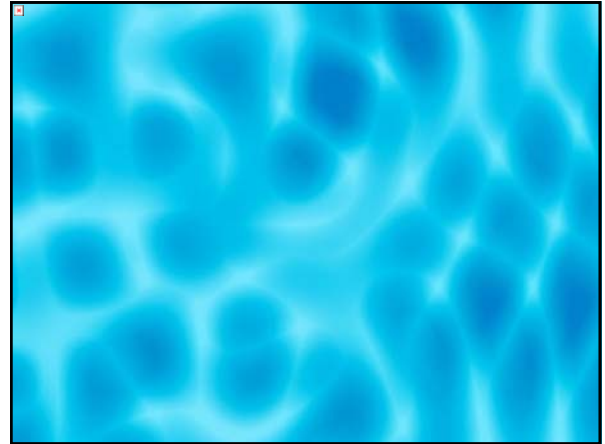


Desquamation

- Latin for "to scrape the scales off of a fish."
- This shedding of the outer layer of the skin is important in disorders of keratinization such as psoriasis.
- In healthy skin the process usually takes about four weeks.
- Psoriasis is named from the Greek word "psora" which means "to itch."
- This is the classic example of hyperkeratosis and difficulty regarding desquamation.

Hospital consult

- 48 y.o. white female on hospital day 23 s/p PE, DVT and intra-abdominal abscess. Multiple medications. WBC 9.2, no bands or segmented neutrophils. O2 sats in the 90's and generalized weakness with inability to ambulate.
- Purpuric plaques that coalesce on trunk and extremities. Greater than 30 % BSA is involved.



28 y.o. w male presents to clinic with complaints of a red, scaling rash to his face. Reluctantly, he agrees to have his back and chest examined.

Diagnosis: Malignant melanoma
Seborrheic Dermatitis

- ◉ Clark's level two melanoma on chest wall
- ◉ No family history
- ◉ No symptoms
- ◉ No history of skin cancer
- ◉ Patient no longer concerned about the scale on his face.
- ◉ Point of concern- no complaint and no symptoms.
- ◉ How many cancers do we walk past every day?

When you biopsy, what is the most important question to ask?

- ◉ The site (leading edge, central or multiple sites)?
- ◉ The type of biopsy (shave, punch or excision)? Immunofluorescence?
- ◉ The amount of tissue?

Albeit these are all important decisions, but they are not the most important.

The answer.

