Skin Health

Myths and Realities

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Myth or Reality

- The skin is the largest organ in the body.
Myth or Reality

- The skin comprises 15% of body weight.
- Chemical composition:
  - 70% water
  - 25% protein
  - 2% lipid
  - 3% other molecules
Skin Health

- Normal structure and function of skin
  - Racial/ethnic variability

- Effects on skin health
  - Habits: UV light exposure, smoking, alcohol consumption
  - Hormonal states in women
    - Oral contraceptives
    - Pregnancy
    - Menopause

- Measures to maintain and improve skin health
Structure of Skin

- Three layers:
  - Epidermis
  - Dermis
  - Subcutaneous tissue
Structure of Epidermis

- Multilayered structure, regenerates continually:
  - Basal layer – actively dividing cells which differentiate and move toward surface; scattered melanocytes
  - Spinous layer – desmosomes between cells; Langerhans cells
Structure of Epidermis

- Granular layer - cells contain keratin precursor, keratohyalin
- Cornified layer – dead cells filled with the tough, insoluble protein keratin; glycolipid ceramide between cells
Epidermal Cell Cycle

- Normal epidermal renewal cycle is roughly 40 days
  - Approximately 28 days for keratinocytes to reach stratum corneum
  - Approximately 12 days for cell in stratum corneum to exfoliate
- Failure to cycle normally leads to epidermal abnormalities
Function of Skin

Epidermis

- Protective barrier
  - Keratin, lipids produced by keratinocytes provide waterproof barrier
  - Barrier disrupted by inadequate hydration of epidermis; prevention:
    - Oil occlusion
    - Humectants
    - Gentle cleansing
Function of Skin

Epidermis

- Immune surveillance – Langerhans cells engulf foreign material, migrate from skin to stimulate immune response
- UV protection – pigment produced by melanocytes
- All functions decrease with age
Myth or Reality

- Fingernails and toenails consist of layers of keratin produced by living cells in the nail matrix. Increased intake of gelatin improves nail strength.
Myth or Reality

- Gelatin is a protein derived from partial hydrolysis of collagen
- Unless protein deficient – rare in the US - adding protein to the diet doesn’t improve nail strength
- Calcium intake doesn’t influence nail strength
Structure of Dermis

- Varies in thickness over the body
  - 1mm on face
  - 4mm on back

- Two distinct layers
  - Papillary dermis - thin layer at DE junction
  - Reticular dermis
Papillary Dermis

- Collagen network filled w/ hygroscopic ground substance consisting of
  - Proteoglycans
  - Glycoproteins
- Microfibrils coated with elastin – bind collagen fibers together and to epidermis
- Cell types: fibroblasts, mast cells, Langerhans cells
Reticular Dermis

- Large collagen bundles
- Elastic fibers
- Fewer cells:
  - Fibroblasts
  - Macrophages
  - Mast cells
Structure of Vascular Supply of Skin

- Dermis and subcutaneous tissue
- Arterioles, capillaries, venules
- AV anastomoses,plexuses
Dermis
Nerve Supply

- Richly innervated
- Motor nerves: sympathetic fibers of ANS
  - Smooth muscle of blood vessels
- Sensory nerves: branches of spinal nerves
Function/Properties of Dermis

- Dermis provides majority of skin’s functions
- Protection – strength, durability due to collagen
- Pliability and elasticity – collagen and stretchable elastin contribute
- Thermoregulation
  - blood flow increases with body temperature
Function/Properties of Dermis

- Sensation: pruritus, pain, touch, pressure, vibration, temperature
- Vitamin D synthesis
- Excretion
- Immune surveillance
- Storage depot
- All functions decrease with age
Structure and Function of Subcutaneous Tissue

- Consists mainly of adipose tissue

- Functions:
  - Protection from trauma; shock absorption
  - Insulation of underlying tissue
  - Storage
  - Endocrine functions
  - Metabolic functions

- Loss with age, disease processes (ex. HIV)
Structure and Function of Cutaneous Appendages

- Hair follicles, arrector pili muscle
  - warmth
- Sweat glands
  - Eccrine- heat regulation, excretion
  - Apocrine – body odor
- Sebaceous glands
  - Produce sebum; lubricates, waterproofs
Myth or Reality?

- People with oily skin in youth may have fewer wrinkles in old age.
Myth or Reality?

- Sebum has been demonstrated to contain Vit E, an antioxidant that helps protect against sun damage.
Racial/Ethnic Variability in
Structure and Function of Skin

- Data are limited concerning differences in structure and function of the skin
- Literature supports racial differential in
  - Pigmentation due to variation in epidermal melanin and melanosome dispersion
  - Hair structure
  - Fibroblast size and structure
Racial/Ethnic Variability in Pigmentation - Skin Phototypes

<table>
<thead>
<tr>
<th>Type</th>
<th>Constitutive Color; Reaction to UVL</th>
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<tbody>
<tr>
<td>I</td>
<td>ivory white; burns easily, never tans</td>
</tr>
<tr>
<td>II</td>
<td>white; burns easily, tans with difficulty</td>
</tr>
<tr>
<td>III</td>
<td>white; burns and tans moderately</td>
</tr>
<tr>
<td>IV</td>
<td>beige; burns minimally, tans easily</td>
</tr>
<tr>
<td>V</td>
<td>moderate brown; rarely burns, tans dark brown</td>
</tr>
<tr>
<td>VI</td>
<td>dark brown or black; never burns, tans deep brown or black</td>
</tr>
</tbody>
</table>
Clinical Implications of Racial/Ethnic Variability in Pigmentation

- Dyschromias
  - Hyperpigmentation
  - Hypopigmentation
  - Depigmentation
- Photoprotection
Racial/Ethnic Variability in Pigmentation - Hyperpigmentation

- Melanonychia striata
Racial/Ethnic Variability in Pigmentation - Hyperpigmentation

- Postinflammatory Hyperpigmentation
  - 3rd most common skin concern in patients with Type VI skin
  - Thought due to inflammatory mediators increasing function of melanocytes
Racial/Ethnic Variability in Pigmentation - Hyperpigmentation

- Melasma – increased prevalence reported in black, Hispanic and Asian subjects
Racial/Ethnic Variability in Pigmentation - Hypopigmentation

- Postinflammatory - thought due to inflammatory mediators decreasing function of melanocytes

- Skin conditions
  - pityriasis alba
  - Tinea versicolor
Racial/Ethnic Variability in Pigmentation - Depigmentation

- Vitiligo
  - no difference in incidence based on gender or race
  - distressing in all skin types, esp. Type VI
    - enhanced visibility on dark skin
    - racial identity implications
Racial/Ethnic Variability in Pigmentation - Photoprotection

- Superior absorption of UV-light in Type VI skin; equivalent to SPF 13.4
- Signs of photoaging can occur in all skin types but less pronounced, delayed onset in darker skin types
- Lower risk of skin cancer in more darkly pigmented skin thanks to the photoprotective effects of melanin
Myth or Reality

- The most common skin cancer in dark-skinned ethnic groups is basal cell carcinoma, as is the case in light-skinned patients.
Myth or Reality

- Squamous cell carcinoma is most common type of skin cancer in skin of color
Myth or Reality

- SCC and melanoma usually occur on sites not exposed to the sun.
- UVL exposure only an important risk factor with basal cell carcinoma.
- Greater morbidity and mortality, likely due to delay in diagnosis.
Racial/Ethnic Variability

Hair Structure

- No difference in keratin types
- Cross-sectional area
  - Largest in Asians; nearly round
  - Smallest in Western Europeans
Racial/Ethnic Variability

Hair Structure

- Four hair types
  - Straight
  - Wavy
  - Helical – coils of constant diameter
  - Spiral – coils diminish in diameter outward; most common hair type in blacks
Racial/Ethnic Variability

Hair Structure

- Pseudofolliculitis barbae: with shaving, sharp edge of coiled hair may penetrate skin

Treatment

- Discontinue shaving or use electric clippers, depilatory
- Hair-releasing techniques
- Topicals: eflornithine cream, steroids, antibiotics
- Laser hair removal
Racial/Ethnic Variability

Hair Structure

- Ultrastructural study found fewer elastic fibers anchoring hair follicles to the dermis in black subjects compared to whites.
- May be important with certain forms of hair loss (ex. traction alopecia).
Racial/Ethnic Variability
Fibroblast Size and Structure

- Larger, binucleated or multinucleated fibroblasts in black skin
- Greater incidence of keloid scar formation in blacks compared to whites due to excessive collagen formation during wound healing
Effects on Skin Health

UV Light Exposure

- Acute effects
- Chronic effects
- Photosensitive skin disease
UVL Exposure, Acute Effects

- Sunburn
- Solar urticaria
UVL Exposure, Chronic Effects

- Actinic keratosis
- Non-melanoma skin cancer
  - Basal cell carcinoma
  - Squamous cell carcinoma
- Melanoma
UVL Exposure, Chronic Effects

Photaging

- Wrinkles (rhytides)
- Dyschromia
- Elastosis
- Erythema
- Telangiectasia
- Textural changes
Photosensitive Skin Disease

Subacute Cutaneous LE

- Subacute Cutaneous LE
- Discoid LE
  - Race: slightly more common in African Americans than in whites or Asians
  - Sex: Male-to-female ratio of 1:2.
  - Age: mean age of approximately 38 years
- Porphyria cutanea tarda
Australian Sun Safety Tips

- **Slip** on a shirt
- **Slap** on a hat
- **Slop** on some sunscreen
Myth or Reality

- There is nothing new under the sun.
Myth or Reality

- Newer sunscreen ingredients improve photoprotection from UVA damage:
  - photostabilized avobenzone (Parsol 1789) - long wave UVA protection, peak 365 nm and up to 400 nm
  - ecamsule (Mexoryl) - short wave UVA protection, peak 345 nm and up to 380 nm
Ultraviolet Light Protection: Sunscreen

- UVB protection
  - Recommend SPF-15 or higher
  - Ray filtering provided:
    - SPF-15: 93%; SPF-30: 97%; SPF-45: 98%
  - Organic/chemical sunscreens (absorbers): Padimate O, homosalate, octisalate, octinoxate, octocrylene, oxybenzone
  - Inorganic/physical sunscreens (sunblock): titanium dioxide or zinc oxide
  - Studies show little or no effect on blood levels of Vitamin D; advise supplementation
Effects on Skin Health

Smoking

- Premature aging and wrinkling of the face
  - Decreases cornified layer moisture
  - Promotes abnormal elastin by increased elastase activity, dermal ischemia
  - Greater photodamage by prooxidant effect, decreasing antioxidant Vit A levels
Smoking’s Effect on Skin Health
Inflammatory Skin Conditions

- Increased risk of palmoplantar pustulosis
- Several studies: significant association with psoriasis
Smoking’s Effects on Skin Health

Neoplasia

- Oral lesions:
  - along with UVL, major risk factor for lip cancer
  - Overwhelmingly linked to oral cancer, leukoplakia
  - Nicotinic stomatitis
Smoking’s Effects on Skin Health

Neoplasia

- Skin Cancer
  - No increased risk but poorer prognosis with malignant melanoma
  - Significant association with risk of squamous cell carcinoma of the skin
Smoking’s Effects on Skin Health

Vascular

- Thromboangiitis obliterans (Buerger’s disease) – young males who smoke heavily, increasingly in female smokers
Smoking’s Effects on Skin Health

Wound Healing

- Detrimental to wound healing
  - Vasoconstriction
  - Decreased tissue oxygenation
  - Reduced collagen deposition
- Increased risk of flap failure, skin slough after surgery
- Advise patients to avoid smoking before and after surgery
Effects on Skin Health
Excessive Alcohol Consumption

- Specific dermatologic manifestations:
  - Vascular changes
    - Spider telangiectasia
    - Unilateral nevoid telangiectasia
    - Palmar erythema
  - Jaundice
  - Pruritus
  - Nail changes: Terry’s nails, koilonychia
Effects on Skin Health
Excessive Alcohol Consumption
Neoplasia

- Skin cancer
  - Higher risk malignant melanoma in one study
  - Higher risk basal cell carcinoma in some studies; aggressive tumors with tendency toward local destruction, recurrence
- Oral cavity squamous cell carcinoma – increased risk
Effects on Skin Health
Excessive Alcohol Consumption
Neoplasia

- Proposed mechanisms for increased risk of skin/oral cancer
  - Higher rates of sunburn reported
  - Immunosuppression
  - Nutritional deficiencies leading to altered mucosal integrity, enzyme dysfunctions
  - Acts synergistically with smoking to increase risk of oral cancer
Effects on Skin Health

Excessive Alcohol Consumption

- Alcohol abuse is detrimental to wound healing
  - Increased risk of wound infection
  - Nutritional deficiencies
  - Compromised platelet function
  - Coagulopathy

- Screen for alcoholism before surgery
Effects on Skin Health
Excessive Alcohol Consumption
Inflammatory Skin Conditions

- Exacerbation of skin disorders, including
  - Psoriasis
  - Seborrheic dermatitis – twice as common with alcohol abuse
  - Nummular eczema
Myth or Reality

- Alcohol consumption made WC Fields’ skin condition worse.
Myth or Reality

- WC Fields had rosacea, which is exacerbated by vasodilation due to alcohol.
Effects on Skin Health
Oral Contraceptives

- May improve acne
Effects on Skin Health

Pregnancy

- Hair
  - Hirsutism
  - Postpartum telogen effluvium
  - Postpartum pattern hair loss
Effects on Skin Health

Pregnancy

- Glandular changes
  - Increased eccrine function
  - Decreased apocrine function
  - Increased sebaceous function
Effects on Skin Health
Pregnancy

- Vascular
  - Spider telangiectasia
  - Palmar erythema
  - Varicosities
  - Gingival hyperemia
  - Hemorrhoids
  - Pyogenic granuloma
Effects on Skin Health
Pregnancy

- Pruritic Urticarial Papules and Plaques (PUPP)
Effects on Skin Health

Pregnancy

- Striae gravidarum
  - 90% of whites, less common in blacks and Asians
  - elastic fibers absent in striae, curled/clumped at edges
Myth or Reality

- Herpes gestationis is an outbreak of Herpes simplex during pregnancy.
Myth or Reality

- Formerly known by the misnomer of Herpes gestationis, pemphigoid gestationis is a rare autoimmune bullous dermatosis.

- In the United States, PG has an estimated prevalence of 1 case in 50,000-60,000 pregnancies.
Effects on Skin Health
Menopause

- Flushing
- Hyperhidrosis
- Hair loss
  - Telogen effluvium
  - Female pattern hair loss
Effects on Skin Health

Menopause

- Skin changes observed:
  - Dryness – decreased water holding capacity
  - Atrophy
  - Pruritus
  - Loss of elasticity with increased fine wrinkling, laxity, skin fragility
  - Delayed healing
Effects on Skin Health
Menopause

- Studies of estrogen’s influence on menopausal skin have demonstrated:
  - HRT: epidermis thicker, less dry; dermis thicker with increased collagen content, improved elasticity
  - Topical estrogen: increased collagen, skin thickness, decreased fine wrinkling, improved elasticity, more rapid wound healing

- Above evidence and risk-benefit ratio of oral, topical estrogen replacement controversial
Healthy Skin Tips

- Protect from ultraviolet light
- Moisturize regularly
- Gently cleanse skin
- Shave with care
- Don’t smoke
- Don’t drink excessively
- Carefully consider exogenous hormones in women
Help patients with skin concerns to thrive!

- Be aware of normal skin structure/function and racial/ethnic variability.
- Advise patients of healthy skin tips and follow them yourself!
Thanks for your attention!