# THE TRICKY TEAR TROUGH: PERIORBITAL SKIN REJUVENATION

Stacey Seastrom, DO PGY-4

# WHY DO WE CARE?

- Patients are often seeking advice about which topical products are most effective in treating periorbital rhytides

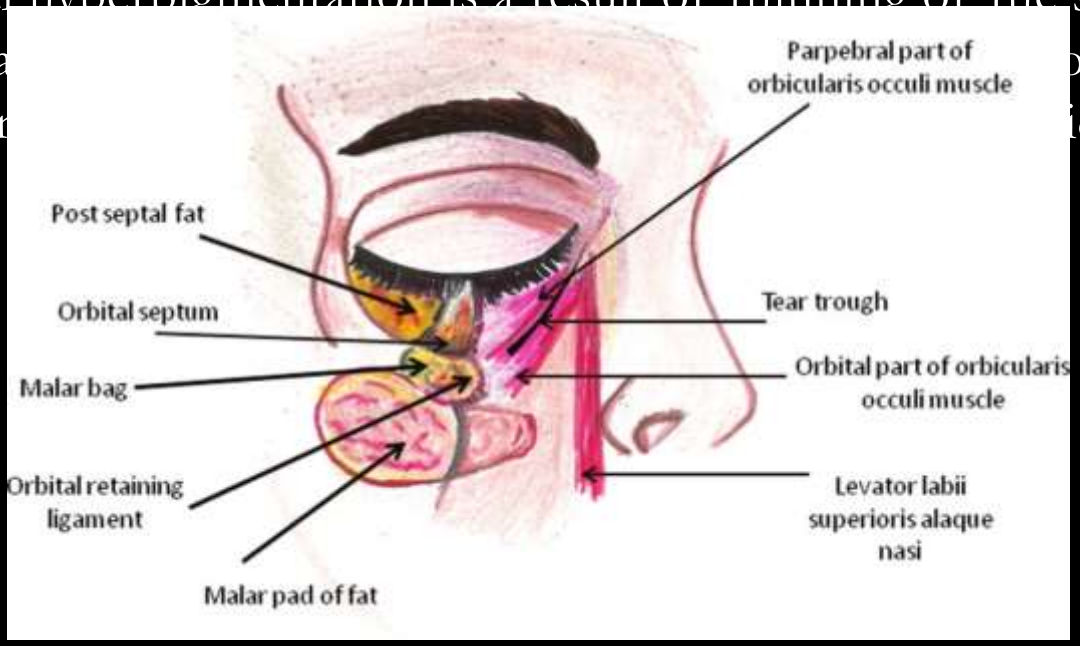
# SEPHORA SKINCARE

# CLINIQUE COUNTER

# THE DOCTORS SHOW

# PERIORBITAL ANATOMY

- Periorbital hyperpigmentation is a result of thinning of the skin, atrophy of the ma… …ony space → hyperpigr… …id and cheek



# UNIQUE CONSIDERATIONS

- Epidermal thickness: 0.2-0.4 mm
- Caution: due to thin skin and close proximity to the eye

# TREATMENT OPTIONS

Classically, treatment options are divided into 3 groups:

- Surgical
- Non-Surgical (fillers, neuromodulators, laser and light therapy)
- Adjunctive (topicals and peels)

# EFFICACY OF TOPICAL INGREDIENTS

Klingman: three golden rules of cosmeceuticals

1) Can the active ingredient penetrate the stratum corneum and be delivered in sufficient concentrations to its intended target in the skin over a time course consistent with its mechanism of action?

2) Does the active ingredient have a specific biochemical mechanism of action in the target cell or tissue in human skin?

3) Are there published peer-reviewed, double-blinded, placebo controlled statistically significant clinical trials to substantiate the efficacy claims?

# RETINOIDS

- Effects of retinoids on fine lines and rhytides are well known
- Retinol, retiny… rans-retinoic acid
- Caution: r… tival irritation


- Due to retinoids ability to induce irritation, there is hesitation to use these products near the eye with the potential to damage to the eye or cause unappealing periorbital erythema

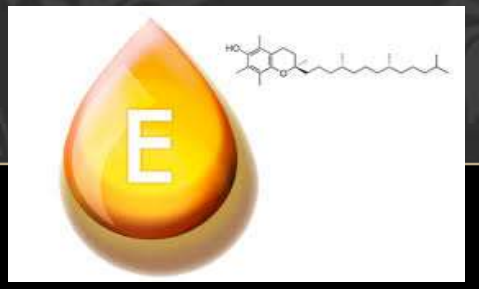
# VITAMIN C/ L-ASCORBIC ACID


- Efficient water soluble antioxidant
- Neutralizes free radicals (intracellularly and extracellularly)
- Protected porcine skin from UVA phototoxic injury & UVB induced erythema & sunburn cell formation
- Essential in collagen biosynthesis; cofactor for both lysyl & prolyl hydroxylase
- Provides lightening benefits via inhibition of tyrosinase
- 3 month double blind vehicle controlled study- 84.2% preferred side treated with vitamin C and optical proflometry demonstrated 73.7% improvement of crows feet

# VITAMIN C CHALLENGES

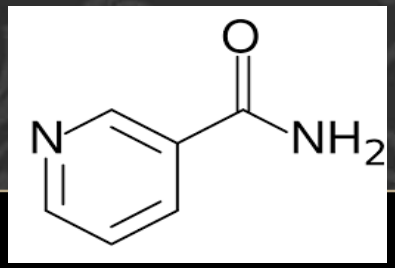

- Greatest challenge: product stability and adequate penetration
- Water soluble ➔prone to oxidation ➔ byproduct dehydroascorbic acid
- Thus, must be formulated at pH < 3.5 to enter the skin
- Maximal concentration for optimal percutaneous absorption is 20%
- Beneficial combination of anhydrous ascorbic acid + lipid soluble terahexyldecyl (THD) ascorbate

# VITAMIN E/ALPHA-TOCOPHEROL




- Lipophilic antioxidant: protective for cell membrane & stratum corneum lipid bilayer
- Neutralizes free radicals & promotes healing process
- Decreases UVB- induced photodamage, inhibits human metalloproteinases that degrade elastin & inhibits UV- induced tumor formation
- 4 month facial study with 5% topical vitamin E showed improvement in periorbital rhytides post-UV inflammation
- 15% L-ascorbic acid & 1% α-tocopherol ➔4-fold photoprotection against erythema & sunburn cell formation
- Synergistic photoprotection: d/t combining the hydrophilic & lipophilic antioxidants ➔stabilized formulation


# NIACINAMIDE/VITAMIN B3




- Antioxidant effects, reduces skin yellowing, hyperpigmentation, erythema & blotchiness, improves the epidermal barrier & reduces fine lines & wrinkles
- Inhibits melanosome transfer from melanocytes to keratinocytes
- Increases collagen production as shown in fibroblast cultures & reduces excess dermal glycosaminoglycans (GAGs) which are characteristic of photodamaged skin
- Increases lipid and protein components of the stratum corneum ➔reduces transepidermal water loss(TEWL) & increases the skin's barrier properties
- One of the best studied cosmeceutical ingredients for antiaging

# GREEN TEA

- Epigallocatechin-3-gallate (EGCG): most abundant & physiologically active polyphenol

- EGCG is a powerful free-radical scavenger that has been shown to reduce UVA-induced sun damage and UVB-induced lipid peroxide, to downregulate UV-induced expression of AP-1 and NF-kB, to inhibit expression of collagenase in cultured human fibroblasts, and to prevent collagen crosslinking in hairless mice

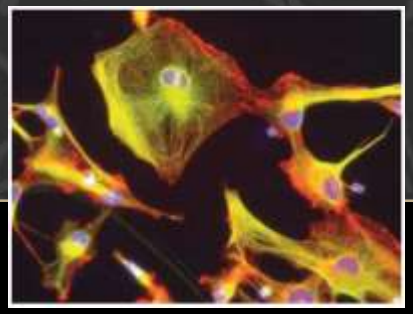
- Histologic exam: green tea application protected epidermal Langerhans cells from UV damage and reduced the number of sunburn cells

# GREEN TEA CHALLENGES

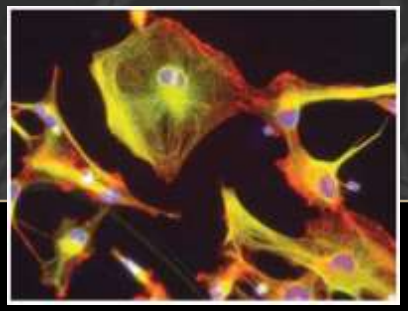
- Lack of stability and epidermal penetration
- EGCG is a highly reactive compound that is easily oxidized
- Oil-in-water emulsion = most effective percutaneous penetration
- Glycosalated form: more efficacious for targeting keratinocytes & max. antioxidant activity
- Skepticism: the only randomized, double-blind, controlled clinical study found no statistically significant clinical improvement
- If stability & penetration can be addressed, the benefits of green tea for the human skin could become a powerful adjunct in our cosmeceutical armamentarium

# PEPTIDES

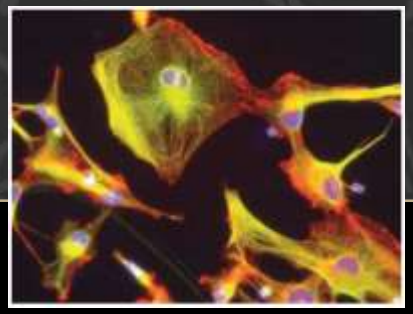
- Lysine-threonine-threonine-lysine-serine (KTTKS) is a fragment of procollagen I, which has been shown to stimulate dermal matrix production in fibroblast cultures
- Palmitoyl, a fatty acid fragment, added to this hydrophilic peptide improves cutaneous penetration
- 12 wk, double-blind, placebo controlled, split face study, topical 3 parts/million pal-KTTKS ➔ significant improvement in the appearance of facial rhytids
- Indefinite modifications can be made to the amino acid sequences comprising peptide molecules
- As the amino acid residues increase, so does the cost and difficulty of skin penetration
- This technology will continue to evolve in the future and will play an integral role in the cosmeceutical industry



# GROWTH FACTORS



- Integral role in the repair and remodeling of dermal infrastructure
- Topical application promotes growth of keratinocytes, dermal fibroblasts & other cells with decreased proliferative capacity due to aging
- Two studies utilizing GF & cytokines obtained from cultured human fetal fibroblasts ➔ 17% improvement of periorbtial wrinkles after 2 months of BID application & 33% improvement after 6 months of BID usage
- On histology: 37% increase in grenz-zone collagen & 30% increase in epidermal thickness after 60 days of BID application



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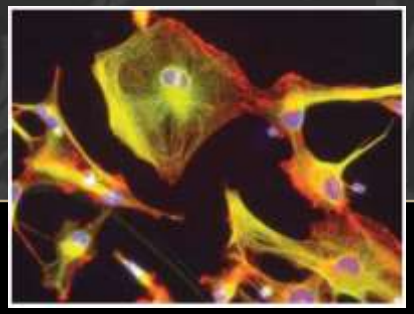
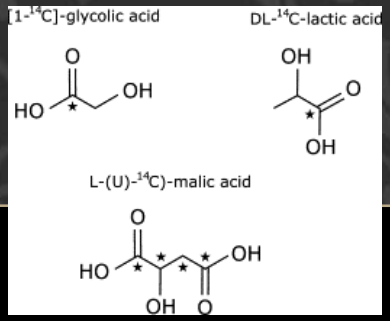
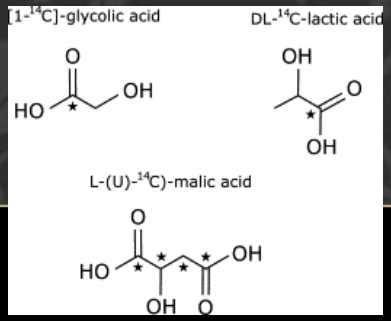


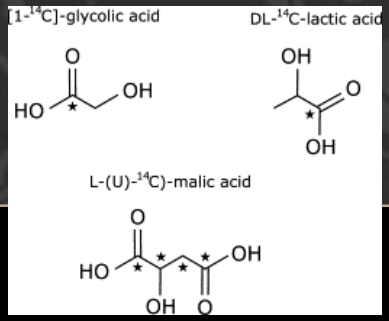
- Alternative to human growth factors → topical product containing secretions of the snail Cryptomphalus aspersa (SCA)
- Shown to provide significant improvement of periorbital rhytides after 12 wks of use
- Large molecular size of growth factors: effective skin penetration?
- Penetrate via a vertical pathway such as hair follicles, sweat glands or microlesions in the inter-follicular stratum corneum
- Growth factors & cytokines will likely continue to be an emerging area of study for periorbital rejuvenation




# ALPHA HYDROXYACIDS




- Glycolic acid, lactic acid, mandelic acid & benzilic acid
- Decreases corneocyte cohesion above the stratum granulosum, promoting exfoliation of the outer layers of stratum corneum
- Topical AHAs for 6 months resulted in 25% increase in epidermal thickness with improved synthesis of glycosaminoglycans, collagen & possibly elastic fibers
- Also reversed basal cell atypia, dispersal of melanin pigmentation & return to a more normal rete pattern

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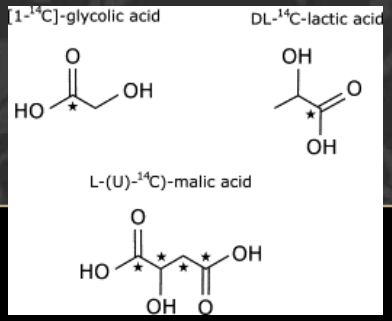



- Formulated in daily skin care regimens
- Higher concentrations may be used for chemical peels
- Address the crucial issues of periorbital rejuvenation including photoaging & hyperpigmentation

# HYALURONIC ACID

- Naturally occurring glycosaminoglycan; major component of ECM
- Humectant: attracts moisture; binds 1,000 X its volume in water
- Helps maintain tissue elasticity, turgor, and hydration

# HYALURONIC ACID CHALLENGES

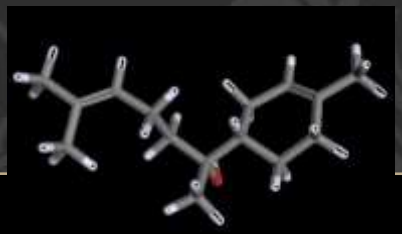
- Challenge: the ability to penetrate the dermis to achieve maximal deposition
- Most OTC hyaluronic molecules are 3,000 nm in diameter, whereas the intercellular space is only 15 to 50 nm
- Recent study: efficacy of a nanoproduct of 5nm in reducing the depth of wrinkles, increasing moisture and elasticity of the face and periorbital region found a statiscally significant change

# CERAMIDES

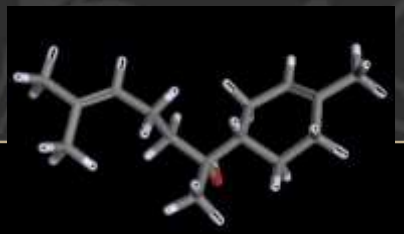
- Essential component of the stratum corneum
- Integral role in skin barrier function & maintenance of homeostasis
- Improves skin hydration, reduces TEWL & increases tretinoin tolerability
- Addition of ceramides to any periorbital rejuvenation regimen will provide improvement in overall skin hydration


# CAFFEINE


- In vitro studies indicate caffeine exerts antioxidant properties
- Exhibits anti-inflammatory properties
- Caffeine stimulates lipolysis by autonomic neural mechanisms ➔ improves lower eyelid sagging and puffiness
- Although caffeine is used in many cosmeceutical products, there is still caution for its anti-aging use, as it has been shown to reduce collagen synthesis in human cultured skin fibroblasts



# CHAMOMILE/BISABOLOL



- Moderate anti-oxidant activities
- Potent anti-inflammatory action
- Further studies need to be performed to clearly demonstrate the role of chamomile in reducing puffiness and irritation of periorbital skin

# LICORICE ROOT/GLYCYRRHIZIC ACID

- Glycyrrhetinic acid: pharmacologically active compound in licorice root with anti-inflammatory properties
- Licorice root contains liquirtin and isoliquertin which disperse melanin and glabridin which inihibits tyrosinase
- Licorice root is effective in treating the hyperpigmentation associated with photoaging
- More studies are needed to examine its role specifically in periorbital hyperpigmentaiton

# TOPICAL BLEACHING AGENTS

- Accelerate skin turnover ➔ Hydroxy acid, retinoic acid
- Premelanin synthesis ➔ Tretinoin
- Tyrosinase inhibition ➔ Hydroquinone, azelaic acid, kojic, arbutin, soy, mushroom, peptides
- Post melanin synthesis tyrosinase degradation ➔ Linoleic acid
- Postmelanin synthesis melanosome transfer inhibition ➔ Soy, niacinamide
- Interacts with copper ions to reduce dopaquinone ➔ Vitamin C

# INVISIBLE SHAPEWEAR

- Noninvasive polymer emulsion which can be applied to the under eye area ➔ resultant in-situ crosslinking functionality & formation of an invisible film

- A randomized, split face study identified a one grade improvement in lower lid bag protrusion & increased epidermal thickness

# CONCLUSION

- Periorbital region is a critical aspect of facial rejuvenation

- Periorbital treatment options have exponentially grown from extensively studied retinoids, to recent technology, such as growth factors and peptides

- Future scientific advances will continue to expand our treatment armamentarium for periorbital rejuvenation

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