

Skin Aging

اللهم اذ بواب الخلقه
التي ~~مختصة~~ صفاتها بين
يديك والامور الصعبة التي
تيسر بها صني عليل
اللهم آمين

And Its Modulation

Introduction

- Two main processes of skin aging: intrinsic and extrinsic
- Intrinsic aging: reflects the genetic background of an individual and results from the passage of time. It is inevitable
- Extrinsic aging (premature skin aging): caused by external factors such as smoking, poor nutrition, alcohol, and sun exposure. It is not inevitable

Skin Aging

سلايد (٥)

شيء داخلي وراثياً $\Rightarrow$ Intrinsic aging

الخلايا التي لفترة معينة من العمر تبدأ بعملية الـ Aging

It is inevitable $\Rightarrow$ لا تستطيع منعها وليس فقط

على الجلد، إنما على كل الأنسجة الموجودة بالجسم

genetically programmed

كل مدة لها وقتاً قصيراً عملية الهدم أكثر من البناء

سبب خارجي وهو $\Rightarrow$ Extrinsic aging

premature شيخوخة يبدأ قبل ما تبدأ عملية الـ

intrinsic aging ، ويسمى excessive aging

sign of aging تكون excessive سبب الـ

extrinsic factor

mainly caused by smoking and sun exposure

هو الـ لا تقدر تمنعه أو نضفة (not inevitable)

سلايد (٦)

الصورتين لتوأم ودية عاشت في القرية ووددة بالمدن

في المدن ما تشبهوا لأشعة الشمس بشكل كبير

مقارنة بين القرية

الصورتين لتراكم وهدق حاسية في الفزيرة (A) وهدقة بالمندرية (B)
 في المندرية يتحرموا لدمية الشخص بشكل اقل مقارنة بفسكان القرى

Two 70 year old women

EXTRINSIC AGING INTRINSIC AGING

wrinkling, deep lines
 and sagging of the skin
 عندنا
 صارت واهية
 everywhere



(A)



(B)

Saja Hamed, Ph.D

منبت البيرة حاذقة
 على ال
 geometry
 تبعثها لكان صار في زيادة
 في ال wrinkles في ايامها
 muscle contraction
 وصارت واهية.

* اذا كنت
 وعاش بطرية محبة جيداً
 عن ال smoking وعامل
 diet و excersies و
 sleep مع مارح تحتاج
 تستخدم! في سكر وتقل age بطرية جميلة.

Intrinsic aging

- The superficial muscles on the face begin to shrink, which causes lines to appear.
- Typical facial wrinkles forming the areas where muscles contract to make facial expressions. These include "worry lines" spanning the forehead, "laugh lines" around the eyes and mouth, and crow's feet radiating from the outside corners of the eyes

الموجودة
بالجبهة
التي حول الفم
والعين

* The Intrinsic aging does not only include the skin.

مع الـ aging رصير عينا bone desorption و muscle shrinkage من بين تغيرات على
الجلد تبع الوجه رصير آتغير كما نابع العضلات التي تحت وكذلك عظام الجبهة نفسها .

5 4 3 2 1
Shrink رصير الـ muscle
Expression line و
Saja Hamed, Ph.D
أكثر

Intrinsic Aging

- The production of immune cells decrease overtime which contribute to the compromised wound healing process
- Gradual flattening of the wavy attachment between epidermis and dermis due to reduced production of keratinocytes → increase skin fragility and reduce nutrient

The rete ridges

transfer between the dermis and epidermis (epidermis) (نقل التغذية)

* (نقطة) الـ epidermis لا تحتوي على blood vessel فإما هي تتغذى من الدم عبر rete ridges (الأوعية الدموية التي تتكون تربط بينها مساهمة الـ rete ridges) (مع الوقت لما يقل هذا الـ ridges شكلها flake رقيق التغذية والتقلص من epidermis) (الـ Toxic يقل وهذا يساهم في slowing the rate of saltier wound healing) (الـ metabolic)
Saja Hamed, Ph.D

عند الكبار بالسن

Intrinsic Aging

يؤثر على كل الجلد وليس فقط الوجه واليد

- It affects the skin on the entire body, including the photoprotected areas in a similar manner
- Slow, continuous, and irreversible tissue degradation
- People of identical chronological age may appear to have younger or older looking skin due to different genetic make up

من شرط على عمر الـ 70 يكون الـ Intrinsic aging أكثر من واحد آخر بلوت genetic background مختلفة ، غنى لوكية أنت وتغير آخر بنفس العمر الزمني هذا الـ Intrinsic aging يظهر بنفس الأسلوب دائما حسب الـ type of skin فالـ Intrinsic aging يكون مختلفة .

7. من الناس الذين يشبهونهم كثير قاعة يكون الـ wrinkles أهم كثير أوضح وهذا على عمرهم 70 genetic background و الـ genetic makeup يتحدد أيضا التغيرات التي يصير على الجلد الـ Intrinsic aging .

Intrinsic Aging

- Both the mortar and bricks of the skin are affected which leads to a reduction in the SC lipid content, damaged barrier functions, increased epidermal water loss and drier skin
- Changes in skin pigmentation and size of the sebaceous glands
- Decrease in melanocytes density → pale appearance which also related to decrease vascularity of the skin → more susceptible to sun damage because of less melanin
- Number of sebaceous glands remain approx. the same throughout life but their size tends to increase with age → the skin pores may widen

سلايد (8)

خلايا الـ Corneo cyte وما يحيط بها من lipid
يُحيط وتتأثر مع الوقت ، كمية الـ lipid حول خلية الخلية
مع مرور الوقت تقل ، يعني في صير damage بالـ
barrier function الذي هو يحافظ على الـ normal
trans epidermal water loss ، وفي regulation الـ
ويزداد إذا زاد الـ TEWL loss ، في صير الجلد drier

وهنا امره الشغل الذي تلي الناس with aging
يُصير بشرتهم جافة التي هي :
(1) نقص الـ lipid content حول الـ

Corneo cyte ما يؤدي (damage in the barrier)

(2) يقل كمية الـ natural moisturizing factor داخل
الـ Corneo cyte وكذلك الـ Hyaluronic acid في
الـ dermis

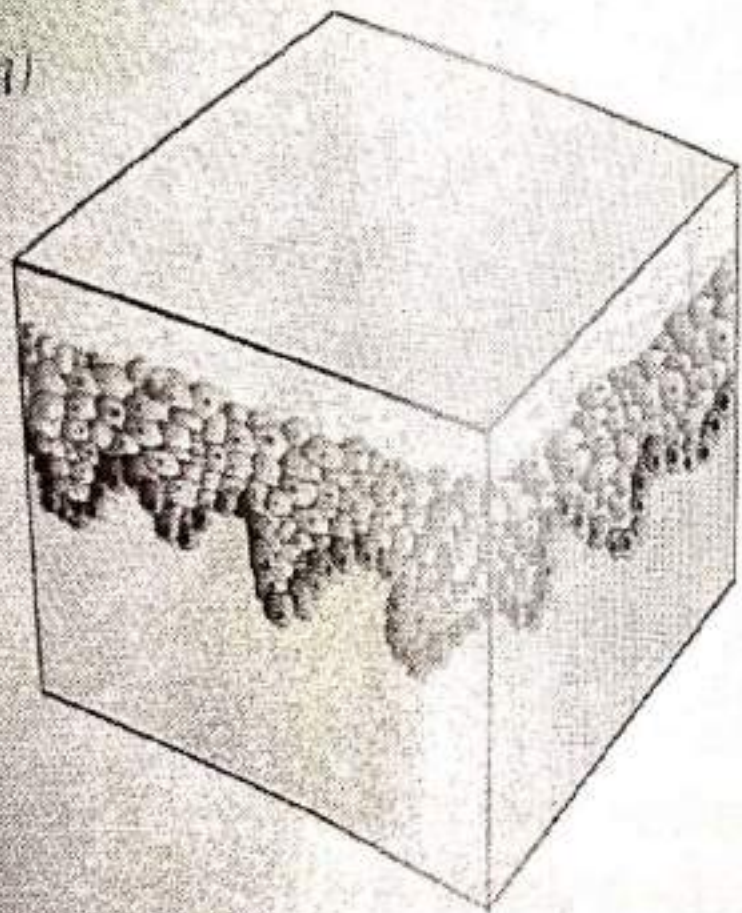
دانة الـ melanin يلعب دور في الـ UV protection
ومع نقص الـ melanocyte بالقدم في الثمر يَصير الجلد
معرضا أكثر للـ sun damage

Size ١١ Size ١١
Number of sebaceous gland
تغير

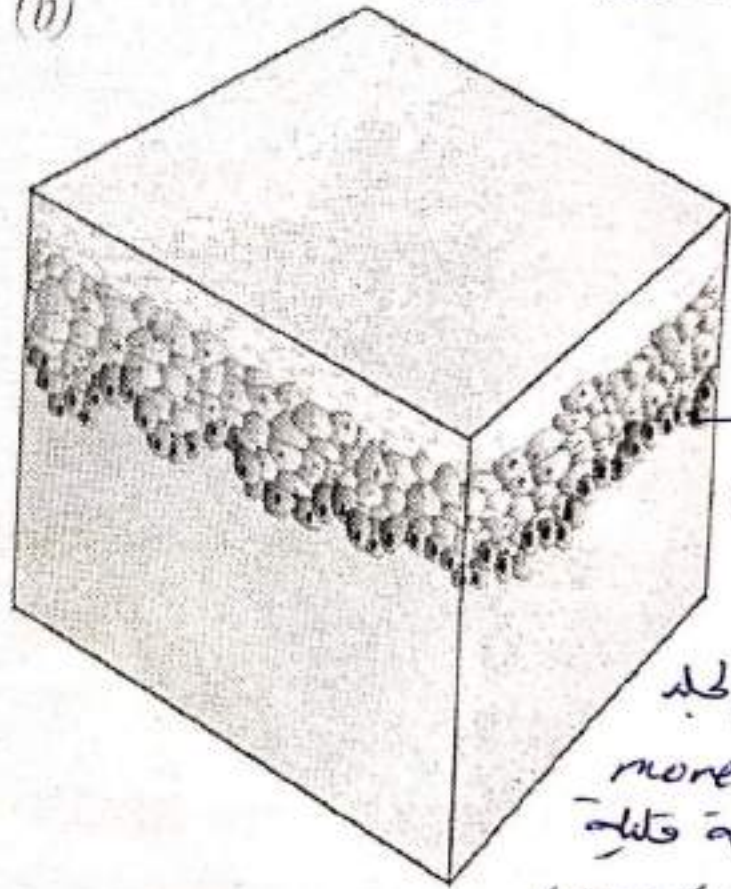
الها صغير أكبر
pore واحد واحد
أكثر في الوجه وصول الألف مقارنة بغير الوجه

مع توضيح اللي ريس بال rete ridges (المتطوعة بين ال dermis وال epidermis)
 وهي عبارة عن ~~نقوش~~ تقرجات هي تزيد قوة الاستواء وتغذية ال epidermis
 من ال vessel اللي بال dermis

(a)



(b)

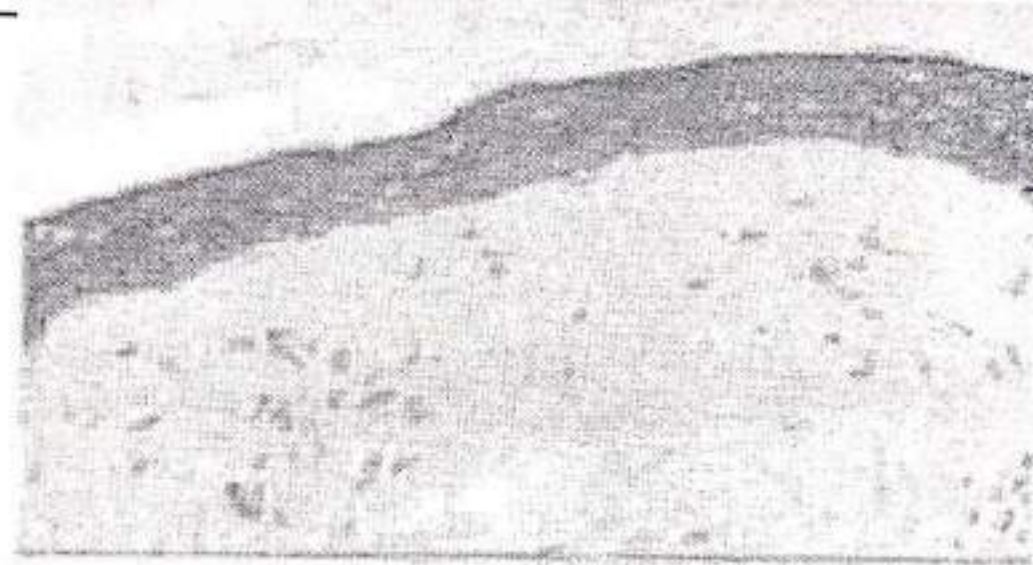


مع اللي ريس
 اخلا ريس
 flattened
 وصاى تخلل الجلد
 more fragi
 والغذية الة قليلة
 وال wound healing
 اقل

Flattening of the attachment between epidermis and dermis in older skin (b), compared with the wavy attachment in younger skin (a).

Young and aged dermis

میکروسکوپ
بافتة ناعمة و صلبة
مخففة و آفکة



Aged

→ Thinning
of epidermis
مخففة و آفکة
dermal ridges
مخففة و آفکة



Young

→ dermal ridges
prominent

Intrinsic aging vs. Extrinsic aging:

Extrinsic aging:

- Appears predominately in exposed areas such as the face, chest, and extensor surfaces of the arm
- It is a results of the total effects of a lifetime of exposure to UVR
- Wrinkles, pigmented lesions (i.e. freckles, lentigines, and patchy hyperpigmentation), and depigmented lesions
- Loss of tone and elasticity, increased skin fragility, area of purpura caused by blood vessels weakness, and benign lesions such as keratoses, telangiectasias, and skin tag

التغيرات الخارجية $\Rightarrow$ In Extrinsic aging
 بال Internal aging يتغير بالإضافة للتغيرات التي
 تسببها excessive exposure to sun and smoke
 وغيرها من (Extrinsic factor) التي تزيد من التغيرات

ال Extrinsic aging تتغير على هذه المناطق التي
 تتعرض لها (Extrinsic factor) مثل:

إذا كانت الشمس مفرطة mainly على الوجه واليدين
 خاصة للناس التي ما تحموا من الشمس.

ال Extrinsic aging mainly من (Life time)
 exposure to UV radiation

ليس فقط exposure لفترة قصيرة إنما Life time
 exposure

تسبب deep wrinkles, pigmented ^{lesion} ~~lesion~~, sun spot
 hyper and hypo pigmented lesion
 يمكن أن تسببها

loss of tone and elasticity ^{sagging} ~~shrinking~~ من
 of the skin، نتيجة لاجتياز الجاذبية

پیر عیدم ال purple واپسے

نواہت سے سکتے واپسے

slam tag

Intrinsic aging vs. Extrinsic aging:

Extrinsic aging:

■ Histopathologically:

- Elastosis ⇒ due to excessive degradation of elastine
excessive UV radiation
- Epidermal atrophy ⇒ extrinsic and intrinsic
more severe extrinsic
- Changes in collagen and elastin fibers: in severely photoaged skin the collagen & elastin fibers are fragmented.

fragmentation

- degradation of collagen and elastin
extrinsic and disorganisation
intrinsic

Intrinsic aging vs. Extrinsic aging:

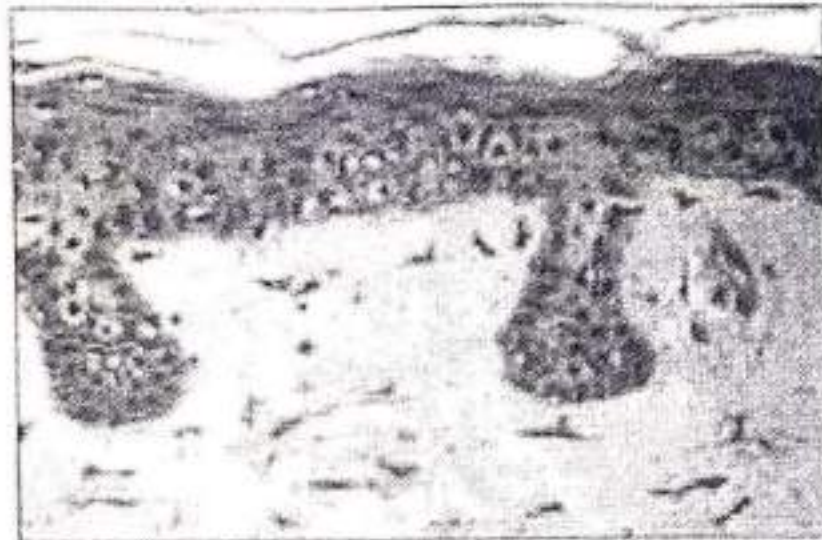
Extrinsic aging:

■ Elastosis:

- A hallmark of photoaged skin
- An accumulation of amorphous elastin material
- Results in reduced elasticity of the skin that may account for sagging skin in elderly

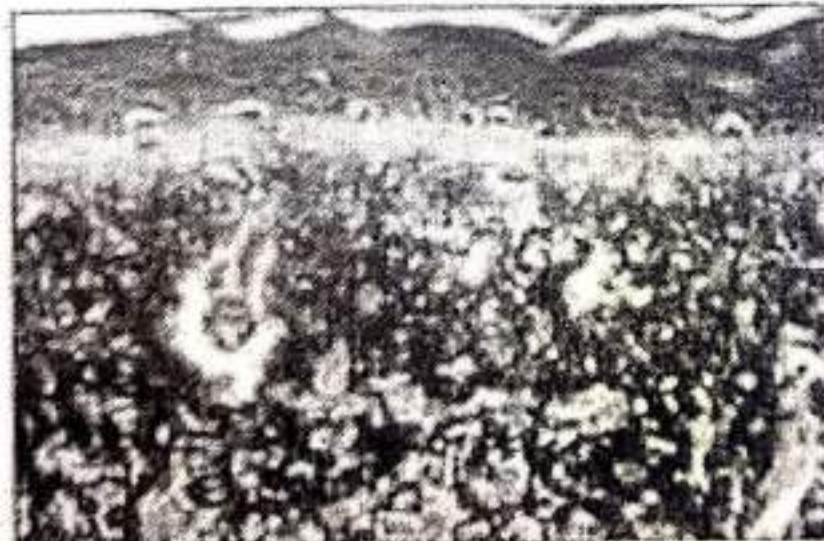
السَّهْلَةُ رَضِيَّةٌ مَرْتَهَلَةٌ

Severely damaged elastin in photoaged skin



INTRINSICALLY AGED EPIDERMIS

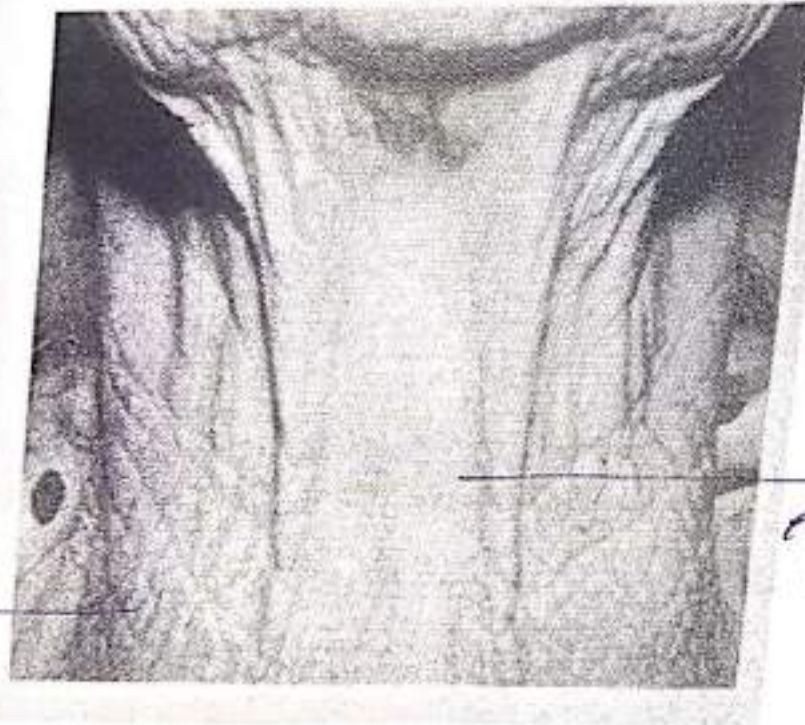
مزرعة حنة ال
Microscope
توضيح ال
Extrinsic aging



SOLAR ELASTOSIS PHOTOAGED SKIN

عجل ال elastosis
Fragmented elastin
Fiber.

Solar Elastosis



Solar Elastosis. Yellowing and furrowing of the skin result from chronic solar exposure. The area under the chin which is protected from the light is undamaged.

هذا الجلد غير
متأثر بال
aging
external

* هذا نتيجة ال
elastosis
and excessive exposure to sun

هذا الجلد الذي
على الأجزاء
sagging
منه خد
farrowing of the skin

Saja Hamed, Ph.D

(Atlas of Skin Cancer Pg: 158, ¹⁵1991)

Extrinsic Aging

The acceleration of intrinsic aging caused by exposure to various environmental factors such as sun, wind, smoking, and air pollutants

The primary factors are UV radiation and smoking

When the process is called photoaging when it is caused by the sun

Photoaging is a cumulative process, which means that exposure adds up over the years

Smoking leads to premature aging

Smokers look older than their true age. Smoking has been shown to be a great contributor to facial wrinkling than sun exposure

(J Invest Dermatol. 2003 Apr;120(4):548-54. Effect of smoking and sun on the aging skin. Kennedy C(1), Bastiaens MT, Bajdik CD, Willemze R, Westendorp RG, Bouwes Bavinck JN; Leiden Skin Cancer Study).

سلايد (١٦)

photoaging $\Rightarrow$ extrinsic aging caused by
excessive exposure to sun

دجني Cumulative كمية سنوية وانت تتعرض للشمس.

smokers looks older than their true age

دجني لو عمرك ٤٠ سنة ومرفنا ٤٥ تبين كسكل اكلبر من عمرك.

لما نقل smoking سكل يومي فانك تحرك ال facial

muscle سكل مستمر على اللى حوالين الفم سبب على ال sucking

فتخلي ال facial wrinkled ارفع من لو كانت نتيجة sun exposure

اللى حوالين العين كذلك ال crow's feet ذاك يدك ترصق

عشان تقدر تشيل ال smoke اللى تبي على العين وتعمل irritation

المركبات اللى زفير خلال عملية ال smoking تزيد على اللى حوالين

بند ال smokers

Intrinsic aging vs. Extrinsic aging:

Extrinsic aging:

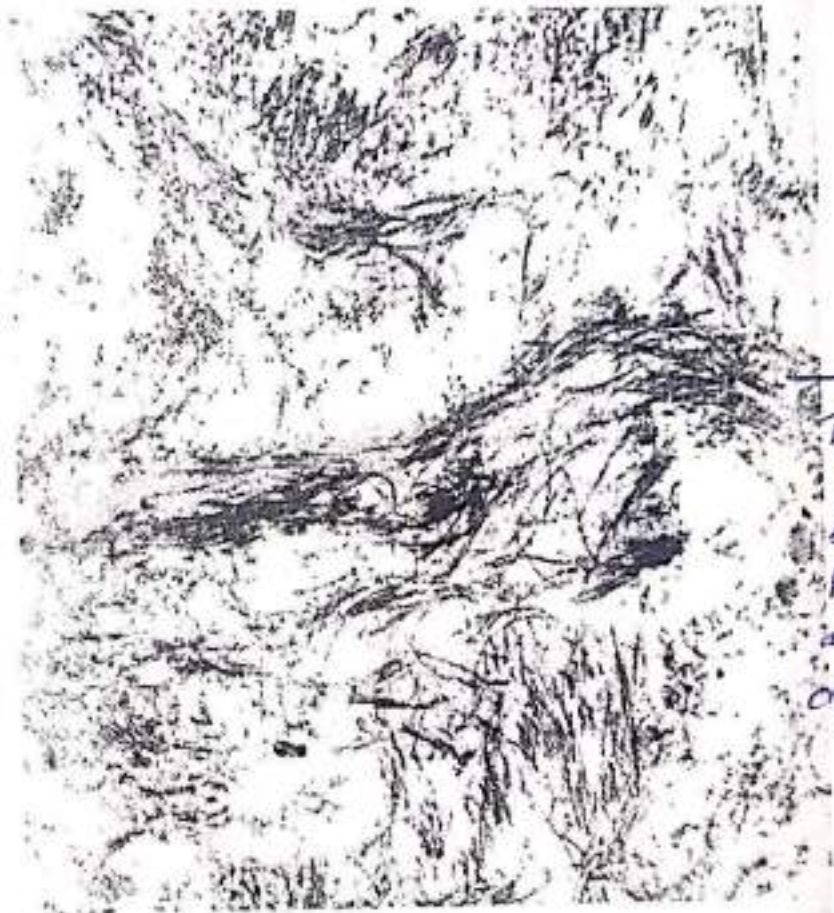
- UVR up-regulates the production of several types of collagen-degrading enzymes known as matrix metalloproteinases (MMP)

مجموعة انزيمات تسمى الـ collagenases والـ gelatinases
↳ cause degradation of collagen

* كما نتعرف ان الـ UVR يحفز الـ up regulation (تزيد) من
degradation of collagen - أكثر مما كانت عليه العنصر.



(a) young Collagen



(b) aging

(a) Collagen fibres in the dermis of 'young skin'. (b) Collagen fibres in the dermis of 'old skin'.

Extrinsic Aging

- Skin type significantly influences the clinical signs of photoaging
- In general the epidermis becomes thinner over the years with thicker coarse areas.
- Blood vessels can be easily seen through the skin where it is thinner and in these areas the skin bruises and bleeds more easily than normal

- نوع الـ skin يؤثر على ^{signes} التي تظهر بالـ photoaging، عند الناس
 التي بشرتهم فاتحة تكون ^{wrinkles and thinning of the skin} أرفع مقارنة بالناس التي بشرتهم غامقة.
 - البشرة الغامقة مع الـ aging تصبح ^{coarse and leathery appearance} خشنة وقشرية.
 - الـ blood vessel walls تصبح أضعف بالـ Aging (النوعين) فتصبح ^{more fragile} أكثر هشاشة
 إذا صار عندى ضربة بسيطة ^{bruise's} تظهر بالوضوح (الطبيعي) و bleeding مقارنة بالوضوح (الطبيعي).

Extrinsic Aging - صاي تجرية علوصا على تأثير استة الشمس على الجلد صاي تجرية علوصا على (الفراة عمرها ٩ - ١٠ أسابيع) وما لهم شعر علوصا لهم irradiation ٥ مرات في الاسبوع لمدة ٦ أشهر وبعد ٦ أشهر سافوا النتيجة.

Motoyoshi, Ota *et.al* investigated the mechanism of wrinkle formation caused by long-term exposure to UVA radiation.

OUTLINE OF THE EXPERIMENT

- Hairless mice (9-10weeks old) were used as the animal model.
- Animals were irradiated 5 times weekly for 6 months.

(Cosmetic and Toiletries 113:51-58,1998)

MECHANISM OF WRINKLE FORMATION (CONTD...)

Visual Examination:

بعد ٦ أشهر صار واضح جداً
الفأر التي تعرضت للشمس بشكل
يومي (A) عند wrinkles واضحة
وفي loose folds كذلك مقارنة
مع (B) التي ما تعرضت وبشرة ممتدة
صندودة.

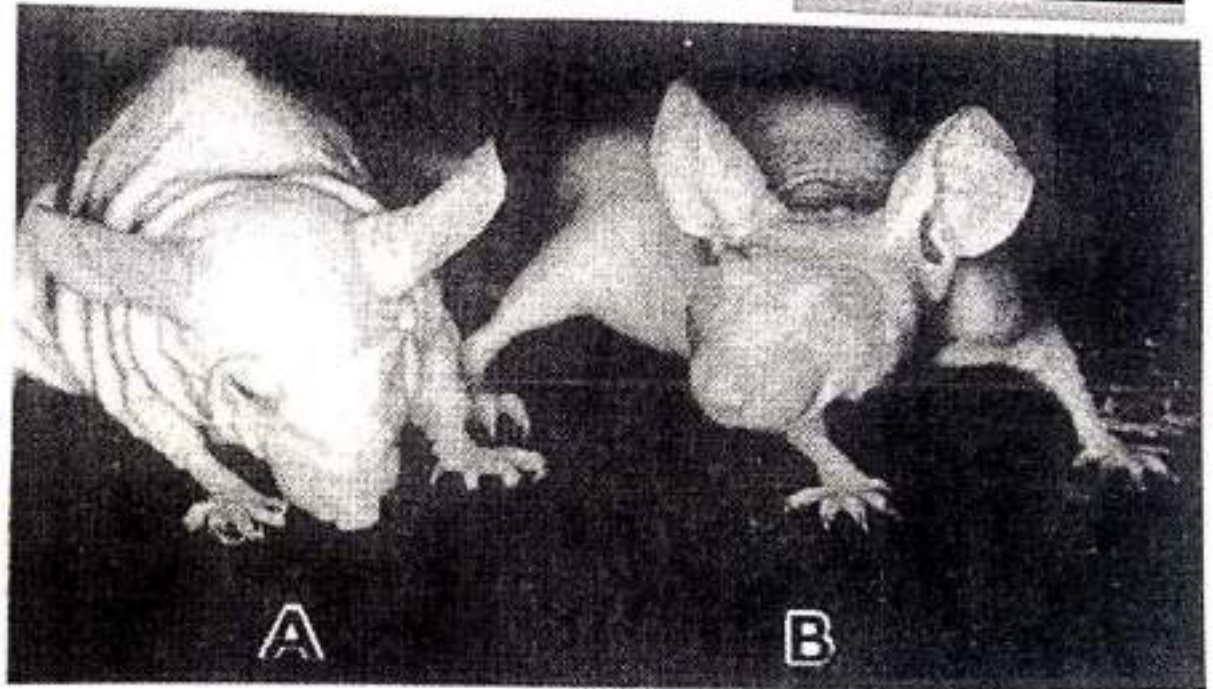


Figure 1-3. Visible changes at 24 weeks
A = UVA-irradiated hairless mouse
B = nonirradiated hairless mouse

- At 6 months, there was complete blanching of skin, nodular texture and loose folds.

- Age associated skin changes and sun exposed skin changes are similar however, the latter are more dramatic and can potentially lead to more severe outcomes

در epidermal atrophy تغییر بنوعی از فرایند aging یعنی جایال extrinsic و گوی
• severe and more dramatic
عجائز
رنگدلت از sun spot , skin lesion , Leathery appearance و ال sagging
بگو، اکثر

Characteristics of Aged Skin

■ Flattening of the dermal-epidermal junction:

- Fragility

- Less nutrient transfer → wound healing
يؤثر على صحة الجلد ودار

■ Decreased cell turnover:

- Slows from 30 to 50% between the third and eighth decades of life
بين عمر ٣٠ - ٨٠ سنة ينخفض معدل تجديد الجلد على ٥٠٪ تقريباً

- Prolonged SC replacement rate → Cell Turnover
تطوي معدل استبدال الخلايا الجلدية إذا كانت أبطأ
معدل دوران أسبوعين وأحياناً شهرين

- Decelerated wound healing
تأخر في التئام الجروح والتئام الجروح بشكل أبطأ
معدل التئام الجروح

- Less effective desquamation in age 65 years or older
→ heaps of corneocytes lead to dull and rough surface

الخلايا الميتة (dead corneocytes) تتراكم على السطح مما يؤدي إلى سطح خشن ولامع
rough surface على الجلد

Characteristics of Aged Skin

- Loss of dermal thickness على عمر ٢٥ وطالغ بعد سنين ١.١٪ نقص
- It is known that the overall collagen content per unit area of the skin surface decreases about 1 percent per year سنة

glucose
amino
glycans

- GACs, especially HA, ^{hyaluronic acid} are decreased in amount in photoaged skin

- Number of melanocytes decreases from 8 to 20% per decade

- Reduction in vascular network units of cells become more fragile
نقص مرونة الجلد

- Site-specific loss and gain of subcutaneous tissue نقل خاصة بالوجه واليد
حيث انما الدورة الدموية

- Reduced immune function

aging اي نوع من ال
immune cells

Saja Hamed, Ph.D

المستويات وليس راحة وكذلك الحظيم في الالة
ورئيس المادة يخرج للدهون حول البطن بار
aging وهذا هو site-specific
بعض تزيد في أماكن وتقل في أخرى

Skin Appearance

Skin tags

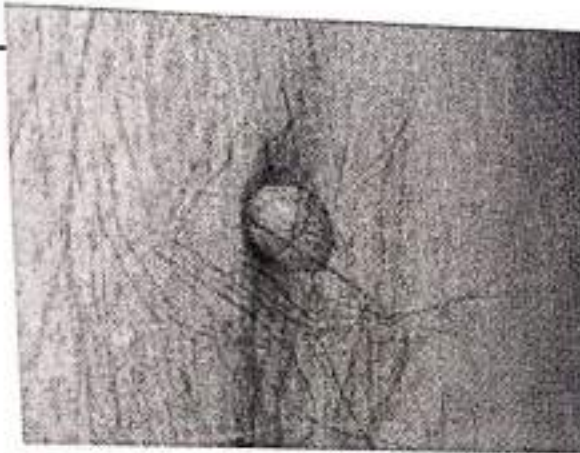


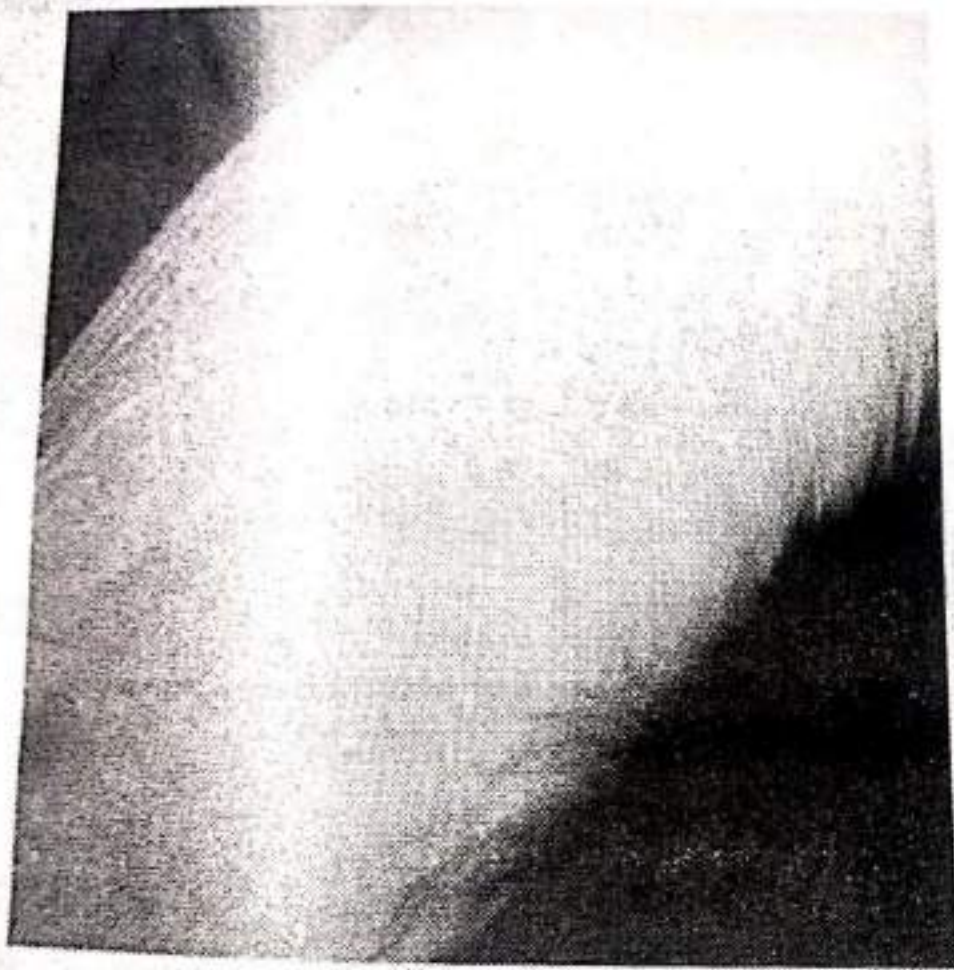
Figure 3-6:
Seborrheic keratosis and other benign neoplasms often occur in areas with significant sun exposure.

Solar Lentigo (Sun spots)

lesion occurs with aging specially
the extrinsic aging

Seborrheic keratosis

Saja Hamed, Ph.D



Extremely thin atrophic skin.

سعال و Thinning



Bruise (local haemorrhage) in an older man's forearm.

اي حبة سبيلهم

purpura

حبة الجلد و Truma

منطقة معرضة
لأشعة الشمس ←



منطقة غير
معرضة لأشعة
الشمس →

Forearm ⇒ sunspot
فيها أقل داءاً أقل قرحة
لشمس فهذا يعطي فكرة
استئصال internal
external ageing.

Figure 3-1.
The extensor (sun-exposed) surface of the arm shows much more photodamage than the flexor (unexposed) surface of the arm. This can be used to demonstrate to patients the importance of photoprotection.

The Role of Free Radicals in Aging

- Reactive oxygen species (ROS) are a major contributor to aging process
- Composed of oxygen with an unpaired electron
- Are created by UV exposure, pollution, stress, smoking, and normal metabolic processes
- Evidence suggests that free radicals lead to degradation of collagen and accumulation of elastin that is characteristics of photoaged skin.

سلايد (٢٨)

الـ free radical تلعب دور مهم في عملية الـ Aging (شيخوخة) الجسم
والجهد وانما لكل الجسم عن طريق الـ Reactive Oxygen species
التي هي جزيئات حرة من الاكسجين ينتجها الكبد (١) في مدارها
الاضيق (مستقر على شكل pairs) وهما الاكسجونية اذا ما اخذتها من
الـ Anti oxidant التي ربما موزعها بالجسم مثل الـ glutathione, vit E, vit A, vit C, super oxide dismutase والـ melatonin
التي هم natural anti oxidant، تروج تخريب الـ DNA RNA
والبروتين مما يجعل الـ الاكسجونية بالتالي تخرب البنى والجبر
وتساهم في موضوع الـ Aging.

* هي الـ oxygen with unpaired electron التي تنتج من الـ normal
metabolic process لكن الـ natural anti oxidant تسيطر عليها وتطهرها الاكسجونية
منها ما تأخذها من الـ normal structure of skin

* هي الـ radicals تزيد مع الـ UV exposure والـ smoking وغيرها.
فتتغير قدرة الـ Anti oxidant اضعف ما انها تسيطر عليها كلها فتتغير
زادتها فتتأخر الـ cells والـ normal component of your skin
وتقل الـ degradation of elastin and collagen.

Cigarettes and Aging Skin

- Smokers manifest greater facial aging and skin wrinkling than nonsmokers
- lower SC water content has been reported in smokers which is likely caused by the diuretic effect of nicotine
- Increased levels of MMPs in the skin of smokers
- Smoking-induced alterations occur deeper in the reticular dermis as opposed to the solar damage to the papillary dermis

دالة إحصائية
ال product - by على الدم وبالتالي تدخلها على

29 الجلد من تحت الـ هو الـ Saja Hamed, Ph.D

reticular dermis.

+ smoking have dramatic effect on the skin.

Cigarettes and Aging Skin

- Chronic smoking diminishes capillary and arterial blood flow leading to local dermal ischemia, this leads to less nutrients and oxygen in the skin with a buildup of toxic waste products that can damage the skin
- It is well known that smoking slows wound healing and that patients should stop smoking prior to any elective cosmetic surgery

*مهم ومنوع ال healing لها ذلك اذا كان استقر من وقتها
يرغبوا من ان يوقف تدخين قبل فترة*

Cigarettes and Aging Skin

- Smoker's face (Cigarette skin):
 - Increased facial wrinkling
 - Slightly red/orange complexion
 - Pale or gray overall skin appearance
 - Puffiness
 - Prematurely older appearance
 - Look older than their stated age
 - Increased incidence of precancerous lesions and squamous cell carcinomas on lips and oral mucosa



Figure 4-1.
Smoker demonstrates premature wrinkling around the mouth known as "smoker's mouth."

بما أن الناس الذين يبدون الوجه Smoker face الهم
سبب كل معين ، أنه الـ wrinkles وخاصة حول
الشم و حول العيون تكون أوسع .

لا تدخنو عام ٢٠٢٠

Modulation of aging sign

* *Intrinsic aging*
Can't be prevent

* *Extrinsic aging*
Can be prevent

is the best thing
1. Primary prevention: healthy life style, no smoking, use sunscreen, balanced diet, adequate water, exercise *and sleep well* ∴

2. Chemical peels, topical injections of chemicals such as Botox and dermal fillers, *wrinkles sign* dermabrasion, laser, corrective surgeries, topically applied products *antioxidant sign*

Many topical products are claimed to prevent oxidative reactions and the formation of free radicals

Retinoids

photo aging →
Intrinsic aging →
Can't be prevented.

- Retinoic acid and its derivatives: adapalene, tazarotene, Tretinoin → Drugs
- Topical retinol derivatives: retinyl esters, retinol, retinaldehyde → cosmetics
- Retinoids in general are lipophilic that can reach the dermis
- They work at the molecular level through receptors in the cells
- Side effects:
 - Retinoid reaction
 - or retinoid dermatitis
 - limit its use in the first weeks

Topically applied Retinoids like they can reach the dermis and affect the collagen synthesis.

نواة الخلية nucleus receptor

بين رتقود على
الجسم تروح
side effect

وجود بالجسم و بالتقوية الـ V. A ⇒
صحة الأغشية المخاطية health of mucous membrane

Retinoids:

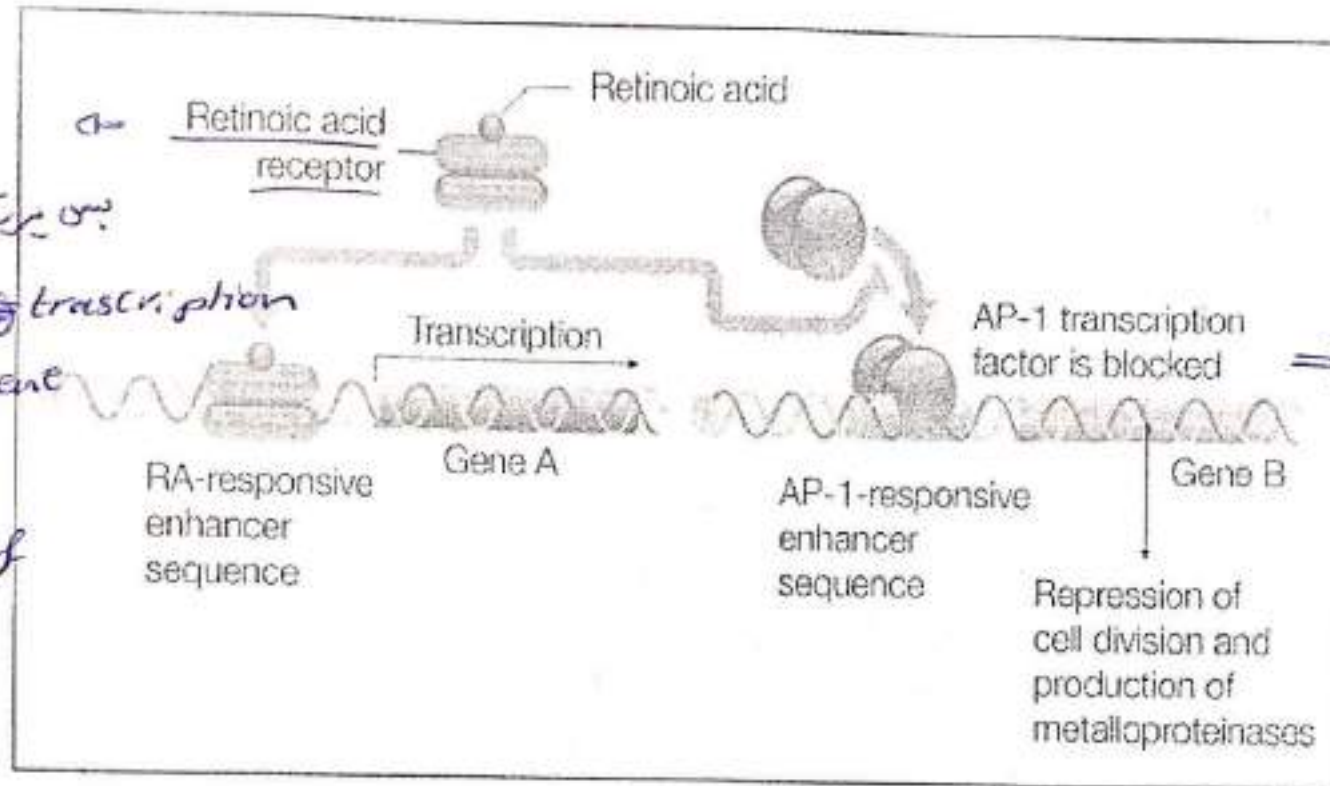
- The role of vitamin A (retinol or all-trans-retinol) is well known in human nutrition
- As relates to the skin: the vitamin is an important regulator of epidermal cell growth and can alter or modulate total collagen synthesis
- The most striking symptom of vitamin A deficiencies is an alteration of the epithelium that is visible as atrophy

المشيمة على الـ
mucose ~~membrane~~ و epithelium
membrane

Retinoids

- Derivatives of beta-carotene and are called vitamin A and its direct metabolites
- It include: retinol, retinaldehyde, retinyl esters, and retinoic acid (Active form)
- The role of topically applied retinoids in regulation of skin development seems most efficiently accomplished by retinoic acid (as demonstrated by Renova® <tretinoin emollient cream> available by prescription only)
- Retinoic acid occurs in two isomeric forms: all-trans retinoic acid (tretinoin) and 13-cis retinoic acid (isotretinoin).
used orally
used topically

- specific receptor
- ① Activation of transcription of certain gene
- ② inhibition of transcription of other genes



inhibition for production of gene responsible for (MMP)

Fig. 6.2 Retinoic acid regulation of gene expression

- Retinoids elicit their effects at the molecular level by inducing transcription from genes with promoter regions that contain retinoid response elements or indirectly by inhibiting the transcription of certain genes

Drugs

* Cosmetics

The most effective
and the most
irritant

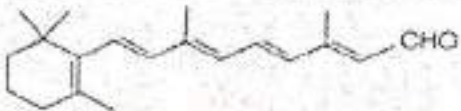
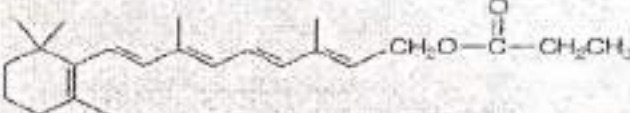
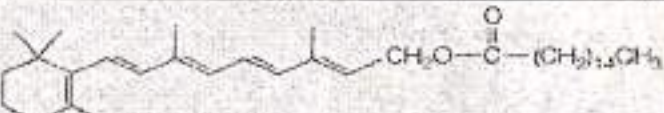
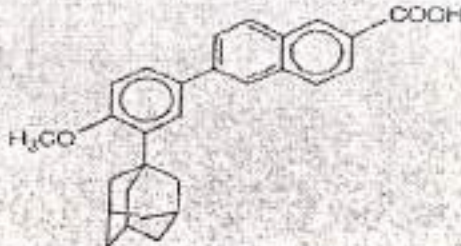
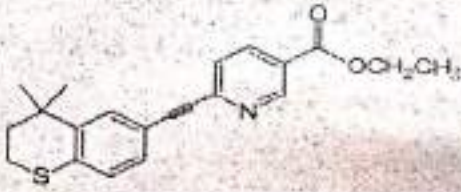
Retinoid	Structure
* retinol	
* retinaldehyde	
<u>tretinoin</u>	
* retinyl propionate	
* retinyl palmitate	
<u>adapalene</u>	
<u>tazarotene</u>	

Fig. 6.1 Chemical structures of key retinoids

⇒ first generation
Adapalene و tretinoin
bazarotene

5 generation
for irritation and teratogenicity
less irritation
irritation

generation 2
modulation

الجسم الـ القدرة انـه يـخزن الـ Retinol
 esterified form stable
 storage form not active
 cosmetics

Retinaldehyde لا يتحول الى Retinaldehyde
 CH=OH (aldehyde)
 CH₂-OH

not the active form
 retinoic acid لا يتحول الى
 بواسطة انزيم (c)

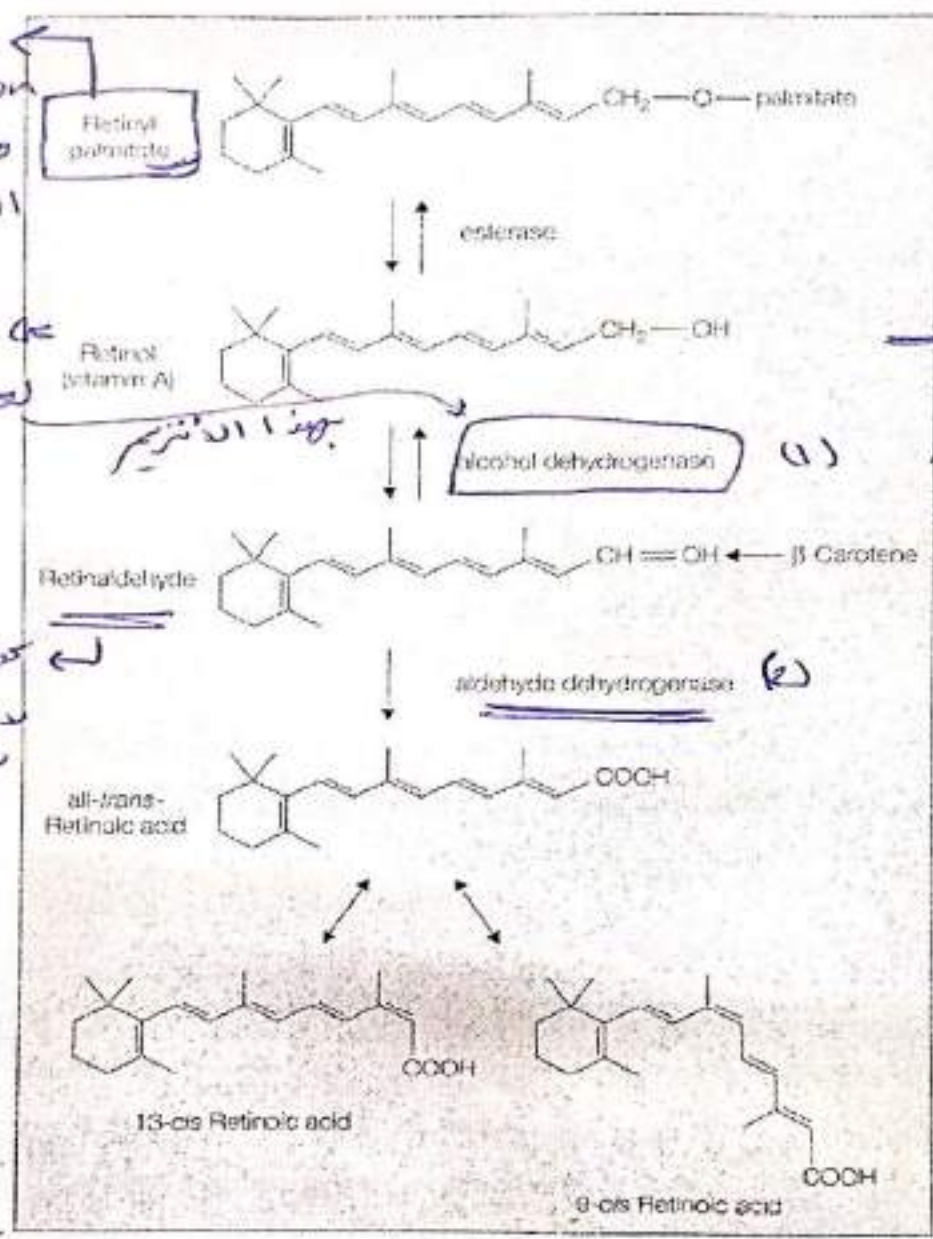


Fig. 6.3 Retinoid metabolism in skin

اذا طس على الجلد
 مارج شيفل لازم
 يتحول الى Active form
 لذلك هو الـ Retinaldehyde
 cosmetics

Retinoic acid
 عبارة عن 2 forms (isomers)
 Active form
 Act directly on the nuclear receptor
 وهذا يعتبروا drugs

-
- Topical usage of retinoids has shown a high degree of efficacy against acne, photodamage, and psoriasis
 - Side effects: skin irritation, desquamation, redness and teratogenic effects

- شدة: تتدنى بار cosmetic (vit. A) ما يظنوا تحسنا عالية
 مئة لدة رجة يزيد irritation بالتالي يبطل هذا استخدامة.
- **Retinol (vitamin A):** Current cosmetics contain relatively low levels of retinol due largely to intolerance amongst consumers for the irritation side effects
 - It is hypothesized that its efficacy occurs via its conversion to retinoic acid *يقولوا انه* *بى تحلة حيل الجبل صوريه رتول* *Active form* *نكى هل يوله كلة؟*
 - Retinol is 20 times less potent than retinoic acid
 - Not all retinol-containing products are equal
 - Retinol must be manufactured, formulated, and packaged properly to avoid oxidation and loss of potency. In addition the amount of retinol in the product must be high enough to be effective
 - Roc Retino Actif-pur and Neutrogena Healthy Skin contain 0.04 to 0.07% retinol
 - Alustra (drug): 4% HQ and 0.3% retinol

* Retinol is highly oxidative like Vit C

اذا ما كانت الشركة مرصية بقلية وصنعة وتخزينه وخلطة لدة اذا صار لة oxidation
 يبطل فعال .

Saja Hamed, Ph.D

- Retinol (all-trans-retinol) is somewhat difficult to formulate into products (the free alcohol being sensitive to air oxidation) while oil solutions are quite stable, at least until combined with other ingredients to form an emulsion. At that time, sensitivity to air and light may precipitate degradation of the material

* ممكن تخففوا من oxidation بأنهم يحطون ب oil solution
- لازم تحط ب Container عشان دخول الهواء معظم ال retinol ب Container
الهواء على شكل air pump التي تطلع كمية بسيطة بدون مانع للهواء أثناء استخدامه
ففيها vacuum ما يدخل.

- For this reason, cosmeceuticals containing this material are often packaged in metal or opaque glass containers with a vacuum-sealed pump applicator to minimize entry of light and air during dispensing

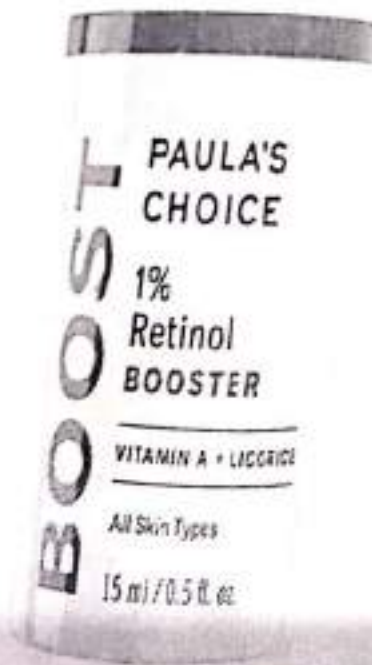
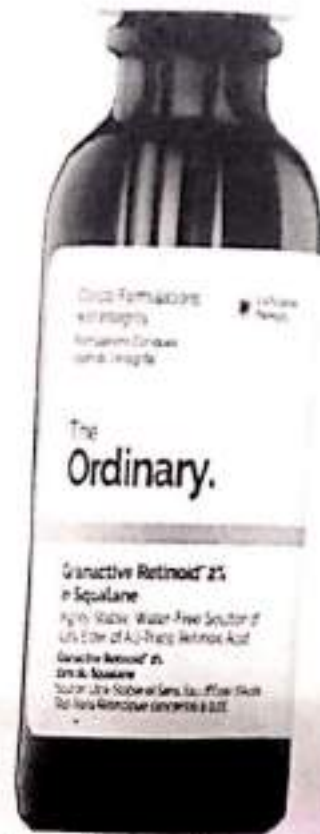
عشان يدخل هواء
ويفسد

- On the manufacturing side, sensitive constituents components should be weighed as much as possible in darkness using black light if necessary with a nitrogen blanket to serve as a barrier to oxygen while mixing

كل
line التخليق لازم ما يكون على oxygen عشان نحمي ما يحترق
oxidation

- Packaging the finished product require also special care

Different retinol products



⇒ Cosmetic retinol derivative
 - They are the storage form of Retinol
 - Activation منه تترىد pathway في جلد
 Retinol منه تترىد

- **Retinyl esters:** Storage form of vitamin A in cells (retinyl palmitate is the predominant form)
- retinyl acetate and retinyl palmitate, while somewhat more stable than retinol in cosmetic creams and lotions, are not as efficient at producing remedial cellular effects when delivered topically
- The lower effectiveness of these materials is due to differing bioconversion rates of each in the skin which is dependent upon enzyme activity
- Esterases hydrolyze retinyl palmitate to retinol which is further oxidized in tissue to retinoic acid through alcohol dehydrogenase
- Retinol, retinaldehyde, and retinyl esters attempt to mimic the effect of tretinoin in cosmeceutical formulations

- الصناعات قد جعلت استقامة لثابتة stable أكثر لظهور اقل تفاعل سبب خطوات Activation
 الطويل . من عتاي التفاعل

Saja Hamed, Ph.D

« اذا بدنا نمنع Cosmetic product او نمنع استم Retinol or Retinaldehyde

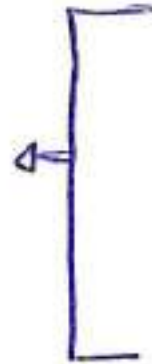
■ Tretinoin (trans-retinoic acid):

- Retin A, Renova, Ortho-Neutrogena
- Improve skin photodamage as fine lines, wrinkles, and pigmentation *not the deep*
- Cause significant irritation and dryness
- Retin A was first approved up to 0.1% levels for acne
- Then approved under Renova name at 0.025 and 0.05% for topical treatment of photodamaged skin
- Application of tretinoin inhibits the induction of MMPs (i.e. collagenase and gelatinase) (Fisher et al., Molecular basis of sun-induced premature skin ageing and retinoid antagonism, Nature, 379, 1996)
- Topical application of tretinoin 0.1% to photodamaged skin partially restores levels of collagen type I *يقلل من الـ ageing*

- استخدمت بتركيز 0.1% لعلاج الـ acne فها استخدمت ناس كبار بالسن لا يفهموا
الـ improvement كفاءته الجلد مثل الـ fine lines و الـ wrinkles و الـ spot
والشركة أخذت approval لاستخدامه لـ photodamaged skin وليس لـ
Intrinsic ageing واستخدمت بتركيز أقل.

Saja Hamed, Ph.D

for photo damaged
skin



For acne



Long-Term Efficacy and Safety of Tretinoin Emollient Cream 0.05% in the Treatment of Photodamaged Facial Skin

A Two-Year, Randomized, Placebo-Controlled Trial

این مطالعه به بررسی اثرات
تتراینوئین ۰.۰۵٪ در درمان
پوست آسیب دیده ناشی از تابش
اشعه ماوراء بنفشه (UVA) و
تابش ماوراء بنفشه (UVB) پرداخته
است. در این مطالعه، ۱۰۰ نفر
از زنان ۴۰ تا ۶۰ ساله با
پوست آسیب دیده ناشی از تابش
اشعه ماوراء بنفشه (UVA) و
تابش ماوراء بنفشه (UVB) شرکت
کردند. این افراد به دو گروه
تقسیم شدند: گروه اول با
تتراینوئین ۰.۰۵٪ و گروه دوم
با پلاسیبو درمان شدند. هر دو
گروه به مدت ۲۴ ماه به
درمان ادامه دادند. در پایان
مطالعه، نتایج نشان داد که
گروه تتراینوئین ۰.۰۵٪ نسبت
به گروه پلاسیبو، بهبود
معنی داری در علائم پیری
پوست داشته است.

improvement in
sign of aging



Fig. 4. Case example of a subject treated with tretinoin emollient cream 0.05%. (a) Baseline. (b) After 24 months of treatment.

■ **Adapalene:** ⇒ Can be used for damaged skin

- Differin, Galderma (0.1%)

- Prescribed for topical acne therapy

■ **Tazarotene:** ⇒ more active and more irritative
غير موصى به في ~~الوجه~~ الوجه

- Prescribed for psoriasis and acne at 0.05 and 0.1% under the name Tazorac and Zorac

- Prescribed for treatment of photodamage under the name Avage

- Still cause irritation

• Acne
سليم في الـ



دوزم كيكى دا patient
 حواكلها واداسيا
 دىخل counselling patient
 ادا ما فهمت شو رح دىبر
 اح يترك صدا الكريم وما
 ستيمة ولازم توضحة
 انة القاشة بدها
 long time of use

Figure 12-2.

Redness, flaking, and tender skin are common symptoms after beginning a retinoid. These symptoms usually improve with time.

خاصة في أول شهر

البروتوكول حسبنا، نذكر الـ Topical Retinoids Skin Care تبعاً.

- 1- نذكر زبدة شوية شوية (ليلة 1هـ وليست ليلة 2).
- 2- خطوة بعد ما نغسل البشرة بـ gentle cleanser ونجففها طريقتين! ما نستني ينشف كويس ونضع pea-size ما الـ Retinoid أو اذا البشرة حساسة استخدم non-irritant moisturizer على البشرة وارتكها.
- 3- رقيقة شوية نضعها بعدن اكل الـ Retinoid.

3- أي شيء يهيج irritation بالفرق

اللي بذكره نذكر فيه الـ Retinoid

على بشرتك الفضة على الدليل 3 أشهر

لحمي صغير متعود على الـ Topical Retinoids

ساعتها ممكن ~~تضيق~~ شوي أكثر تصيف

Apply to dry skin

Apply only a pea-size amount

Apply every third night in the beginning

After 2 weeks, apply every other night

After another 2 weeks, apply every night

Do not cover with a moisturizer

Do not use with hydroxy acids

Do not use with Vitamin C topical products

- زيادة خطر exposure للحساسية الجلدية تزيد احتمالية

تعرضك لـ sun burns

- زيادة normalization of keratinization للناس الذين يعانون من مرض (Keratinization) (Keratinization) process

- زيادة explosive effect نتيجة زيادة Acceleration cell turn over

Do topical retinoids have any side effects?

Topical retinoids can irritate the skin, especially when they are first used. This is more likely in those with sensitive skin, resulting in stinging. Excessive use results in redness, swelling, peeling and blistering in treated areas. It may cause or aggravate eczema, particularly atopic dermatitis.

By peeling off the top layer of skin, they may increase the chance of sunburn. Irritation may also be aggravated by exposure to wind or cold, use of soaps and cleansers, astringents, peeling agents and certain cosmetics.

— Some people have reported a flare of acne in the first few weeks of treatment. This usually settles with continued use.

http://www.dermnetnz.org/topics/topical-retinoids/ * فطال استجابة لـ acne
في أول 4 أسابيع يلاحظ زيادة حدة
flare of acne مؤقتة بعد البدء

Saja Hamed, Ph.D

51 صرطيلج الـ Micro Comedon

التي موجودة deeper in the skin

- إذا أكثر من سهر وسهرتك لسا مكنسة ما ال Retinoids
 رغم اتباع كل التعليمات عشان نسطر على ال sensitivity
 مكنة Retinoid is not for you مكنة تروح لفضارح اخرى مثل ال Azelic Acid

How to use topical retinoids

Follow these instructions carefully:

- Be cautious if you are using other topical acne treatments – ask your doctor if you should stop these.
- In general, a cream is less irritating than a gel. If there is a choice, start with a lower concentration product.
- Use your topical retinoid on alternate nights at first. If you have sensitive skin, wash it off after an hour or so. If it irritates, apply it less often. If it doesn't, try every night, and if possible twice daily. In most people, the skin gradually gets used to it.
- To reduce stinging, apply it to dry skin, that is, 30 minutes or longer after washing.
- Apply a tiny amount to all the areas affected, and spread it as far as it will go.
- Don't get it in your eyes or mouth.
- Apply a sunscreen to exposed skin in the morning.
- Wear your usual make-up if you wish, and use gentle cleansers (avoid soap) and apply non-greasy moisturisers as often as required.
- If you have acne, choose oil-free cosmetics.
- If your skin goes scarlet and peels dramatically even with cautious use, the retinoid may be unsuitable for your sensitive skin.

Saja Hamed, Ph.D

<http://www.dermnetnz.org/topics/topical-retinoids/>

In general, retinoids affect cell proliferation during the process of keratinization

They also affect sebum secretion → ~~يؤثر~~ يرفعها لوضعها الطبيعي

Affect inflammatory and immunological reactions

Retinoic acid reportedly repairs photoaged skin by inhibiting collagenase, and improving dermal vasculature and stimulate new collagen deposition

- topical vitamin A and its analogues inhibit the expression of MMP and stimulate collagen synthesis in both photodamaged and photoprotected aged skin

Approaches have been made to decrease the irritating potential of retinoic acid

■ Formulation of specific delivery systems

gel, emollient, foam, solution, Micronized form, microsponge form, Microsphere form of tretinoin.

■ Synthesis of new derivatives

■ Products should be used at night in small amounts

كميات قليلة

■ Moisturizer use

ترطيب

■ Sunscreen ⇒ for good protection of skin

irritation delivery system

■ Retinoids are best used at night ⇒ degradation by light

■ When using retinoids it has been shown that most of the improvement in aging signs occur within first year of treatment

- لا تتركيز العلاج في الليل
أكثر للشمس وخصوصاً عند sun burns

Adapalene
يمكن استخدامها
ما قبل النوم
أو بعد الغسل
الليالي

Retinoids
تستخدم في الليل

- تحتاج إلى consistency من سنة ونصف لتسكن آثارها
Adapalene عند stability أفضل مما يؤثر في سرعة الاستخدام بالليل

دراسة تدقيق مجموعة استئصال عن ال
Topical Retinoid
وتجارب عنها .

Clinical Review: Topical Retinoids

Sheri L. Rolewski

Disclosures Dermatology Nursing. 2003;15(5)

http://www.medscape.com/viewarticle/464026_4

Topical Retinoids in the Management of Photodamaged Skin: From Theory to Evidence- based Practical Approach

R. Darlenski; C. Surber; J.W. Fluhr
The British Journal of Dermatology.
2010;163(6):1157-1165

Generation	Members
First (non-aromatic retinoids)	Retinol (all-trans-retinol, vitamin A) Retinaldehyde Tretinon (all-trans retinoic acid) Isotretinoin (13-cis retinoic acid) Alitretinoin (9-cis retinoic acid)
Second (mono-aromatic retinoids)	Etretinate Acitretin
Third (poly-aromatic retinoids)	Adapalene Tazarotene $\Rightarrow$ سيز موجود بالارد Bexarotene
New retinoids	Sclerotinoid G [*] Arotinoid Etretin

ال generation
صحيحة لنتقل
ال irritation
زيادة الفاعلية.

Clinical Efficacy and Safety of Topical Retinoids in the Management of Skin Photodamage

Tretinoin

- More than 20 randomized studies with tretinoin application in photodamaged skin have been published since 1986, either placebo-controlled or in reference therapy comparisons.
- In the following we address clinically relevant questions, such as
 - duration of treatment,
 - appropriate concentration, and
 - adverse effects

استخدموا
reference therapy
كافي غير ال
Tretinone
حسنان دياروهم
ببجفون

Control group
ما أضفوا
الدواء

معتر طريقت خليس
جوابوا على ٢ ١ شله

How Long should Tretinoin be Administered?

في البداية ١٠٠٪ ثم تنقص الى ٢٠٪
ويعطى ثانياً بتردد اسبوعي
Therapy → less frequency

Despite the beneficial effects of tretinoin on photodamaged skin, discontinuing treatment results in progression of the skin photodamage

ويعاد
Concentration

The clinical studies generally last between 1 month and 2 years, but mostly 6 months (12 studies).

The long-term beneficial effects of tretinoin were first demonstrated at the clinical and histological level over a 22-month period

استمر ٢٢ شهر متواصلاً
→ beneficial effect on
The dermis and epidermis

- Application of 0.05% tretinoin cream, once daily for 24 months, resulted in an improvement of photodamage which continued until the end of the study

How Long should Tretinoin be Administered?

- In addition, application of 0.05% tretinoin cream three times per week sustained the improvement achieved in the initial treatment phase

✓ ■ In summary, initial treatment with tretinoin should be followed by a long-term maintenance phase of retinoid application, maybe at a lower concentration and/or with less frequent applications

What is the Optimal Tretinoin Concentration?

- dose-dependent therapeutic effect of tretinoin has been demonstrated
- Other authors could not establish a difference in the clinical or histological appearance after the application of different tretinoin concentrations (48 weeks, 0.025% vs. 0.1% tretinoin cream) (same improvement but different degree of irritation).
- Overall, 0.025% may be considered therapeutically effective with a reasonable safety profile

مع علاج long term
مارج يفرح اذا بدأ ح
بتركيز 0.1% أو 0.025% مع نأفة
نفس improvement لكن
بح مختلف ال degree of
irritation
(كلما زاد التركيز يزيد ال irritation)

Adverse Effects of Tretinoin Treatment – How Can they be Diminished?

- *Systemic adverse events:* Since its introduction as a topical drug, no systemic adverse effects have been reported for topical tretinoin application
- Nevertheless, pregnant women are generally advised to cease tretinoin treatment during pregnancy, and to avoid pregnancy during tretinoin treatment.

يمكن تجنب الآثار الجانبية باستخدام tretinoin مع الحوامل
والمرضى لا ينبغي استخدام tretinoin أثناء الحمل
يوصى بعدم الحمل أثناء العلاج
Adverse effect

Adverse Effects of Tretinoin Treatment – how Can they be Diminished?

تصغير بالـ Topical
منه ينزل الطبقات
العلية من الجلد
تدوير البشرة
photo sensitive
أكثر

Local adverse effects of tretinoin treatment include the 'retinoid reaction', also known as 'retinoid dermatitis', as well as exaggerated photosensitivity at the beginning of the treatment.

- Results from four prospective, randomized, controlled trials in healthy volunteers showed that tretinoin is neither phototoxic nor photoallergenic

Adverse Effects of Tretinoin Treatment – how Can they be Diminished?

- Several strategies to diminish and/or prevent the adverse effects of tretinoin application have been suggested and can be summarized as follows:
 - Dosing related
 - Patient related
 - Accompanying measures

Dosing related

- Once daily application, in the evening
- Less frequent application if moderate to severe irritation occurs, i.e. alternate days or three times a week
- Possible concomitant application of 3% indomethacin and/or 1% hydrocortisone to relieve the irritant reaction

tretinoin

لكن ما نستخدمه لهم لفترة طويلة
بس كحد ما البسوف نتعود على اد
عشان نتجنب اد side effect

اذا ليلة واحدة وليس
لا
اذا irritation
كثير المفروض انما
نستخدمه بحذر عشان
نريح بشرتك لما تعود
صلية

Patient Related

أولاً ما وضحنا لـ patient متى يجب رؤية الطبيب
أولاً نتحدث مع المريض to expect the result
من الاستخدام المتواصل وسنذكر Adverse effect
التي يدها تقيس مارجيس سحر عليه

- Discovering the patient's expectations of therapy
استخدام الـ Retinoid بدون مارجيس
SunSmart مارجيس يعطى اي فائدة
- Explaining and discussing the expected outcomes, course and duration of treatment
- Discussing the adverse effects, such as the 'retinoid reaction', before starting treatment

Accompanying measures

- Appropriate dermal moisturization, at least 30 min after the retinoid application
- Application of sunscreens during daytime
- Avoidance of any other irritant components:
AHA, vit C

نفس ال protocol
التي شرحت قبل

① إما مرة قبل washing و مرة نصف ساعة بعد
بعدين تحت ال Topical Retinoid و بعدها ب ١٥ - ٣٠ دقيقة تحت ال moisturizer .

② مرة تحت washing و بعدين moisturizer بعدين مرة ٣ رقيقة و بعدين
تحت ال Topical Retinoid و هو أفضل للبشر الحساسة في بداية مرة الاستخدام .

- أول ٣ أشهر مطلق استخدام , تستخدم فقط cleanser , moisturizer و sunscreen
(يفضل بعوض physical أو إذا من موهود تستخدم ال Orated for children) (منخفض)
للطفال) على أساس يكون less irritant على البشرة () .

Retinol and its Derivatives

- Topical retinol (vitamin A) showed beneficial effects in influencing the pathogenesis of cutaneous photodamage, e.g. inducing epidermal thickening, reducing MMP expression and increasing collagen synthesis, although it was 20-fold less potent than RA.

- On the other hand, retinol is less irritant than its natural metabolite RA.

- However, retinol is very unstable and degrades easily into inactive metabolites.

* لازم نكود مرصين بموضوع التصنيع وأهمية العناية بالثبات unstable

Retinol and its Derivatives

- Retinol derivatives such as retinyl propionate and the N-formyl aspartame derivative have been proposed as anti-photoageing agents, as they are more stable and have shown some beneficial effects in experimental studies.
- However, data from clinical controlled studies with retinol derivatives are either sparse or nonexistent.

- بعض الشرح تتجنب حطه وكذا بداله ال ester form ال more stable ال more effective (لا توجد دراسات)

- لانه ال Activation صار بوقت ظهور ال كثر

Retinol and its Derivatives

- Retinaldehyde, a naturally occurring precursor of RA and retinol metabolite, has biological activity and good tolerability in the treatment of skin photodamage.
- Topical 0.05% retinaldehyde is effective in improving signs of photodamage, as demonstrated by ultrasound and rheological techniques in a prospective, vehicle-controlled study.

Regulatory Issues

- photo-damaged skin – defined for regulatory purposes as 'fine wrinkles', 'mottled^{sun spot} _{not the deep one} hyperpigmentation' and/or 'tactile roughness'_{خشخشی} of facial skin.

Regulatory Issues

In recent years the indication 'photodamaged skin' has been refined to 'fine wrinkles', 'mottled hyperpigmentation', 'tactile roughness' of facial skin. In the U.S. currently only two drug molecules (tretinoin and tazarotene) are approved in this indication with a series of further restrictive specifications – listed in the Patient Information Leaflet (PIL) such as – 'the products should always be used under medical supervision as an adjunct to a comprehensive skin care and sun avoidance program that includes the use of effective sunscreens and protective clothing when desired results on fine wrinkles, mottled hyperpigmentation, and roughness of facial skin have not been achieved with a comprehensive skin care and sun avoidance program alone' (mitigation) or 'the product does not eliminate wrinkles, repair sun-damaged skin, reverse photoaging, or restore a

دردم تگوت
Sun smart

صنایع عطری ناس

Regulatory Issues

damaged skin, reverse photoageing, or restore a more youthful or younger dermal histologic pattern', etc. In Europe only tretinoin is approved in this indication. The labelling of corresponding European products is less comprehensive. Interestingly a series of approvals have been withdrawn in recent years – currently tretinoin has effective registrations and is marketed only in Austria, Italy, Norway and Spain.

The lengthy labelling texts may question the usefulness of these products in the indication 'photodamaged skin'. This is further reinforced by labelling texts in the PIL, e.g. 'many patients achieve desired palliative effects on fine wrinkling, mottled hyperpigmentation, and tactile roughness of facial skin with the use of comprehensive skin care and sun avoidance programs including sunscreens, protective

دردم عیوفا
leaflet

Regulatory Issues

programs including sunscreens, protective clothing and emollient creams NOT containing tretinoin'. Also in recent publications the clinical evidence of tretinoin and tazarotene for the above-mentioned indications is assessed with reserve.^[77]

The major indications of tretinoin and tazarotene are not in photodamaged skin but in acne (tretinoin, tazarotene) and psoriasis (tazarotene). From the various available tretinoin or tazarotene products (e.g. with different strength or different vehicles) only some are registered in the indication 'photodamaged skin'. Therefore the use of a product that deviates from its labelled indication must be considered as an 'off-label-use'. The treating physician/dermatologist should be aware of this fact and hence has to guarantee that there is sufficient scientific evidence for the

Regulatory Issues

Adapalene approved from the FDA for Acne
توضیح: در نسخه‌های off-label use برای photodamaged skin و patient به عنوان درمان استفاده می‌شود.

vehicles) only some are registered in the indication 'photodamaged skin'. Therefore the use of a product that deviates from its labelled indication must be considered as an 'off-label-use'. The treating physician/dermatologist should be aware of this fact and hence has to guarantee that there is sufficient scientific evidence for the chosen therapeutic procedure and that the patient is adequately informed. Occasionally the labelling texts in the section 'indications and usage' of the PIL indirectly point this out, e.g. 'the safety and efficacy of the use of this product in the treatment of other disorders have not been established'.

Vehicle of Retinoid Products

- Topical retinoids whether used in photodamaged skin, acne or psoriasis may cause itching, burning, erythema, and skin peeling and may therefore limit its use in some patients
- This fact encouraged the pharmaceutical industry to find ways to reduce or even avoid these undesirable side-effects:
 - a disease specific drug concentration (strength)
 - and a skin-condition or skin-type tailored vehicle may lead to more acceptable formulations.

سلايد (٧٠)

Vehicle is important for less irritation and undesirable side effect

Microsized form of tretinoin is Tretinoin

Tretinoin is less irritant than Microsized

in very tiny size and size homogeneous distribution (hot spot) Clumps, and the

slow release Microsphere

Less irritation • acceptable formulation or

Concentration PRENKO

إذا اشتركت معسامة ابدأ بتركيز قليل من مستحضر بشرتك مرة
1-2 شهر وبعدها ادراساخ ل 3 اشهر بعد من هذا لتركيز اعلى.

Concluding Remarks

- In the U.S. the use of tretinoin, tazarotene and other retinoids in many different formulations (products) with and without official indications is widespread whereas in Europe their use in these indications are sparse.

إلى لازم تشرح للمريض أنه الـ off label use
ما دى يلاعى هذا الـ indication يا
أحمد approved for acne

Concluding Remarks

• wrinkles ١١

- To date no evidence-based data are available on the degree of photodamage that requires the initiation of topical retinoid treatment.
- We recommend the use of topical retinoids for visible signs of ageing.
- The clinical and regulatory difficulties in the indication 'photodamaged skin' as well as the considerable financial investments of a successful product development and launch into this growing market are challenging.

- أهم نقطة انك تكون sun smart
لأنه غير سهل يكون اهدار للمال والوقت

Clinical Review: Topical Retinoids

review
photoaged skin, acne
other skin disorders

Sheri L. Rolewski

Dermatology Nursing. 2003;15(5)

Introduction

- We must empower our patients with the knowledge of risks, benefits, reasonable expectations, and the importance of becoming "sun smart."

3th generation

- Tazarotene (Tazorac®) is pharmacologically inactive until metabolic conversion to the active drug transpires (Wolverton, 2001). This prodrug is hydrolyzed rapidly in tissues to the active metabolite tazarotenic acid.

لازم تحويل لـ
Active form

Clinical use Photodamage

- بعد ما قعمل ال effect لازم تستر علي رما نقطوة
بدراسة طلو ال volunteers سيجدوا ال Topical
Retinoids طرفة ٤٥ اسبوع متواصل بعد بن راجعهم
طرفة ١٦ شهر بدون ما سيجد موق فصار عندكم
reverse of some beneficial effect
اللي معمولها فتركز على استخدام ال maintenance
therapy

- Dr. Elise Olsen and associates (Olsen et al., 1997) discovered that reducing the frequency of tretinoin 0.05% cream from once daily to 3 times per week maintains, and in some cases, possibly further enhances reduction of photodamage. They also observed that cessation of tretinoin therapy for 6 months, however, resulted in some reversal of the beneficial effects seen after 48 weeks of treatment.

maintenance therapy ⇒ less frequency
and lower
concentration.