

DOM Research Seminar with Drs. Vivian Shi and John Galgiani – April 12, 2018



Vivian Y. Shi, MD, asst. professor and director, Eczema & Skin Barrier Research Program and Inflammatory Skin Center, UA Dermatology, spoke on "Gaps' in Skin Barrier." UA Valley Fever Center for Excellence director and professor John Galgiani, MD's topic: "Updating VF Serology: It's Not WWII Anymore." See the archived video [here](#).

Components of The Skin Barrier

- Corneocytes
- Lipids
 - Structural function
 - Eccrine, sebaceous
- Structural proteins
 - Tight junctions
 - Intermediate filaments
- Enzymes
 - Protease, anti-protease
- Natural moisturizing factor
- Sweat, Sebum
- Microbiota

Normal Skin Barrier

The diagram illustrates the normal skin barrier, showing the stratum corneum (the outermost layer) composed of multiple layers of corneocytes and lipids. Below it are the epidermal layers, including the basal layer and the dermal papillae.



Skin Barrier Disruption and Dysfunction

The diagram shows a cross-section of the skin barrier. The top part, labeled 'Intact Skin Barrier', shows a continuous layer of corneocytes and lipids. The bottom part, labeled 'Disrupted Skin Barrier', shows gaps and holes in the barrier, with arrows indicating the loss of lipids and corneocytes.

- Increased transepidermal water loss (TEWL)
- Decrease sodium level
- Decreased hydration
- Increased external corrosion pH
- Increased external proteolytic enzyme activity
- Decreased anti-microbial resistance
- Alteration of the microbiota diversity
- Increased irritant and allergen exposure
- Impaired skin repair mechanisms



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Transepidermal Water Loss (g/h/m²)

$$J_{TL} = -D \cdot A \cdot \frac{dP}{dx}$$

The diagram shows a cross-section of the skin barrier with arrows indicating water vapor escaping from the skin surface. A hand is shown applying a product to the skin, suggesting a method to reduce TEWL.

J_{TL} is measured in g/h/m²
 D is the diffusion coefficient (g/h/m)
 A is the surface area (m²)
 $\frac{dP}{dx}$ is the partial vapor pressure gradient (g/h/m²)
 Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2704000/

Hydration - Corneometry

Parameter	Value
Hydration	100%
Corneometry	100%
...	...

Sweat Wearables - "Biomicrofluidics"

Skin-mounted microfluidic system

Laser Doppler Flowmetry (LDF)

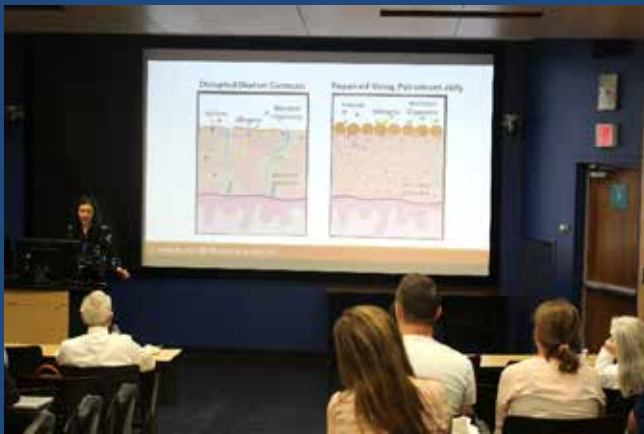
Laser Doppler Flowmetry

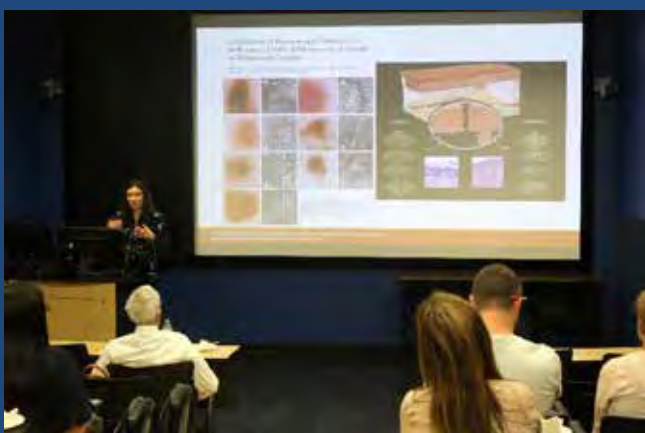
Sebumeter

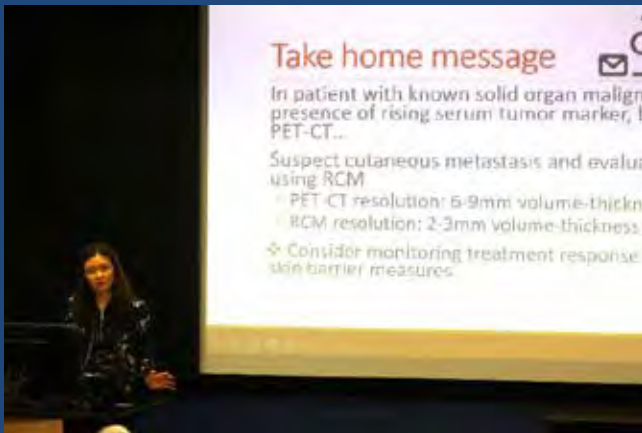
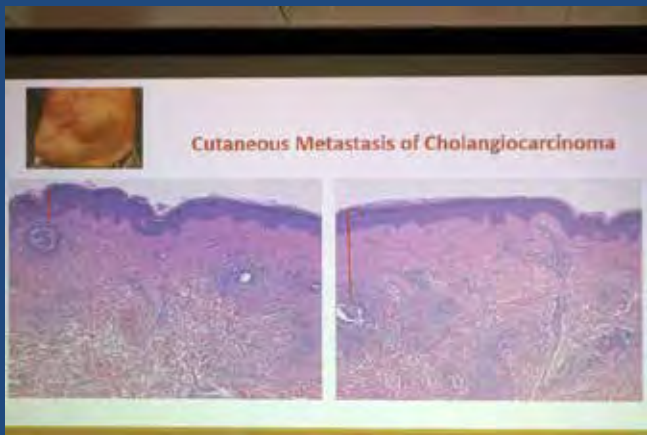
Circadian Rhythm

Chronotherapy

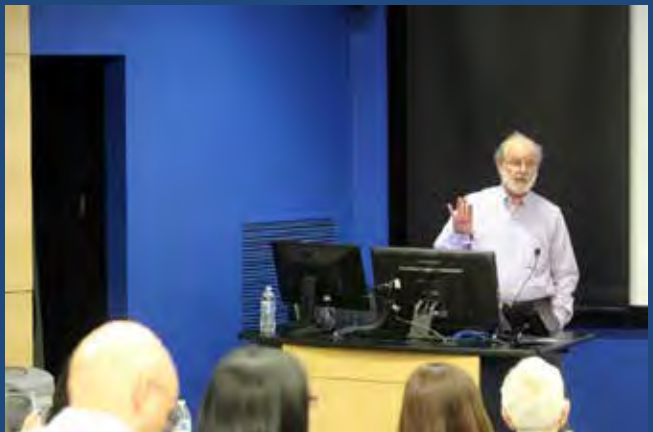
Treatment of an illness that takes into account the body's natural rhythms and cycles.

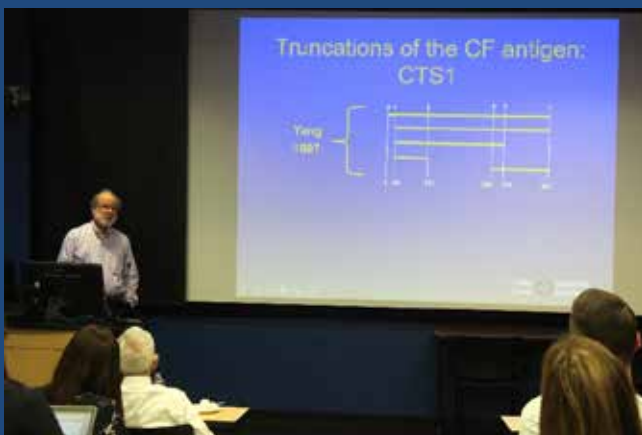
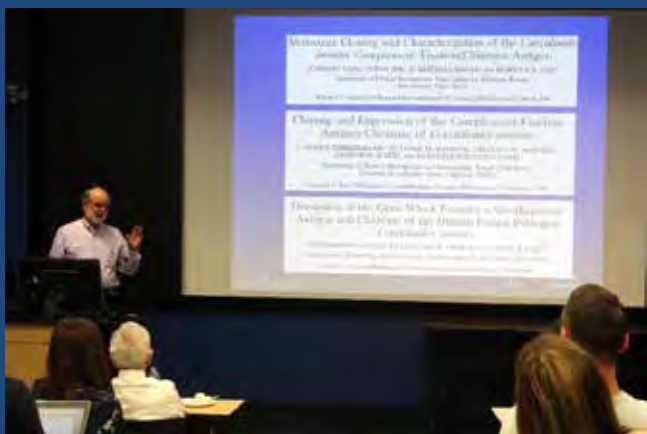
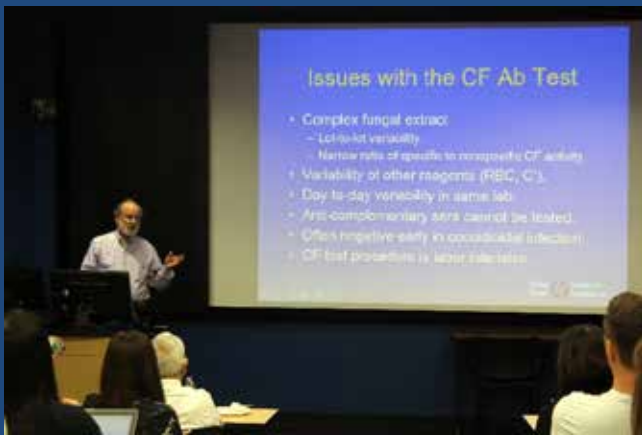


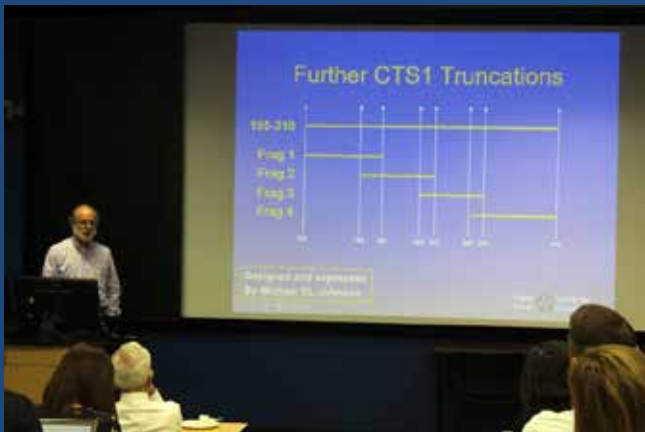
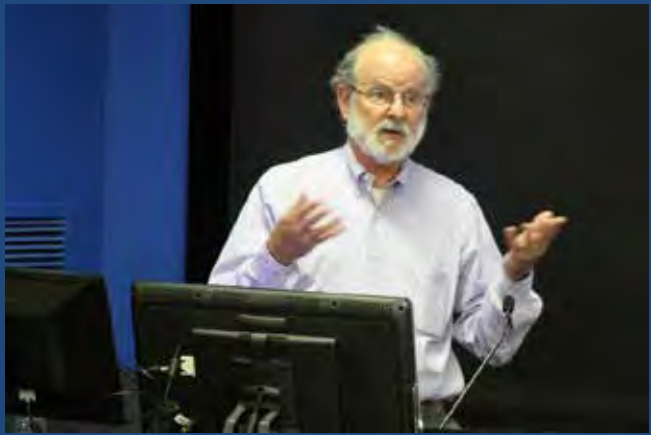
















Archived video of the April 12, 2018, DOM Research Seminar can be viewed here:
<https://streaming.biocom.arizona.edu/event/index.cfm?id=28114>

Photos courtesy of David Mogollón, Communications Coordinator, UA Department of
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