



The "beach" has no sand and is inside a laboratory, yet this guinea pig with hair close shaven is taking an infrared "sun bath" that could save his human counterparts from considerable pain.

# Don't Go Near the Sunlight

until you know  
what Old Sol can  
do to your skin

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**A** DAY at the lake and your skin burns, blisters and peels. But your companion reacts differently. You notice enviously that he has a handsome tan under way.

One farmer is exposed to searing sun for many summers with no ill effects, while a neighbor working under the same conditions develops skin cancer.

Why?

A research group at the University of Oklahoma Medical Center is attempting to answer these and other questions involved in the relationship of solar radiation to the chemistry and health of the skin—relatively unexplored territory in medical research.

In early work the investigators found a substance in the outer layer of the human skin that has proved to be a powerful protector against harmful sun rays. And this discovery has opened the way for extensive

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experiments, usually not on humans but on white guinea pigs that sunbathe on a sterile laboratory beach. Of all experimental animals, their skin most closely resembles man's.

The sun-on-skin study started two years ago as a single project on light-sensitive skin under the direction of the late Dr. John H. Lamb, '28ba, '32med, who was chairman of the medical school's department of dermatology.

The large-scale research program developing from the initial experiments has attracted substantial support from granting agencies, including a five-year \$180,000 award from the National Institutes of Health, enabling scientists to explore many more aspects of the effects of the sun's rays on skin.

**T**HE result has been an effective collaboration between clinicians in the dermatology department and basic scientists in the department of biochemistry.

Dermatologists are most concerned with abnormal or sick skin. They have teamed with the chemists to ferret out factors responsible for lack of pigmentation (a fairly common hereditary disease), the light allergies, lupus erythematosus (a condition that usually begins with what the patient believes is a severe sunburn), and other light-related diseases that are sometimes disabling.

The biochemists want to chart the chemical alterations caused by light on skin, the changes in the acid of nucleus materials, skin enzymes and other factors in cell division and growth influenced by exposure to the sun's rays.

Principal investigators in the project are Dr. Mark Allen Everett, '47ba, '51med, assistant professor of dermatology, Dr. Arley T. Bever, associate professor of biochemistry, and J. Hill Anglin, graduate student in biochemistry.

Dr. Everett contends that medical scientists have largely ignored the skin as a research subject in favor of those intriguing organs hidden beneath our outer covering. "Yet the skin is one of the largest and most accessible and most fascinating subjects for study," he explains.

The sun-drenched Southwest provides an especially pertinent target for this sort of research. Light-sensitive skin is a common problem in Oklahoma, and the incidence of skin cancer also is high compared with less sunny regions.

Scientists know why we tan—but not why we blister. The mechanism of tanning, involving the production of pigment by certain cells, has been worked out in the past five years by researchers at Yale, but although the same ultraviolet wave lengths responsible for tanning also cause reddening and blistering, the two chemical processes are unrelated.

Skin reacts to ultraviolet light exposure by thickening as well as tanning, and thickening gives more protection against the sun's rays than the pigmentation does. To find out why this is true, the Oklahoma group began studies of urocanic acid, a substance that was known to absorb light and to be present in the skin of guinea pigs and the sweat of humans.

They have established that this substance also is present in the outer layer of the human skin and that it does act as an important light absorber in man, sharing this protective property with melanin and other factors previously recognized for their ability to absorb ultraviolet light. However, Dr. Bever reports that urocanic acid has a specific absorbing activity markedly higher than that of the other known compounds.

"By absorbing ultraviolet light," he explains, "the substance is transformed into another form of urocanic acid which is present to a greater degree in skin that has thickened as a result of exposure to light." There is a direct correlation between the amount present and the thickness of the skin.

"Although this appears to be responsible for protection, we don't know what substance is released to cause the blood vessels to dilate and cause sunburn. Nor do we know what material results in the long-term aging effects on the skin or in skin cancer," Dr. Everett adds.

Anglin reported from subsequent animal experiments that urocanic acid was virtually absent from the mucous membrane of the mouth, indicating the body



A hamster is tested with a photoelectric meter which measures light reflected from an object.

summons it up where most needed, in its exposed outer covering.

In the course of this experimental research, animals, and some human volunteers, are exposed to varying degrees of ultraviolet light. (Later, the role of heat also will be investigated.) Small samples of tissue are removed and examined for the presence of compounds at different levels of the skin before and after exposure and with or without the administration of photosensitizing chemicals.

**S**KIN specimens are frozen in liquid nitrogen then reduced to a powder-like form. The skin abstracts next are suspended in solution and subjected to column fractionation. With this separation technique, components are extracted out according to the size of the molecule and its affinity for different compounds. Components are analyzed by means of a machine which measures and records light radiation and then are put through a process that separates them into colored layers for closer study.

As research proceeds, new leads open new pathways of investigation. The sun projects fall into two general categories—studies of the normal reaction of skin to the sun or the reaction of sick skin to the sun and the abnormal reaction initiated in normal skin by chemicals and drugs.

Someday this O.U. research may clear away the mysteries of the inequality of those beautiful bathing beach tans and skin which must be hidden beneath layers of lotions and oils.