Getting Burned

Dangers posed by ultraviolet radiation damage sun worshippers' skin

CYRA GATLING AND STUART HUTSON
The Battalion

With summer days approaching, college students are daydreaming about lazy days of basking in the sun at the closest pool, but if they are not careful, those dreams may turn into nightmares. The villain of the nightmare: ultraviolet (UV) light.

Ultraviolet light is a form of electromagnetic radiation — a term physicists use to define energy that travels in such forms as light, radio waves and microwaves — that lies just beyond the visible color spectrum.

This means that UV light cannot be seen by the human eye, but it carries more energy than any color of light that can be seen.

Because of its intense energy, UV light is capable of damaging genetic material within cells and disinfecting foods.

A result more commonly known to the average college student is the damage UV light inflicts when encountering a person's skin: a sunburn.

Unlike the large-scale effects of a thermal burn (such as what is received from touching a hot skillet or catching an arm on fire), a sunburn affects individual skin cells, causing damage to the cell walls and interior.

This can release toxins into the body from the individually damaged cells, possibly resulting in a fever.

UV rays may also lead to cancer by damaging the genetic material of the cells that produce additional skin cells.

The skin is made up of three layers, the epidermis, the dermis and the subcutis.

The epidermis is the top, thinnest layer of skin that protects the deeper layers of the skin and organs from the environment. It also receives the most damage from sunburns.

The epidermis is composed of the stratum corneum, which is the outermost layer of skin and is composed of dead skin cells. The lowest part of the epidermis is a layer of cells called basal cells which produce new skin cells — these are the cells that commonly become cancerous when damaged by UV rays.

Sandwiched between these two layers is an intermediary level where living skin cells formed from the basal cells replace the upper level of dead cells.

The dermis is the middle layer of the skin. It is thicker than the epidermis and is made up of hair follicles, sweat glands, blood vessels and nerves.

The subcutis is the deepest layer of skin. It conserves heat and protects the body's organs from injury.

Each of these layers provide protection from UV rays by absorbing them before they can damage the body's internal cells. But, when it comes to protecting skin and other organs, they cannot handle the power of the UV rays of the sun alone.

The American Cancer Society recommends wearing a hat, sunglasses, sunscreen and a shirt when out in the sun.

Fabrics that have a tight weave provide the best protection against the sun.

Margaret Griffith, the health education coordinator at Texas A&M offered additional valuable tips for tackling UV rays.

"When choosing a sunscreen, you should get an SPF (sun-protection factor) of at least 15 and re-apply it often," Griffith said. "Even if it is waterproof, that doesn't mean that it stays on all day long. Sunscreen can rub off by sweating or swimming."

One should also wear sunscreen on hazy days because UV light can penetrate cloud cover, even though visible light cannot, Griffith said.

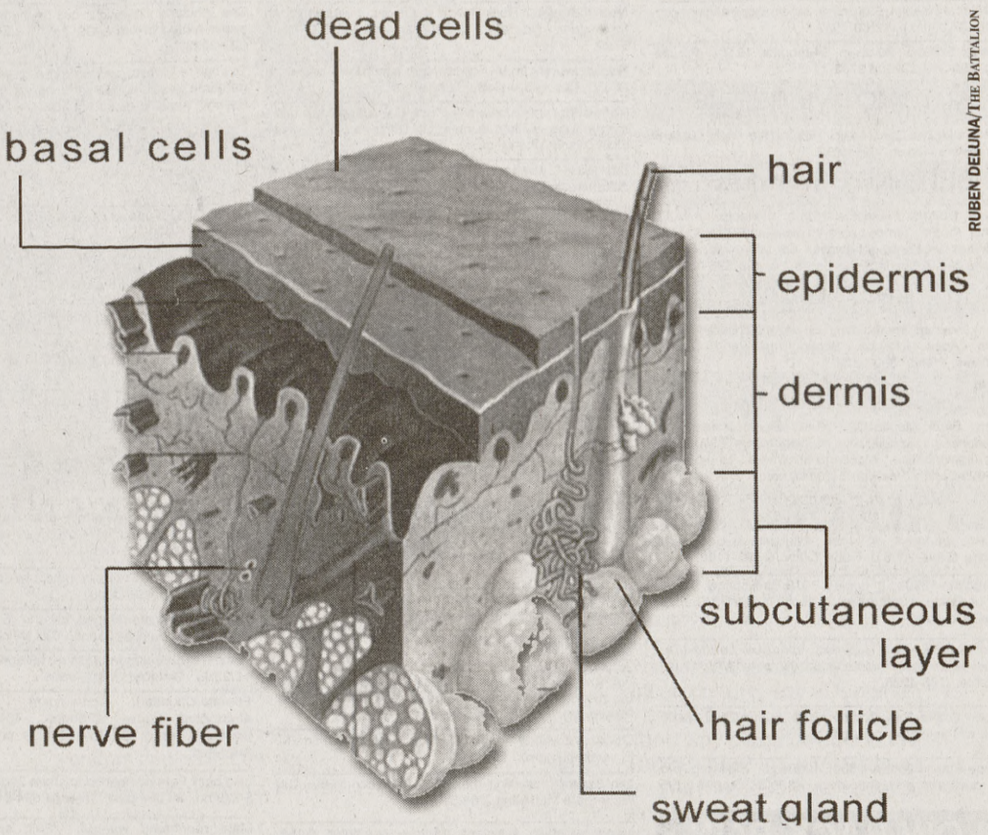
The effect of the sun on skin depends on the way its light contacts it, said Dennis Driscoll, associate professor of meteorology at A&M.

"The sun is harshest when it is in right-angle contact with the skin," Driscoll said. "The degree of harshness depends whether or not the sun is vertical or horizontal and whether or not your body is vertical or horizontal to the sun."

The UV rays from the sun must go through more layers of the atmosphere when the sun is closer to the horizon (or "more horizontal"), so less of the UV light penetrates the atmosphere and reaches the skin.

The sun is most dangerous when it is directly above head, because the UV rays have less atmosphere to penetrate.

There are three different types of UV rays.



RUBEN DELUNA/THE BATTALION

UV-A rays are almost harmless. They cause aging and wrinkling. These rays can increase the damage of UV-B rays.

UV-B rays are more harmful. They play a larger role in the development of skin cancer than UV-A rays. UV-C rays are deadly to any living thing. They are commonly absorbed by the ozone. However, these rays penetrate the earth's atmosphere when ozone layers are damaged.

Hurricanes predicted for Texas

STUART HUTSON
The Battalion

Farmers in central and west Texas may find relief from this year's drought in an ironic source — a hurricane.

William Gray, head of Colorado State's hurricane forecast team, is predicting an above-average number of hurricanes for the 2000 hurricane season — 12 named storms, eight hurricanes and four major hurricanes.

Texas State Climatologist John Nielsen-Gammon said that one out of three hurricanes will generally strike the Texas coastline, causing rain.

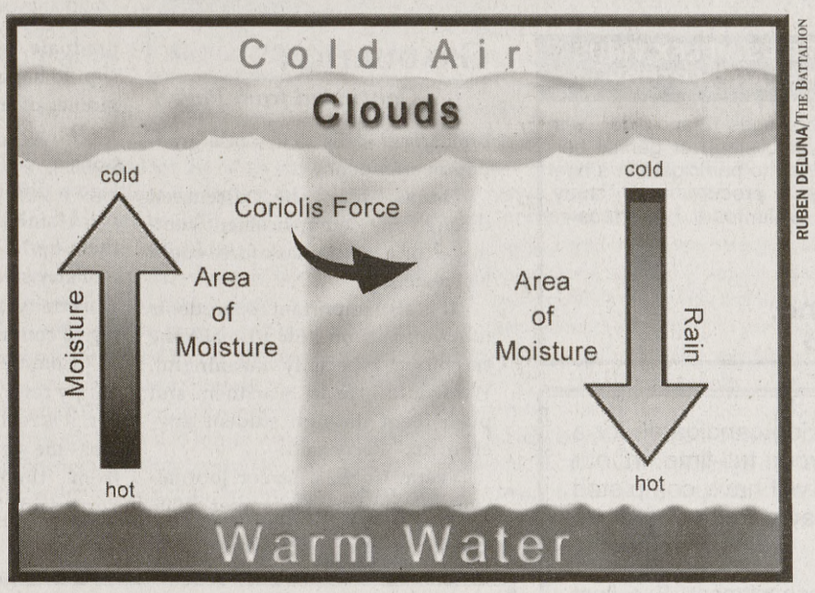
"Certain parts of Texas are experiencing a worse drought than they are used to seeing," Nielsen-Gammon said. "So, there is a strong possibility that, with increased chances of hurricanes and tropical storms, there will be rain that will help alleviate that situation."

He said central Texas, including the Brazos County through Waco and Tyler will experience a fair amount of rainfall.

However, Nielsen-Gammon said coastal areas and the mountain area stretching northward from Temple are likely to experience severe flooding problems.

"The coastal areas are always in danger of flooding because of storm surges where the ocean rises up and floods the shore," he said.

The areas farther west receive higher levels of rain because moisture in the air from the storm encounters the mountains and is pushed up into the colder air in higher elevations. There, it cools and condenses into rainfall.



RUBEN DELUNA/THE BATTALION

Nielsen-Gammon said there is also an increased chance of tornadoes associated with hurricanes.

"No one really knows all the reasons why tornadoes result from some hurricanes and not others," he said. "Some hurricanes don't produce any, while others can produce dozens. Generally, a hurricane that hits the shore will cause at least a few tornadoes."

A hurricane forms when a pocket of warm, moist air becomes trapped between an area of ocean with above-level surface temperatures (around 80 degrees Fahrenheit) and an area of cold air.

The ocean acts as a heat engine, driving the moist air upward, where it condenses into rain in the cold air above. This rain then adds moisture to the middle area.

The additional moisture causes more moisture to be driven upward, resulting in more rain.

This cycle, called cyclogenesis, continues until a tropical storm results.

If the storm is more than 300 miles away from the equator, the Coriolis force (the same force, caused by the spin of the earth, that makes water going down a drain spin counterclockwise) causes the storm to spin, and a hurricane forms.

Gray said that this year, the Atlantic Ocean's surface temperature is higher than normal, resulting in the higher probability of a hurricane.

Nielsen-Gammon said hurricanes are usually prevented from starting by strong, high-level winds that tear the storm apart before it can evolve into a hurricane.

These winds usually come from air currents over the Pacific Ocean. Gray said the presence of La Nina, a large area of cold water in the Pacific Ocean, is preventing these winds from developing, thus leading to an even greater probability of hurricanes.

A snowball's chance ...

STUART HUTSON
The Battalion

Scientists believe that life on earth began 3.8 billion years ago. But until now, they had trouble believing that it has survived.

An ice age that blanketed the earth 600 million years ago (called the "snowball period") was previously believed to have covered the entire earth — from poles to equator — in a layer of ice that should have prevented the single-cell organisms of the day from surviving.

"Life at this time existed in the oceans, but if those oceans were covered in a thick layer of ice, light from the sun couldn't have made it through," said William Hyde, professor of oceanography at Texas A&M. "These organisms depended on a process called photosynthesis for energy. So, no light meant no life."

Photosynthesis is the process by which organisms absorb light from the sun and then use the energy from that light to make sugar for the organisms to feed on.

Life may have survived in ice-free pools of ocean surrounding the Earth's equator

Hyde, along with A&M oceanographers Thomas Crowley and Steven Baum, and University of Toronto physicist W. Richard Peltier, has constructed a computer model of the earth at that time, which indicates that life may have survived in ice-free pools of ocean surrounding the earth's equator.

"We were constructing different models of what the earth may have looked like at this time under certain conditions and came along this set up which seems a very probable possibility," Hyde said. "This is isn't the definite way that things went, but it would answer some questions."

Hyde said the snowball period, which predates the latest ice age — known for its cave men and woolly mammoths — by hundreds of millions of years, was caused by low levels of carbon dioxide in the atmosphere and a sun that was 6 percent dimmer than today's.

The sun is believed to have been dimmer because a star grows brighter as it grows older due to a nuclear chain reaction which gradually consumes more fuel in the star's core.

Carbon dioxide is one of the main contributors to a process known as the "greenhouse effect." The clear carbon dioxide gas allows the sun's energy, in the form of light, to penetrate the atmosphere.

The light warms the earth which in turn radiates the energy in as heat into the atmosphere. The carbon dioxide then acts as an insulating blanket, keeping that heat in.

Black box technology 'within reach' for autos

SALT LAKE CITY (AP) — A car rolls on the highway in the middle of the night and a signal is sent to the nearest 911 center. Within seconds, emergency workers know how fast the car was going, where it crashed, who was inside and whether they were wearing seat belts.

The technology is within reach, according to experts who presented a prototype of the Automatic Crash Notification System at the National Emergency Number Association conference Monday.

"It's not here today, but it's right around the corner," said Stephen Meer of SCC Communications Corp., a 911 routing company that was part of the demonstration.

The system is based on a so-called "black box" — nicknamed after the devices that record altitude and other flight data on planes — built by Veridian.

The box uses sensors to record the speed a car is traveling and the point of impact, and then radios that information into a central communication system when a crash occurs.

A global positioning system embedded in the box tells the network how to relay the call to a local 911 number, transmitting the crash information to the dispatcher on the ground.

That data can then be relayed to a hospital or trauma center to feed information about the crash to doctors or paramedics on their way to the accident.

The idea of crash notification is not new; General Motors and other car companies already install systems such as OnStar in some models. Proponents of the new technology call those systems basic.

"That says there was a frontal crash, yes or no," said Doug Funke, transportation sector program manager for Veridian. "But we know was it side impact, was it the left side, did the car roll over, what was the car's final resting position — on the side or the roof — as well as the car's actual location."

The new system also meshes with traditional 911 operations, said Meer, who helped design a routing network for calls. That means emergency systems will not have to be overhauled each time another company invents a new black box.

The system was tested earlier this month, when Veridian wired two cars and crashed them near Niagara Falls, N.Y. The emergency services department in Harris County, Texas, which covers Houston and its suburbs, signed on in advance to take the call.

When the cars slammed together, the black box data was instantly transmitted to SCC's home base in Boulder, Colo. and relayed to Houston's 911 number.

In less than a minute, dispatchers at the Houston Fire Department read the crash data and decided how many engines and paramedics to send (because the crash was in New York, no crews were actually dispatched). Within five minutes, the crash data was translated into a computer model that could be read by doctors.

That final step — which will eventually include information about the ages of passengers and crumple zones of specific makes of car — is not yet ready for the mass market.

But it will be soon. Response Services Center, a subsidiary of AAA, has paired up with SCC and plans to offer an emergency notification system to consumers in 2001. Experts predict the technology will become as standard as seat belts and air bags in just a few years.