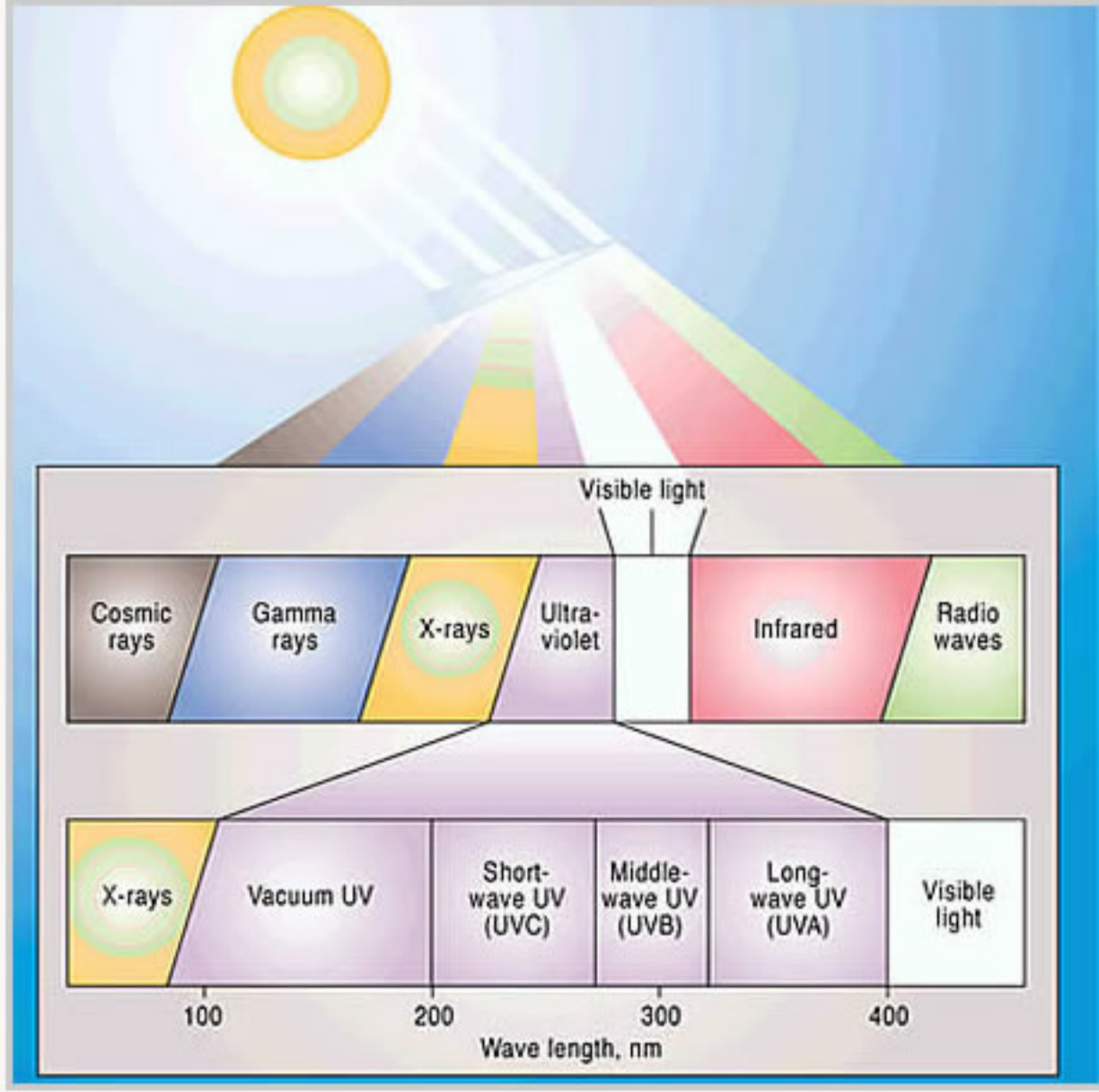


UV-C: An Introduction to Ultraviolet (UV) Light

It is very important to know that UV Light exist all around us. Generated by the sun, it is a part of the spectrum of electromagnetic energy. This spectrum consists of other form of energy such as radio waves, infrared, visible light, x-rays, gamma rays and cosmic rays. Since UV is not visible, it is technically not a "light"!



Discovery:

The discovery of UV radiation was intimately associated with the observation that silver salts darken when exposed to sunlight. It was in the 1801 that German physicist Johann Wilhelm Ritter made the observation that invisible rays just beyond the violet end of the visible spectrum were especially effective at darkening silver chloride-soaked paper. The term "chemical rays" was adopted shortly thereafter, and it remained popular throughout the 19th century. The terms chemical and heat rays were eventually dropped in favor of ultraviolet and infrared radiation, respectively.

It was not until 1950's that the connection and effect of sun's rays on the human tissue was discovered. An artificial sunlight known as the Finsen Curative lamp which contained ultraviolet (UV) rays was then developed. This lamp has been used as a sterilizing aid throughout the late 1950's.

The key portion of the discovery was that (UV) light has the ability to destroy pathogenic organisms.

What are the type of UV Light exist?

UV-A: "Longwave" UV also known as blacklight, the major type of UV in sunlight, responsible for skin tanning.

UV-A is harmful and it is used to treat certain type of skin disorders.

UV-B: It is a small part of the sunlight and dangerous. Most of it is being blocked by the ozone layer. Long exposure to the sun can enable UV-B responsibility for skin cancer, skin aging and cataracts.

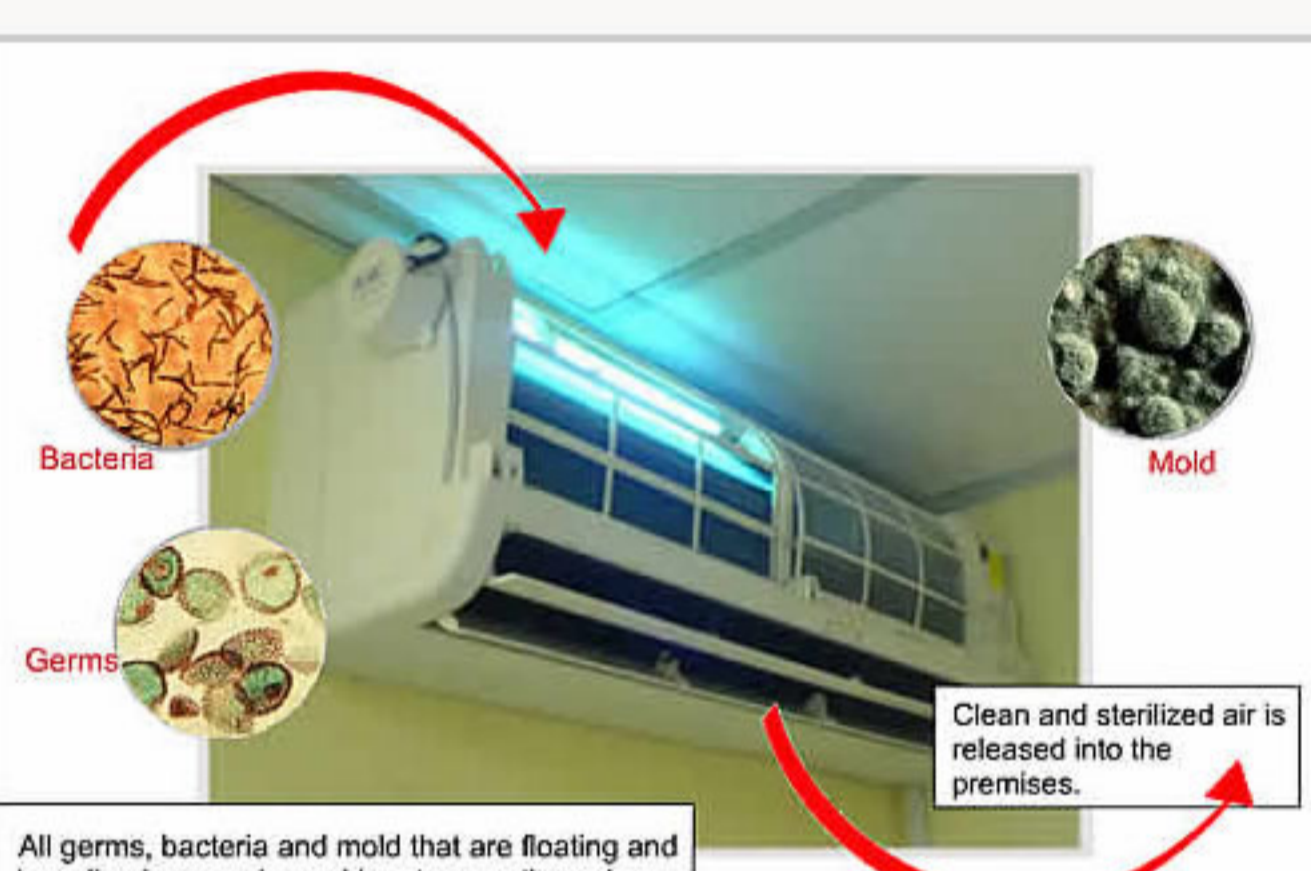
UV-C: "Short-wave" UV and it is not present in the sunlight. It also includes germicidal UV (253.7nm wavelength) used for air disinfection. If unintentionally overexposed it can cause transient skin redness and eye irritation. UV-C do not cause skin cancer or cataracts.

Germicidal UV:

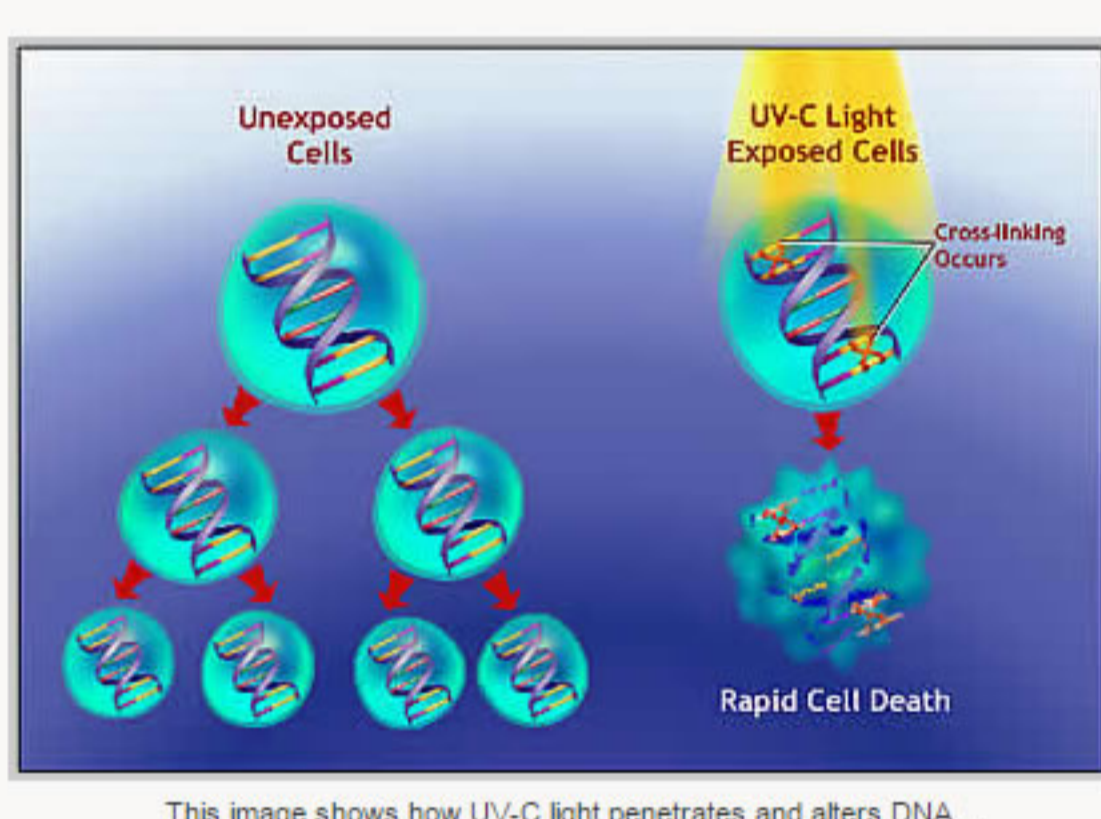
UV-C contains a 253.7nm wavelength that is also known as Germicidal UV. This UV is aimed at the upper room air so that it is able to kill and cripple germs that is contained in the tiny airborne droplets (droplet nuclei) that transmit some infections (measles, tuberculosis and influenza) from person to person inside a room or a building.

This is done by permanently altering the DNA and the structure of the molecular bonds of microbiological contaminants. For more than 50 years, Germicidal UV has been used safely and effectively in hospitals, clinics and laboratories.

Soma Medical Sdn. Bhd. provides services related to Germicidal UV. We provide implementation of UV-C type equipments ([click here for our case study](#)) and UV-C type products.



This diagram shows how UVMMax's (a UV-C type product) ability to eradicate different types of organism and produces clean air using UV-C rays.



This image shows how UV-C light penetrates and alters DNA configuration on organism and eventually causes it to self-destruct.

UV "Kill" Airborne Pathogens?

UV-C reacts with cell DNA, causing alterations which result in organism self-destruction. Any form of organism that the UV-C is able to penetrate will be killed. This of course is dependant on time, exposure and intensity of the UV-C rays. UV-C rays do not have great penetrating abilities into most substances. Penetration is ineffective on "solid" surfaces. Organism visible to the naked eye are usually too large and therefore too resistant to be killed. It may take 10 to 100 times the intensity to kill them.

The UV-C "Killing Factors" are based on:

1. The intensity of UV radiation.
2. The length of time or exposure to the UV radiation.
3. The relative humidity.
4. The air temperature.
5. The microbial species.

The safe level of UV exposure and installation are still needed to be handled by experts or those who have experience in installing UV-C type products. This is because exposed UV-C rays can cause eye irritation. Every UV-C products need to meet the NIOSH standards before being used or marketed.

However now, Soma Medical Sdn. Bhd. has a range of UV-C based products that works effectively on almost all type of surfaces. The UV-C lamps are better handled and optimized for any range of environment and situation. [Click here for the type of products available.](#)

Contact us for more information.

Researching UVGI? You'll find government studies and guidelines for the use of UVGI below.

Agency	Description and Link
US Army Fort Leonard Wood	Army Chemical Review article on using UVGI to harden HVAC systems against a bio-terror attack
CDC	National Institute for Occupational Safety and Health (NIOSH) sponsored tests of UVGI Updated Guidelines for Using UVGI Against TB
National Institute of Environmental Health	Overview of study showing UVGI's effectiveness against Sick Building Syndrome Excerpt Complete Report
US Dept. of Agriculture	Article: UVGI Keeps Fresh-Cut Fruit Fresher, Longer
US Office of Research Facilities and Operations	Analysis of Efficacy of UVGI Inactivation of Airborne Organisms Using Eulerian and Lagrangian Approaches Designing a UVGI system to maximize TB kill
State of Oklahoma	UVGI Guidelines
NIOSH	UVGI and Bioterror
CDC Public Health Practice Program	CDC Training Module of UVGI and Infectious Disease Control
CDC & NIOSH	SARS in Taiwan, how UVGI played a role
FEMA	UVGI Recognized as Biodefense Measure
US Veterans Affairs Office	VA examines UVGI's Role in the Fight Against TB
New York State Dept. of Health	UVGI as a Control Measure for Airborne Droplet Nuclei Excerpt Complete Report
CDC HICPAC	Guidelines for Environmental Infection Control in Health Care Facilities
Nat'l Institute of Standards and Technology	Strategies to Reduce the Spread of Airborne Infections in Hospitals
Kansas Dept. of Health	Guidelines for Smallpox Excerpt Complete Report
New York City Dept. of Health	Guidelines for Smallpox Excerpt Complete Report
Health Care and Safety Association of Ontario	Guide to Protecting Healthcare Workers from Infectious Disease
Georgia Institute of Technology and the GSA	Benefits of UVGI for a Moldy Court House Excerpt Complete Report