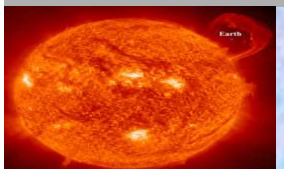
SUNLIGHT SIMULATORS

A KEY TO UNDERSTANDING

THE PHYSIOLOGICAL EFFECTS OF THE SUN



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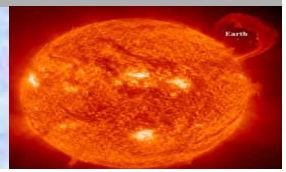
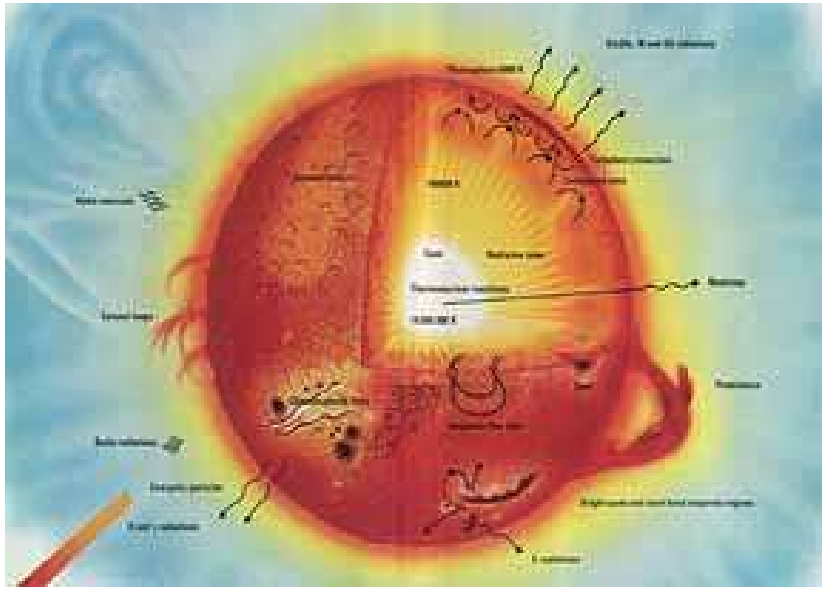


SUNNY FACTS



Mass (kg) :	**1.989e+30**	**≡**	**332.830(Earth mass)**
Equatorial radius (km) :	**695 000**	**≡**	**108.97(Earth radius)**
Mean Density (gm/cm^3) :	**1.410**		
Rotational Period (days) :	**25-36**		
Luminosity (ergs/sec) :	**3.827e33**		
Mean surface temperature :	**6,000°C**		
Age (billion years) :	**4.5**		

Principal Chemistry

Hydrogen	**92.1%**
Helium	**7.8%**
Oxygen	**0.061%**
Carbon	**0.030 %**
Nitrogen	**0.0084 %**
Neon	**0.0076 %**
Iron	**0.0037 %**
Silicon	**0.0031 %**
Magnesium	**0.0024 %**
Sulfur	**0.0015 %**
All others	**0.0015 %**

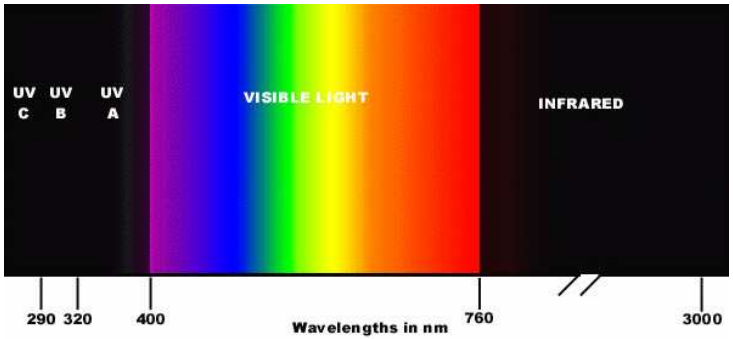
SUNLIGHT SIMULATOR???

CAN IT REALLY?

"A sunlight simulator includes an elongated, cylindrical housing, an artificial light source disposed along the longitudinal axis thereof, and a plurality of light collecting subassemblies equidistantly spaced radially from and around the light source.

The light source is of a type that emits a substantial amount of radiation in the UV portion of the spectrum. The light collecting subassemblies provide a plurality of individually and selectively adjustable beams of UV radiation.
A plurality of light guides are provided for directing the radiation to desired locations. " - United States Patent 4933813

300W solar simulator



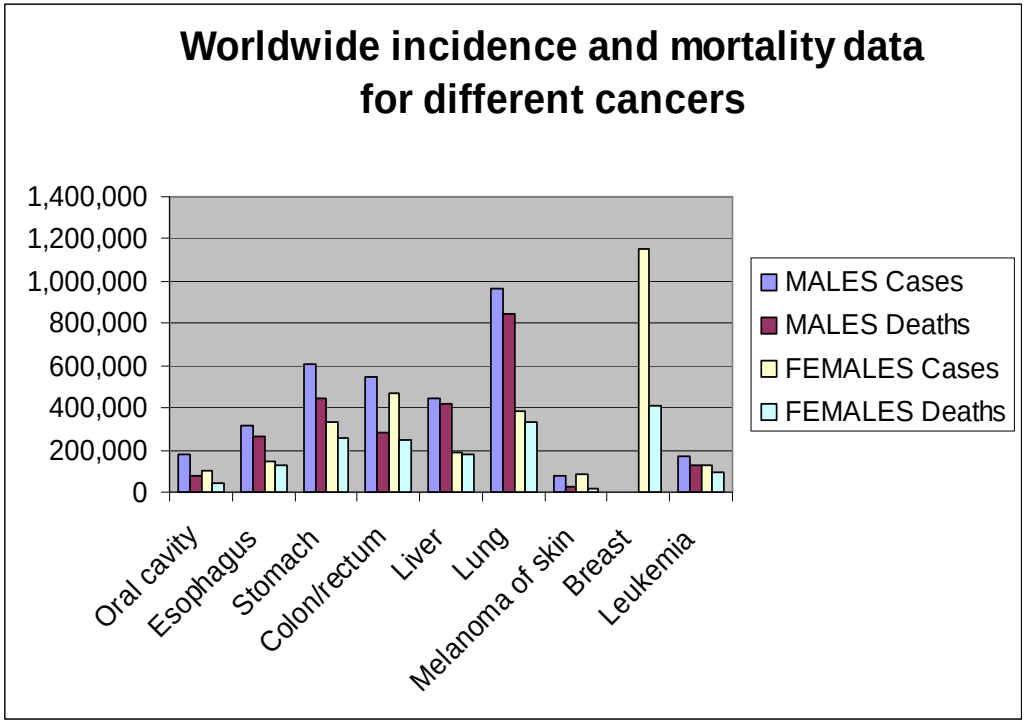
WHY SOLAR SIMULATORS

- Benefits of natural sunlight
- Restrictions of lifestyles
- Common misconceptions
- Experimental setups

to change

WHY SUNSCREENS ... CANCER STATS (1)

Cancer	Males		Females	
	Cases	*Deaths*	*Cases*	*Deaths*
Oral cavity	175,916	80,736	98,373	46,723
Esophagus	315,394	261,162	146,723	124,730
Stomach	603,419	446,052	330,518	254,297
Colon/rectum	550,465	278,446	472,687	250,532
Liver	442,119	416,882	184,043	181,439
Lung	965,241	848,132	386,891	330,786
Melanoma of skin	**79,043**	**21,952**	**81,134**	**18,829**
Breast			1,151,298	410,712
Leukemia	171,037	125,142	129,485	97,364
All sites but skin	**5,801,839**	**3,795,991**	**5,060,657**	**2,927,896**



...SOUTH AFRICAN SKIN CANCER STATS

- 1 in 45 White male [2]
- 1 in 56 White female
- 1 in 909 Black male
- 1 in 769 Black female

Ambient UV radiation conditions in SA are high throughout the year [5] hence an elevated prevalence of skin cancer

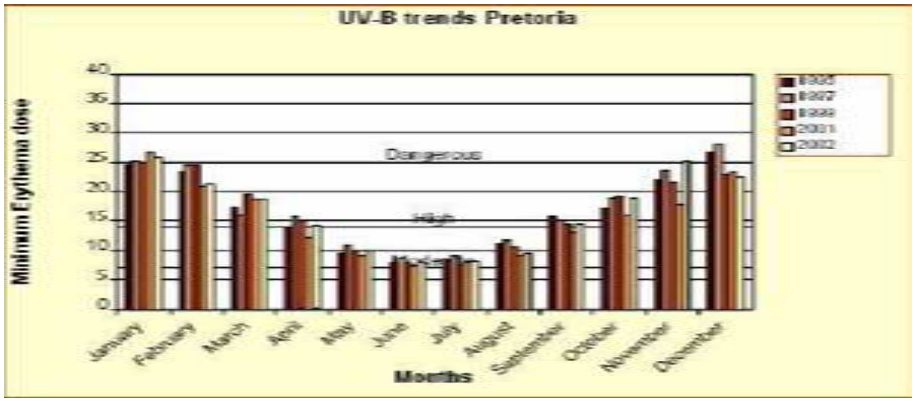
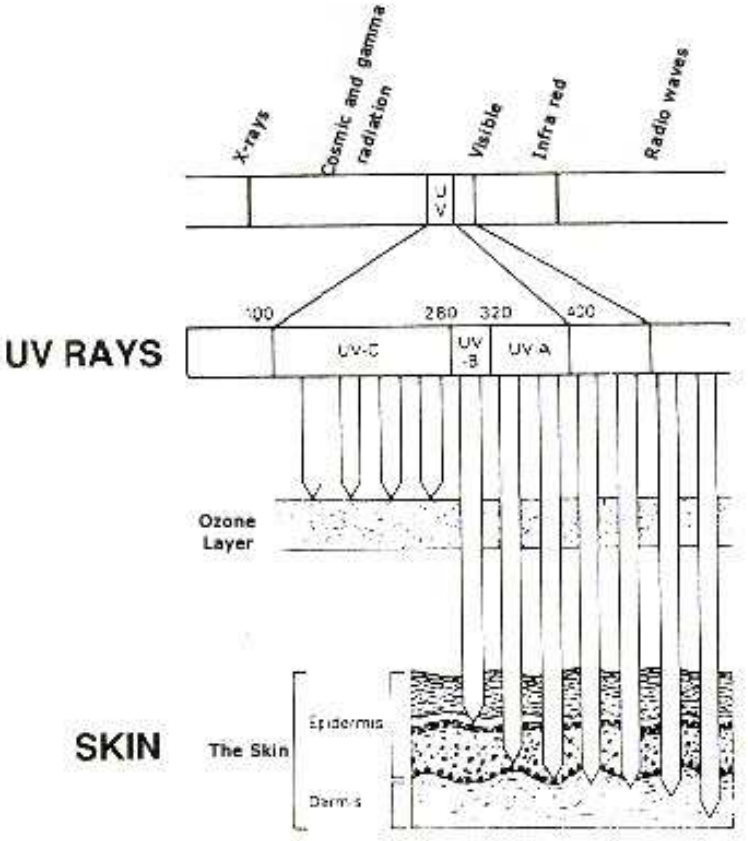


Fig 1: UV ratings per year

- According to Australian reports 1 in 25 males and 1 in 38 females will develop skin cancer by the age of 75 [3]
- Points to bear in mind, many deaths in poorer communities goes unnoticed

WHAT IS SKIN CANCER?

- The presence of malignant cells in the outer layers of the skin often as a result of sun exposure



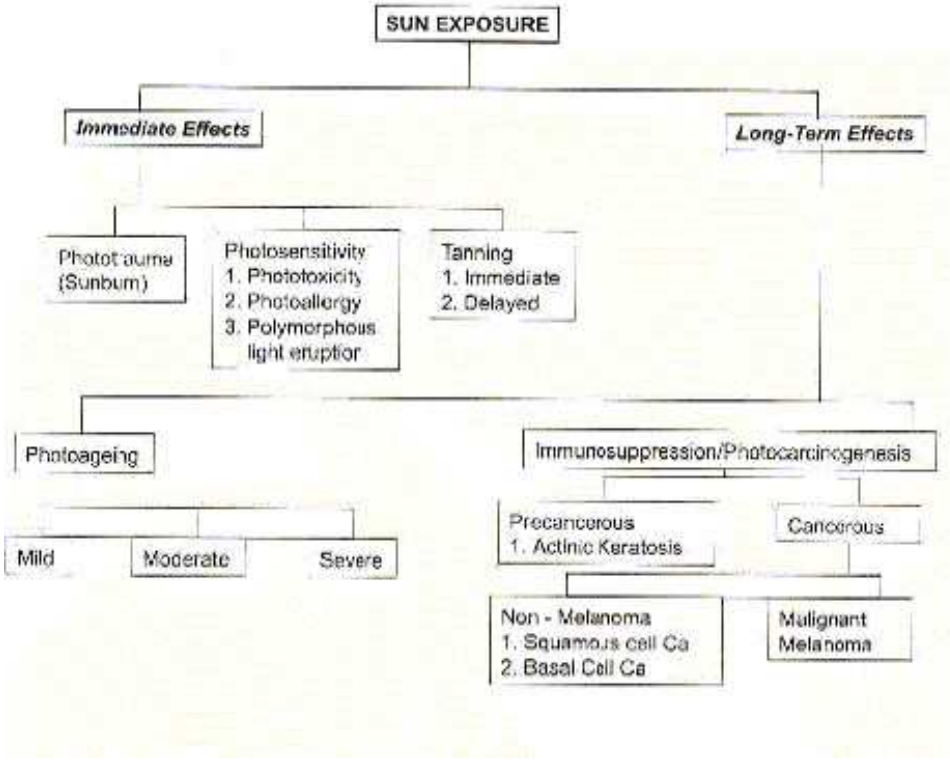


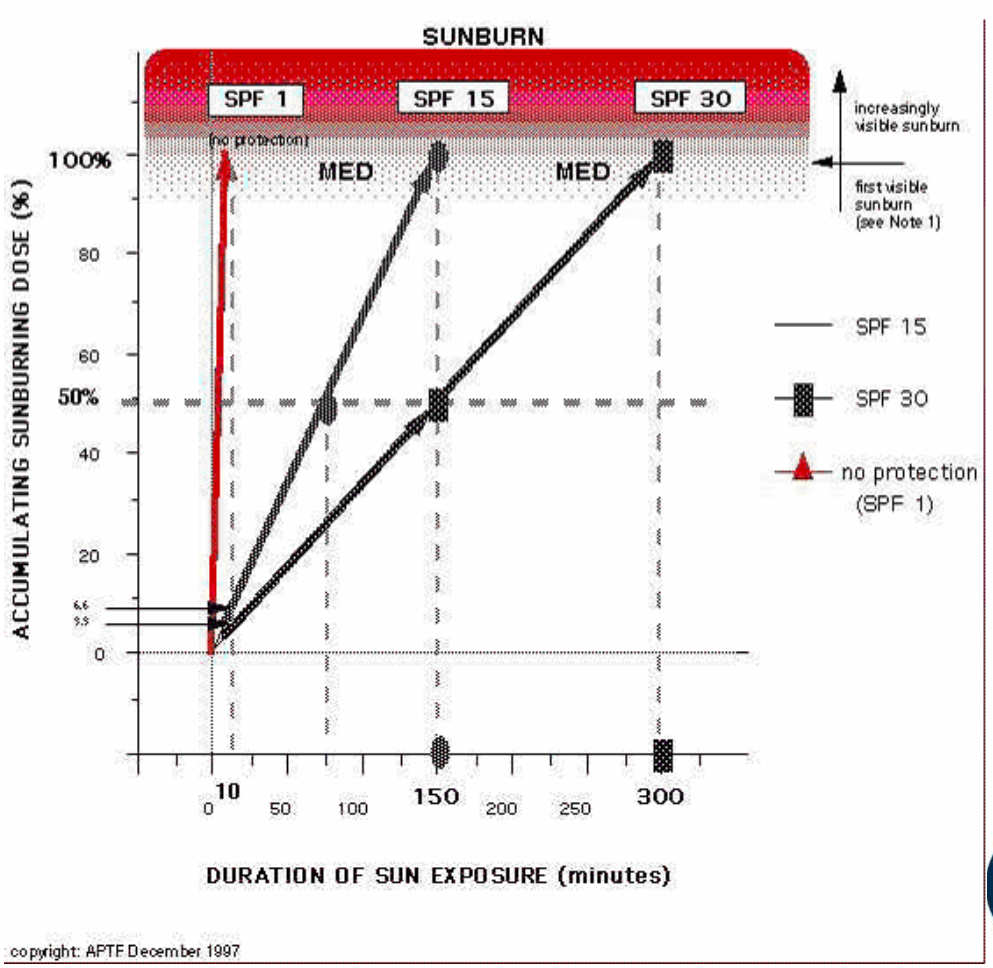
Fig 2: Sunlight and skin penetration [4]

SOME CASES

Fig 3: Different forms of skin cancer [7]

HOW DO SUNSCREENS WORK?

- By definition, sunscreens include active ingredients which variably absorb, scatter and reflect UV energy which would otherwise enter the skin and cause damage. They filter the light passing through the skin and do not block it all out.



WE WILL USE .... THE NEW 3D SKIN MODEL

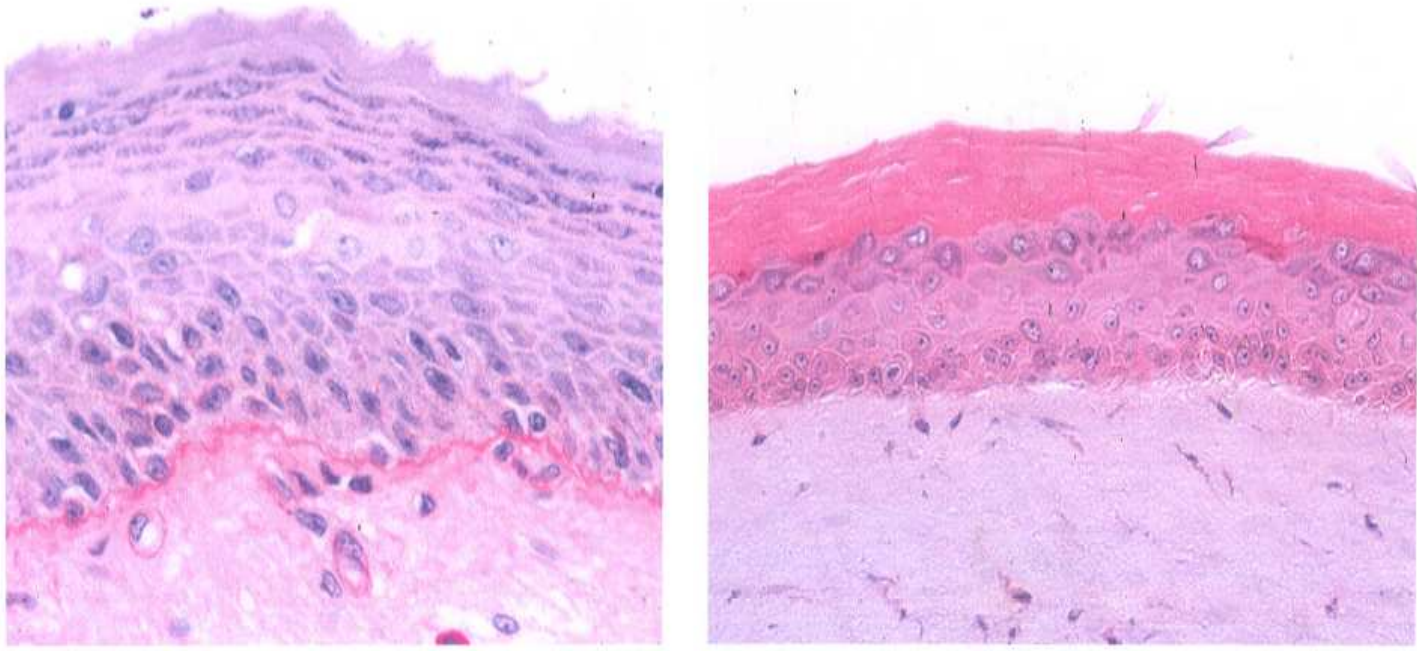
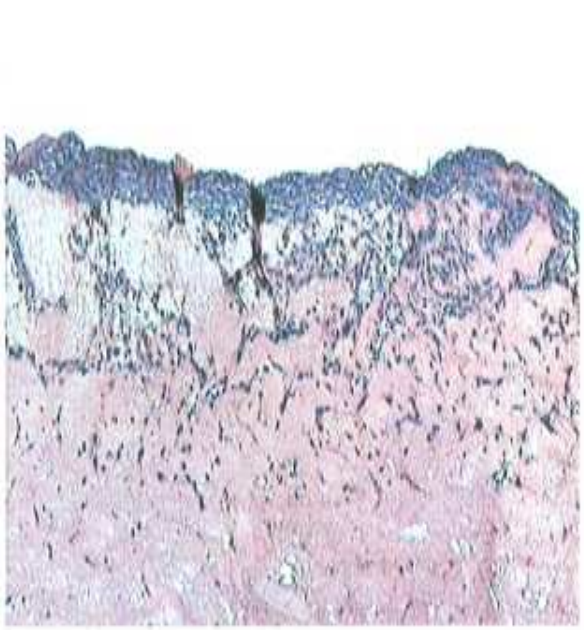
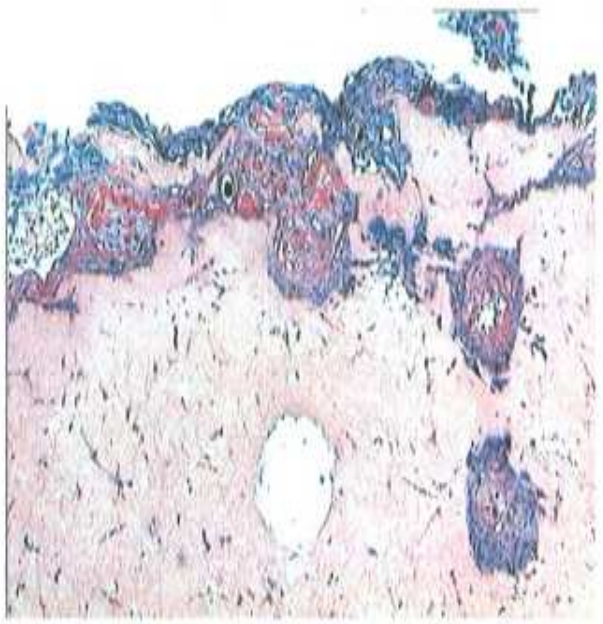


Figure 4: Comparison of histological cross-sections of real skin tissue (left) and a 3D skin model (right). (Copyright:Fraunhofer IGB)

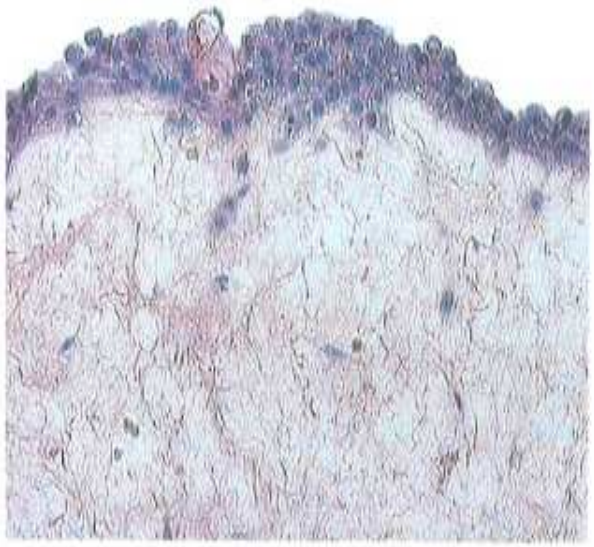
DIFFERENT STUDIES



BLM-cell line infiltrate the dermis



M13 cell line build tumour nests



SK Mel 28 cell line

Fig 5: Tumour induced skin models

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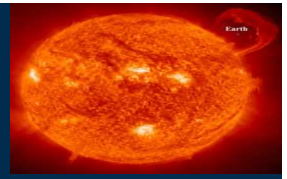
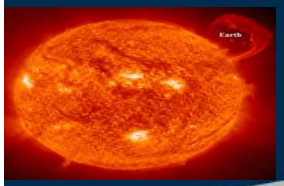


THANK YOU



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