GENERAL REMARKS

This fifty-fifth volume of *IARC Monographs* contains evaluations of carcinogenic risks associated with human exposure to solar and ultraviolet (UV) radiation from medical and cosmetic devices, general illumination and industrial sources. Ultraviolet radiation (UVR) was considered previously (IARC, 1986) in a volume in which furocoumarins were evaluated. Since some of these compounds are used clinically in conjunction with ultraviolet A (UVA) radiation, information on the carcinogenic effects of UVR alone was provided in an appendix; however, no evaluation was made at that time.

Solar radiation is largely optical radiation (UV, visible and infrared), although both shorter wavelength (ionizing) and longer wavelength (microwaves and radiofrequency) radiation is present. UVR lies in the interval 100–400 nm and is further subdivided into UVA (315–400 nm), UVB (280–315 nm) and UVC (100–280 nm). The UV component of terrestrial radiation from the sun comprises about 95% UVA and 5% UVB; UVC is removed from extraterrestrial radiation by stratopheric ozone. Before the beginning of this century, the sun was essentially the only source of UVR; with the advent of artificial sources, the opportunity for additional exposure, not only to UVA and UVB but also to UVC, has increased. It should be stressed that the distinction of UVR into UVA, UVB and UVC ranges has no biological basis, and the potential of UVR for causing damage to biomolecules, cells, tissues and organisms varies enormously over the spectral region from 250 to 400 nm.

UVA radiation is one of the components of solar emissions and of emissions from medical lamps and lamps used for cosmetic purposes. UVB radiation is present in solar emissions, from lamps used in medicine and for cosmetic purposes and in certain lamps used for general illumination, such as unshielded fluorescent and tungsten–halogen lamps. It causes sunburn relatively easily and is immunosuppressive; it can cause ocular cataracts. The possibility that the UVB component of solar radiation will increase as a result of depletion of the ozone layer is a matter of concern. This question was not addressed in the present volume.

Human exposure to UVC radiation is uncommon and is related to the use of germicidal and tungsten–halogen lamps, phototherapy and welding arcs. Thus, very little is known about the effects of UVC on humans, although a great deal of information is available on the effects of radiation in this range on biomolecules, cells and viruses.

In the USA, skin melanoma has been second only to lung cancer in its rate of increase in incidence over the last 40 years: the incidence has been increasing by about 5% per year. The major sites have been male trunk and female leg. Mortality from melanoma may now be falling in younger generations (at least in the USA) due, possibly, to changes in sun exposure (Scotto *et al.*, 1991). There is also evidence that the incidence of nonmelanocytic skin cancer is increasing in some white-skinned populations (Gallagher *et al.*, 1990). Constitutional risk

factors, e.g., skin type, hair and eye colour and specific subtypes of exposure (for example, occupational and recreational), have been assessed in individual studies or sections of the monographs but have not been included in the evaluations.

UVR is ubiquitous and cannot be totally avoided. An appendix to this volume presents a discussion on the use of topical sunscreens, taking into consideration both potentially beneficial, protective effects and possible adverse reactions. The biological effects of combinations of psoralens and UVR were not considered since these were the subjects of separate monographs (IARC, 1980, 1986, 1987) in the *IARC Monographs* series.

References

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