

production of lens opacity. Some reports allude to delayed biochemical changes to occur in the irradiated lens, i.e., a late decrease in the ascorbic acid and glutathione content of the lens [Carpenter and van Ummerson, 1968]. Others report such ultrastructural changes as alteration of the equatorial and subcapsular cortical fibers in the absence of slit lamp detectable changes in lenses exposed repeatedly to near-threshold power densities [Williams et al., 1975]. More recent studies using isolated rat lenses have found that irradiation *in vitro* with high power 918 MHz pulses of 10-microsecond width delivered at various repetition rates produced histopathological damages at the lens equator [Stewart-DeHaan et al., 1983,1985; Creighton et al., 1987]. Although the threshold at which damage was observed in the lenses differed depending on the type of damage, the lowest SAR at which holes within the fiber cells in the equatorial region were observed occurred at 231 W/kg after 6 min of exposure. Moreover, the damage was about 4.7 times as great as for CW radiation. The ratio of damage decreased when the peak power is decreased. However, the significance of these ultrastructural or histopathological changes cannot be evaluated since it is not known whether lenses with similar changes will ultimately sustain damages such as a cataract. In addition, extrapolation from *in vitro* to intact lens in the whole animal is speculative. Nevertheless, these results suggest that repeated and/or high power pulsed microwave radiation are capable of causing lenticular damage that is not related to average temperature elevation.

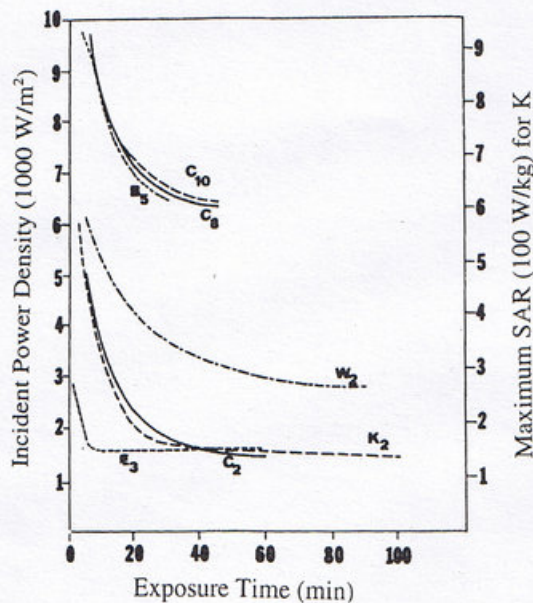


Figure 2. Power density or SAR and time thresholds for induction of cataracts in rabbits by single exposure to near-field 2450 MHz microwave radiation (From Kramar et al., 1975).

Table 11. Effect of

Frequency/ pps (MHz)/(Hz) Effect	Pulse Width Dura (us)/
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918/1-100 10/6

2450 10/4
/100

2450 CW
CW

Corneal les.
to 2450 MHz micro
maintained under h
CW and pulsed ex
changes by CW ra
pulsed microwave
mW/cm² (local SA
10 W/cm² and 260
It is noteworthy th
the monkeys wer
[Kamimura et al.,