
It has been demonstrated that monkeys can suppress a behavioral response at the onset of a brief pulse of x-rays. It had been thought that an intact olfactory system was necessary for this immediate x-ray detection.

Roentgen and other early investigators reported that x-rays yielded a visual sensation in man. Since these observations, data has been collected which suggests that a dark-adapted eye is essential for the visual detection of x-rays. The purpose of the present study was to demonstrate visual detection of x-rays in anosmic monkeys, to establish dose-rate thresholds, and to see if development of detection was a function of time spent in darkness.

Rhesus monkeys were made anosmic by bilateral sectioning of the olfactory tracts. While the dark-adapted animal was pressing a lever for food reward, pulsed x-rays were directed to the head for 15 seconds, with the termination of this period coinciding with electric shock. After a few pairings of x-ray and shock, the monkeys showed suppression of lever pressing upon onset of the x-ray exposure.

The results show that x-ray detection in the dark was readily obtained, while no detection was evident in the light-adapted eye. In addition, dark adaptation curves were obtained with detection occurring immediately after lights out at a dose rate of 50 mR/sec, but not being evident for approximately 6 minutes at a dose rate of 6 mR/sec. The dose rate threshold for anosmic monkeys was 4 mR/sec. This threshold is similar to the olfactory thresholds obtained in previous studies with light-adapted subjects.