5. DISCUSSION

The incidence of chromosomal aberrations observed in the lymphocytes of the DS was relatively more than that seen in healthy individuals. The untreated Down's syndrome lymphocytes showed about 1.33% of spontaneous aberrations while the irradiated and EMS treated cells of the DS patients showed a frequency of 14.66% and 4.85% respectively (Table I).

5.2. Types of chromosomal aberrations in irradiated lymphocytes

The irradiated lymphocytes of the DS patients showed an increased incidence of dicentrics, fragments and minutes. Rings and triradials were however, few in number.

Shafik et al (1988) demonstrated the hypersensitivity of the lymphocytes of DS to radiation and they found higher frequency of chromosomal aberrations in DS cells than in the normal cells irradiated at different phases of the cell cycle.

Different types of aberrations were observed in the trisomic cells of the mosaic DS individuals. Similar observations were recorded also by Sasaki et al (1970). Chromosomal radiosensitivity was found to be intrinsically higher in cells which are trisomic either for the whole chromosome or a part of it, compared to that of normal diploid cells (Sasaki, 1970).

The study carried out by Leonard and Merz (1983) showed that the skin fibroblasts of DS patients possessed similar response as that of healthy individuals when exposed to radiation. According to them increased radiosensitivity in trisomy 21 may be restricted only to the lymphocytes. The normal level of chromosomal
radiosensitivity in trisomy 21 skin fibroblasts implies a normal capacity to sustain and repair genetic damage induced by exposure to ionising radiation.

Leonard and Merz (1983) have suggested that the increased chromosomal radiosensitivity previously reported for the trisomy-21 lymphocytes is related to an apparent rapid response to stimulation by PHA. They report that increased chromosomal radiosensitivity in trisomy-21 lymphocytes is clearly observable when irradiation occurs within 30 minutes of PHA stimulation as compared to the increased chromosomal radiosensitivity observed in normal lymphocytes when irradiated 8 hours after PHA stimulation.

5.3. Types of chromosomal aberrations in EMS treated cells:

The effect of EMS on the normal and DS lymphocytes was compared and it was found that the dose employed (1 X 10^{-4}M) was sufficient to produce aberrations in the DS patients while it proved insufficient in the normal individuals. This observation also led to prove that the DS lymphocytes were hypersensitive to any mutagenic agent as compared to normal lymphocytes. 4.85% of EMS treated cells of DS patients were found to be aberrant. It was found that fragments and breaks constituted the major types of the chromosomal aberrations induced. This is in agreement with the work of probst et al (1979) which demonstrated increased incidence of strand breaks in crandall feline kidney cells. Sono and Sakaguchi (1980) also observed increased incidence of chromosomal aberrations induced by EMS in the presence of colchicine. The aberrations seen were mainly breaks and fragments.
5.4. Radiation and EMS induced break points in the chromosomes of DS lymphocytes:

Radiation induced breaks have been found to be non-random involving the sites 1q21, 2q13, 3p21, 5q31, 6q21, 6q23, 7q22 and 9q34. The sites 1q21 and 9q34 were seen to break in three patients each while the rest were each observed in two patients.

This non-random nature of break points was not seen in EMS - induced chromosome aberrations. However most of the sites were observed to coincide with those seen in radiation induced abnormalities (Tables V & VI).

Some of the break points observed in this study were found to lie on the sites of heritable fragile sites. These were 2q13, 8q24, 11q23 and 16q22.