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THE EFFECTS OF THE TRANSCENDENTAL MEDITATION AND TM-SIDHI PROGRAM ON DNA REPAIR

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Participants in the Transcendental Meditation and TM-Sidhi program displayed a unique pattern of DNA repair, which may be a mechanism underlying improved health.—EDITORS

INTRODUCTION

The Transcendental Meditation (TM) and TM-Sidhi program are widely practiced mental techniques which have been reported to have therapeutic value in relieving mental and physical tension and to unfold each person's natural capacity for happiness. In the early 1970s, Wallace [1] reported physiological changes during meditation which indicated a state of deep relaxation along with mental alertness. Some of the physiological changes described included decreased oxygen consumption, carbon dioxide elimination, respiratory rate and minute ventilation with no change in respiratory quotient, and increased skin resistance. Later work by Wallace [2] and associates reported the effects of the TM program on specific autonomic and sensory processes resulting in significantly younger biological ages in long-term meditators. Since the TM program produces such wide-ranging physiological effects, we planned an experiment to study its effect on the basic controller of cellular function, i.e., DNA. If the repair mechanism of the DNA could be affected by the TM technique, then it would result in an even broader range of changes in the physiological parameters of the body than have been reported.

METHOD

The experiment was carried out on five healthy male subjects with a mean age of 29 years (26–32 years), who had been practicing the TM and TM-Sidhi program for an average of 10.4 years (8–14 years). Nucleoid repair was compared with normal, low-, and high-stress individuals. These data were collated from a study on distress and DNA repair in human lymphocytes which was proceeding simultaneously [3]. The subjects fasted 12 hours overnight, and blood samples were taken in the morning after their meditation program. For nucleoid repair, mixed peripheral lymphocytes (MPL) were isolated from whole blood by standard Ficoll-Hypaque step gradients. The cells were routinely cultured as per Lipetz et al. [4]. To measure nucleoid structure after x-irradiation, MPL were resuspended at 1 x 10^7 cells/ml and irradiated on ice with 100 rads (Profex-ray unit calibrated at 200 rad/min, 100 kV, 6 mA). MPL were then maintained on ice or transferred to a culture medium (1 x 10^6 cells/ml) for the appropriate repair time intervals. Following these periods, cells were centrifuged, resuspended at 1 x 10^7 cells/ml in cold phosphate buffered saline, and layered onto gradients.

Nucleoid preparation and analysis were an adaption of that of Lipetz et al. [4] for non-dividing cells, except that gradients were fractionated from the top (Buchler Auto Densi Flow), pumped (2.5 ml/min) into a Y joint where they were mixed with a 300 ng/ml 4',6-diamidino-2-phenylindole (DAPI) solution (7.5 ml/min), then passed through an American Research Products Corp. Flow fluorimeter (excitation <400nm; emission >400nm). The DAPI-DNA signal was graphed on a strip chart recorder (ISCO). Unirradiated nucleoid migration from each group served as the 100% recovery control value.
RESULTS AND DISCUSSION

Figure 1 shows the nucleoid repair comparison against low-stress, high-stress, and normal individuals, and individuals practicing the TM and TM-Sidhi program. The initiation of the repair process starts immediately in normal individuals and in individuals with low and high stress. The repair is 100% in low-stress and normal individuals; however, with high stress the repair never exceeds 80% at 5 hours. In general, in TM meditators there was a delay in initiation of repair of chromatin structure and lymphocytes following x-irradiation induced damage, with 100% repair after 5 hours.

It is a well-known physiological phenomenon that repeated stress to the system leads to induction of enzymes as a protective mechanism. An example is induction of alcohol dehydrogenase enzymes in the livers of alcoholics. These physiological responses are induced in the cells to protect them from the onslaught of various forms of injury. The immediate initiation of chromatin repair that is seen in stressed and normal individuals may be an indication of continuous induction of enzymes due to chemical stress put on the cells at the level of DNA. If the stress is removed, either as an immediate or long-term effect of TM and TM-Sidhi practice, the enzymes are not induced and there will be delay in the initiation of repair, as seen in the meditators in our experiments. However, it seems that in the meditators there is enough reserve capacity in the system to induce the enzymes to start the process of DNA repair. DNA, being a very complex structure with multiple twists and turns and loop formation, will take some time to open up the deeper structures after injury to provide a complete, error-free repair. The time taken to initiate the healing process in the chromatin structure in meditators may be utilized in unfolding the DNA molecule, so that the deep recesses become available for enzymatic activity to initiate the repair process. This is reflected in the 100% repair seen in meditators, and the incomplete repair seen in distressed individuals. While these suggestions are speculative and need further study, the fact that TM meditators have markedly reduced health care utilization as compared to normal controls [5] suggests that their unique pattern of DNA self-repair may be an important mechanism for better health.

REFERENCES