HISTOPATHOLOGICAL AND BIOCHEMICAL STUDIES ON THE SYNERGISTIC EFFECTS OF NICOTINE AND RADIATION ON SOME BODY ORGANS OF THE MALE ALBINO RAT

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By

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Heartily dedicated

to

my husband

George Kyrillos

&

my sweet little

Monica

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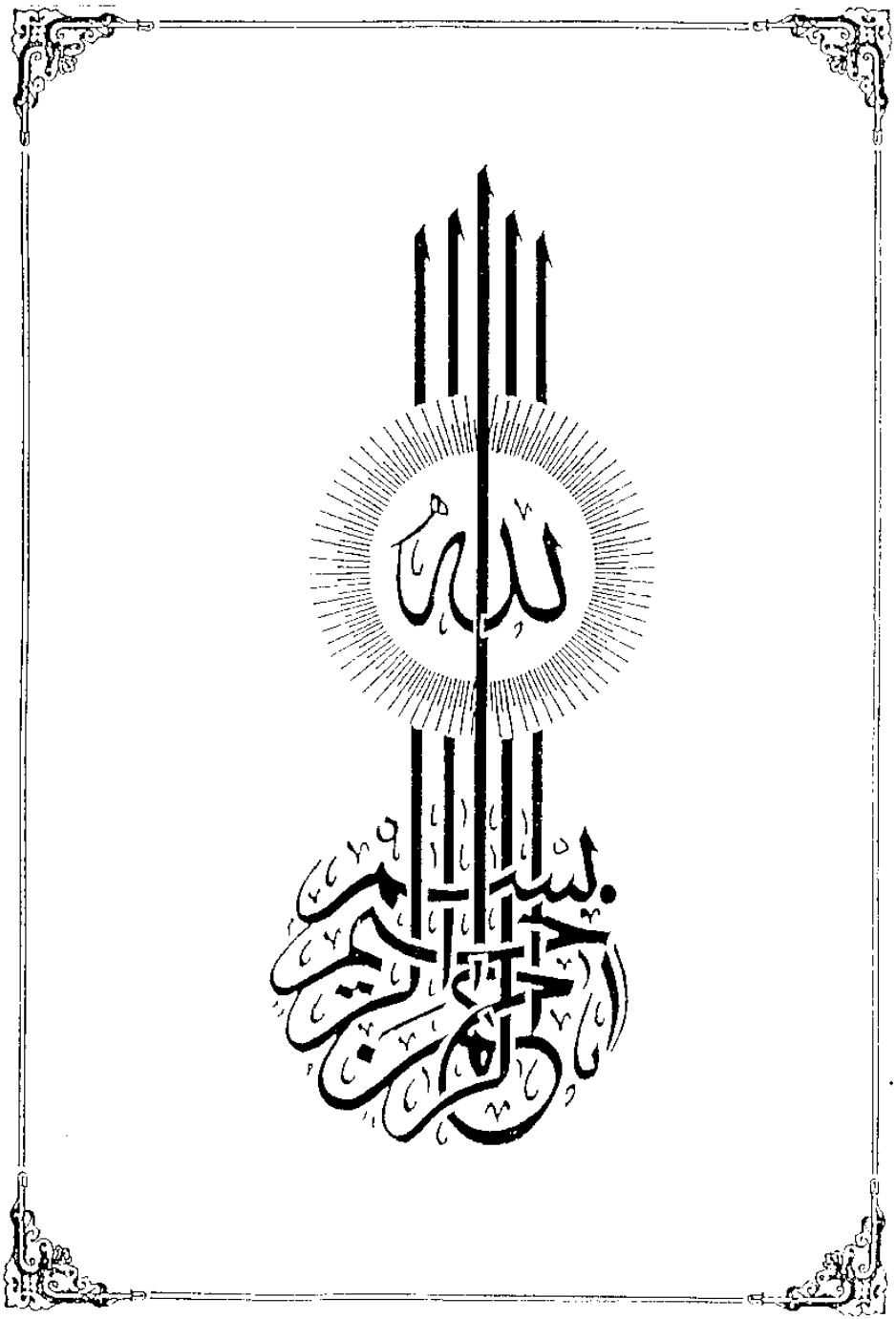

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INTRODUCTION

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INTRODUCTION

Nowadays, tremendous progress has been achieved in the field of radiation biology especially in the peaceful purposes. In this respect, it is quite clear that radiation technology has been greatly flourished in various disciplines of our life, e.g., in medicine, industry and agriculture as well as other biological aspects (Bloom and Bloom, 1954). But unluckily, even in such beneficial trends, several incidents and accidents have been frequently encountered anytime and anywhere without previous notice amongst those working in these areas as well as those exposed to their impacts even as therapeutic agents. In this concern, inevitable histopathological reactions in addition to systemic injuries to blood forming organs and possible reduction in fertility and life span were frequently recorded (Boulos, 1990). Thus, radiation is obviously a bifold tool; on one hand, it is a highly beneficial tool and on the other hand, it could act as a harmful, and even a fatal weapon. In other words, in an instance in which radiation is applied as a radiotherapeutic treatment for cancer cells, yet at the same time, it could cause other cells to be malignant.

Thus, there is an urgent and continuous need to provide as much information as possible in this area, which could direct and help the users of these agents to cope effectively and successfully with these serious agents, aiming at obtaining the utmost of their benefits and to avoid, to the maximum possible degree, the extent of their hazardous consequences, which could affect, not only the patients, but also all those dealing with radiation by any means. In similar health areas, the trend of smoking has sprung as one of the most serious problems in the present time allover the world. The main reason lying behind this aroused interest

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is that this habit is progressively increasing the risk of cancer induction as emphasized by many reliable international reports (Sanders, 1986). In spite of these serious warnings, yet it is quite amazing that millions of people are continuing to smoke disregarding and neglecting the dangerous consequences of smoking not only among the smokers themselves but also among those exposed unintentionally to the smoke vapours of cigarettes.

In this concern, nicotine stands as one, or even the most toxic agent in cigarette smoke, thus being one of the essential carcinogenic factors. Nicotine was estimated to represent 0.5-5.0 mg per cigarette approximately as listed by the U.S. Department Of Health, Education and Welfare 1979 (Sanders, 1986).

Therefore, there is a pressing necessity for illustrating clearly the deleterious consequences of smoking in the body organs, both structurally and functionally (i.e. histopathologically and biochemically). This might be of some help in stopping, or at least minimizing this unpleasant and harmful habit for the health and welfare of human beings in general.

Worthwhile, is that extensive studies have been carried out on the biological effects of either radiation exposure or nicotine material on the structural and biochemical aspects in the body, but nonetheless, the synergistic effect of both these physical (irradiation) and chemical factors together (in combination) has received, but little attention by researchers involved in such problems.

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AIM OF THE PRESENT WORK

Taking the previously listed introductory remarks into consideration, the present work was designed to assess and evaluate the synergistic (combined) influence of both radiation exposure and nicotine application in a simultaneous manner from the structural (histological) and functional (biochemical) points of view. This investigation was intended to be carried out on some body organs in one of the mammalian representatives, namely albino rats.

To achieve these goals, the work included the following essential parameters:

Evaluation of the histopathological changes induced in the two presently selected organs, namely the thyroid gland and testis post-treatment with either gamma rays or nicotine in a separate manner or in combination. This, of course, has necessitated a general demonstration of the familiar histological features of these two organs to clarify the deleterious pictures obtained from the experimented animals.

Assessment of some biochemical aspects including serum triiodothyronine (T3), tetraiiodothyronine (T4) and testosterone hormones under the same previous circumstances.

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