

Stimulatory Effects of Estradiol and FSH on the Restoration of Spermatogenesis in Azoospermic Mice

Jafarian, Arefeh (M.Sc.)¹; Akhondi, Mohammad Mehdi* (Ph.D.)²; Pezhhan, Nooshabeh (Ph.D.)¹; Sadeghi, Mohammad Reza (Ph.D.)²; Zarnani, Amir Hassan (Ph.D., D.M.T.)^{3,4}; Salehkhoh, Sheida (B.Sc.)²

1. Department of Biochemistry, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

2. Reproductive Biotechnology Research Center, Avicenna Research Institute, ACECR, Tehran, Iran.

3. Nanobiotechnology Research Center, Avicenna Research Institute, ACECR, Tehran, Iran.

4. Department of Immunology, Faculty of Medicine, Iran University of Medical Sciences, Tehran, Iran.

Abstract

Introduction: Loss of spermatogenesis following chemo or radiotherapy for the treatment of malignancies leads to the patient's temporary or permanent infertility. Restoration of spermatogenesis after malignancy treatments is the main target of recent studies. Therefore, this study was undertaken to evaluate role of follicular stimulating hormone (FSH) and estradiol in the regeneration of spermatogenesis in azoospermic mice.

Materials and Methods: Busulfan, 30mg/kg, was used to induce azoospermia, in 20 male C57Bl/6 mice. Later on, the mice were divided into four groups of five animals. The animals on groups one to three received daily injections of FSH (7.5IU), estradiol benzoate (EB) (12.5µg) and simultaneous FSH and EB, respectively for ten days with no medication for the control group. On the 11th day, serum testosterone levels were measured. After sacrificing the animals, one testis of each mouse was fixed and processed for histopathological studies and the other was used for DNA flow cytometry to count haploid cells.

Results: The highest increase in testosterone levels was seen with concomitant use of FSH and estradiol. The highest increases in haploid cells were seen in solitary use of estradiol and its concomitant use with FSH and resumption of spermatogenesis were observed histologically in these two kinds of administrations (p<0.001).

Conclusion: FSH unlike estradiol did not restore spermatogenesis in azoospermic mice. Simultaneous use of FSH and estradiol had synergistic effects in the restoration of spermatogenesis in azoospermic mice. Therefore, the concomitant use of the two hormones may be considered for the restoration of spermatogenesis in men who have undergone treatments for malignancies.

Key Words: Azoospermia, Busulfan, Chemotherapy, Estradiol, FSH, Haploid cell, Infertility, Spermatogenesis, Testosterone.

Corresponding Author: Mohammad Mehdi Akhondi, Reproductive Biotechnology Research Center, Avicenna Research Institute, Shaid Beheshti University, Evin, Tehran, Iran. P.O. Box 19615-1177.

E-mail: Akhondi@avicenna.ac.ir

Received: Nov 26, 2008; **Accepted:** Jan 17, 2009