could be used for controlled ovarian hyperstimulation (COH). However, uFSH implies a number of disadvantages, such as batch-to-batch inconsistency, no absolute source control, dependence on large amounts of urine, low specific activity, and low purity. The purpose of this study was to evaluate the efficacy of rFSH in human IVF-ET program.

Materials and Methods: A total of 508 infertile women was enrolled in this study. They are classified into rFSH group (n=177) or uFSH group (n=331), and all of them were matched by age and cause of infertility in same period. The Puregon® (Organon, Holland) was used as rFSH and the Metrodin-HP® (Serono, Switzeland) and Humegon® (Organon, Holland) was used as uFSH. The outcomes of IVF-ET program were analyzed using the statistical package for social sciences (SPSS).

Results: There was no significant differences in the level of estradiol on hCG injection day, the numbers of retrieved oocytes, matured oocytes, fertilized oocytes, transferred embryos, frozen embryos between the two groups. The total dose (IU) of gonadotrophin for COH was significantly lower in the rFSH group compared to uFSH group (1339±5491.1 vs 2527.8±1075.2 IU, $p<0.001$). Clinical pregnancy rate per embryo transfer in the rFSH group showed increasing tendency, compared to the uFSH group, but there was no statistical significance (35.2% vs 29.3%).

Conclusions: The ovarian stimulatory effect and clinical outcome of recombinant FSH was similar to that of the urinary gonadotrophin. The IVF-ET cycles with significantly lower dose of gonadotrophin in rFSH group showed comparable results. Therefore, we suggest that recombinant FSH is more potent and effective than urinary gonadotrophin.

M-12 Accumulation of mtDNA Deletion ($\triangle$mtDNA4^{977}) Showing Tissue-Specific and Age-Related Variation

포천중문의대 차병원 여성의학연구소 유전학연구실

이숙환 · 정혜진 · 조성원 · 이수만 · 곽인평 · 윤태기

Objectives: Controversial arguments exists on both the case for and against on the accumulation of mtDNA deletion in association to tissue and age. The debate continues as to whether this mutation is a major contributor to the phenotypic expression of ageing and common degenerative diseases or simply a clinical insignificant epiphenomenon. The objective of this study was to determine whether the accumulation of mtDNA deletion is correlated with age-related and tissue-specific variation.

Design: A prospective study

Materials and Methods: One hundred and fifty-seven tissues from blood, ovary, uterine muscle, and abdominal muscle were obtained from patients ranging in age from 31~60 years. After reviewing the clinical reports, patients with mitochondrial disorder were excluded from this study. The tissues were obtained at gynecological surgeries with the consent of the patient. Total DNA isolated from blood, ovary, uterine muscle, and abdominal muscle was amplified by two rounds of PCR using two pairs of primers corresponding to positions 8225-8247 (sense), 13551-13574 (antisense) for the area around deleted mtDNA

and 8421-8440 (sense), 13520-13501 (antisense) for nested PCR product. A statistical analysis were performed by χ^2-test.

Results: Sixty-one percent of total cases harbored mtDNA deletion under the conditions of the PCR used in this study. The results obtained are shown below.

Table 1. Age distribution

Tissue	30~39 year	40~49 year	50~59 year	Total
Lymphocyte	0/16 (0%)	0/23 (0%)	0/8 (0%)	0/47 (0%)
Ovary	10/11 (90.9%)	20/21 (95.2%)	7/7 (100%)	37/39 (94.9%)
U.M.†	7/11 (63.6%)	14/20 (70%)	4/4 (100%)	25/35 (71.4%)
A.M.‡	7/ 9 (77.8%)	17/20 (85%)	7/7 (100%)	21/36 (86.1%)

†U.M.: Uterine muscle, ‡A.M.: Abdominal muscle

Conclusions: This study confirms that absence of the mtDNA deletion in rapidly dividing cells, such as leukocytes, is understandable if we accept that such tissues may lose the defect by selective pressure. On the other hand, accumulation of mtDNA deletion was found in ovary, uterine muscle, and abdominal muscle during the ageing process. There was also a tendency of tissue-specific manner in ovary, uterine muscle, and abdominal muscle, even though statistical differences were not significant. Although this method is not quantitative and does not reflect the real number and proportion of deletions, we could demonstrate increased rate of accumulation of age-related mtDNA deletion in association with tissue-specific variation. However, more extensive tissue analysis is required to clarify causal relationship between mtDNA mutations including mtDNA deletion and biochemical or clinical defect.

M-13 ICSI is Essential for Achieve the Higher Fertilization Rate in *in vitro* Matured Human Oocytes Retrieved from Unstimulated Ovaries of Women Undergoing IVM/F-ET Cycles

Hyun CS, Yoon SH, Son WY, Lee SW, Park SJ, Moon JH, Lee WD, Lim JH

Maria Infertility Hospital, Seoul, Korea

Objective: It has been suggested that *in vitro* maturation (IVM) of immature oocytes is a potentially useful treatment for women with high risk of OHSS. Qualitative changes, including zona hardening, occur in the zona pellucida during oocyte maturation *in vitro* that may reduce the fertilization rates using conventional IVF (DeFelici and Siracusa, 1982). Therefore, ICSI has been used routenly for induce the fertilization of oocytes matured *in vitro*. Recently, however, Chian *et al* (2000) reported that conventional IVF can also achieve the higher fertilization, suggesting that ICSI is not an essential for the fertilization of IVM oocytes. To demonstrate a more useful fertilization technique in matured oocytes derived from IVM/F-ETs cycles, the fertilization rate was compared with conventional IVF and ICSI.