I18 Study on the MAOA-uVNTR for Criminal Population in Taiwan

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After attending this presentation, attendees will pay attention that abnormal DNA may have strong relation to committing a crime.

This presentation will impact the forensic community and/or humanity by providing a study on criminal population for preventing the crime.

Monoamine Oxidase (MAO) A and B exist in the outer mitochon- drial membrane, where they play an important role in regulating levels of the oxidative metabolism of catecholamine and indoleamine neuro-transmitters. MAOA differs from MAOB in its higher activity toward serotonin and norepinephrine. MAO activity has been suggested to asso- ciation with certain psychiatric disorders or behavioral traits. MAOA and MAOB are encoded by two tightly linked genes that are arranged adjacently on the short arm of the X chromosome between bands Xp 11.23 and Xp11.4. A functional MAOA-uVNTR (variable number of tandem repeats) polymorphism, which is located 1.2kb upstream of the MAOA coding sequence, consisting of 30bp repeated sequences has been proven to have a significant effect on gene transcription.

Sabol et al. reported that, by performing genes fusion and tran- scription experiments of MAOA-uVNTR in three different cell lines, alleles containing 3.5 or 4 repeats (allele 2 and 3) of the 30bp sequence are expressed significantly more efficiently than alleles containing either 3 or 5 repeat (allele 1 and 4) sequences in MAOA promoter activity. Recently, the interesting finding of MAOA-uVNTR has been provoked several reports on the correlation of personality, aberrant behavior and psychiatric disorders. For example, Deckert et al. found that the longer MAOA-uVNTR allele (allele 2 and 3) were significantly more frequent than control samples in female patients with panic disorder in Germany and Italy. They suggest that increased MAOA promoter expression may be a risk factor for panic disorder in female patients. In a similar study, Schulze et al. evaluated the association of MAOA-uVNTR with major depressive disorder in unrelated patients of German descent. Their data suggest that an excess of high activity MAOA gene promoter alleles resulting in an elevated MAOA activity is a risk factor for major depressive disorder in females. Therefore, MAOA-uVNTR in the MAOA gene would be good candidates to consider the association between gene and violence.

The aim of the study was initially to investigate the role of MAOA- uVNTR as a biological marker in Taiwan's criminal population. Our results indicate the MAOA high activity promoter alleles appear more frequently in criminal population (N=286, allele 1: 49.65%; allele 3: 50.34%), comparing with control group (N=225, allele 1: 63.1%; allele 3: 36.9%).

Furthermore, it has been reported that Klinefelter's syndrome is not a rare sex chromosomal abnormality occurring with approximately the same frequency as Down's syndrome in the general population (one in 1000 male offspring) . Although they have normal male characteristics, the defects of infertility, gynecomastia, a tendency to be tall and thin with long legs, and some degree of mental deficiency are found in persons with Klinefelter's syndrome. Especially, they are found in rela- tively large numbers among the criminal population due to social mal- adjustment. Another aim of our study was to evaluate the frequency of appearing Klinefelter's syndrome in Taiwan¡¦s criminal population. We have examined 753 cases of criminals and found 3 probable cases with Klinefelter's syndrome (47, XXY) by using X-STR technique. The ratio of Klinefelter's syndrome in criminal group is higher than normal popu- lation (1/600~1/800) in Taiwan, but it shouldn't be regarded as that the persons with Klinefelter's syndrome are prone to commit crimes. We still need more investigations to sustain this hypothesis.

Monoamine Oxidase(MAO), MAOA-uVNTR, Klinefelter's Syndrome

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