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Research Paper

DISTRIBUTION OF 5-HTTLPR SEROTONIN TRANSPORTER POLYMORPHISM IN MOROCCAN POPULATION

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The distribution of 5-HTTLPR genotype of the serotonin transporter is variable and diverse by region and ethnicity. The main feature of the Moroccan population is its ethnic diversity. However, genetic studies on this population are very limited. Our objective was to determine the frequency of the 5-HTTLPR polymorphism in the Moroccan population. The study involved 100 healthy Moroccan subjects. Our results showed that the distribution of genotypes of polymorphism 5-HTTLPR was in equilibrium with the Hardy-Weinberg with a frequency of homozygosity II estimated at 52% and 20% DD. This frequency is intermediate between the western population and population sub-Saharan Africa.

Keywords: 5-HTTLPR genotype, Serotonin transporter, Moroccan population

INTRODUCTION

Genetic polymorphisms that influence serotonin (5-hydroxytryptamine, 5HT) neurotransmission are candidates for contributing to susceptibility to several neuropsychiatric and cardiovascular diseases. The allelic frequency of 5-HTTLPR polymorphism was evaluated in many populations (Asiatic, Europeans, American, etc.). In the Morrocan context, there was no study evaluating the frequency of allelic polymorphism 5-HTTLPR.

The objective of this work is to determine the allele frequency of these polymorphisms in the Moroccan population. This can be used as an epidemiological data in association studies with neuropsychiatric diseases.

MATERIALS AND METHODS

A total of 100 Moroccan voluntaries (49 Women and 51 Men) were enrolled in this work. Blood samples were collected after consent. The meaning of age of our participants was 44 years. Genomic DNA was extracted from peripheral blood leukocytes by standard phenol–chloroform method. Genetic analysis was carried with simple PCR.

Primers PF(5'ATGCCAGCACCTAACCCC

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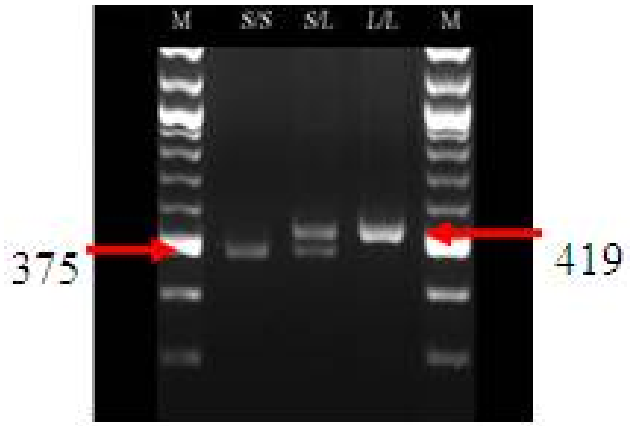
TAATGT3') and PR (5'GGACCGCAAGG TGGGCGGGA3') were used to amplify a product that was 375 base pair (bp) product for the 14-repeat (s) allele and a 419 bp product for the 16-repeat allele (Gelernter et al 1998). Applied Biosystems Veriti™ Thermal Cycler was used for deoxyribonucleic acid (DNA) amplification. The polymerase chain reaction (PCR) cycling conditions consisted of an initial denaturation for 2 min at 95°C, followed by 35 cycles of 95°C for 1 min, 62°C for 1 min, and 72°C for 1 min, and a final extension at 72°C for 4 min. Polymerase chain reaction products were electrophoresed on a 2% agarose gel and visualized under ultraviolet (Figure1). Statistical analysis was performed by chi-square test. Compliance to Hardy-Weinberg equilibrium for distribution of genotypes (with an error risk of 0.05) was examined using SPSS.

Table 1: Populations 5HTTLPR Allelic Frequency

Population	N	Genotypic Distribution (%)			Allelic Distribution (%)		References
		L/L	L/S	S/S	L	S	
ChinA	112	14,29	31,25	54,46	29,91	70,09	(Hong et al 2003) (4)
India	143	9,79	43,36	46,85	31,47	68,53	(Guhathakurta et al 2006) (8)
Japon	501	3,19	31,74	65,07	19,06	80,94	(Murakami et al 1999) (3)
Germany	301	35,88	47,18	16,94	59,47	40,10	(Klauck et al 1997) (9)
Europe	53	32,08	52,83	15,09	58,49	41,51	(Reneman et al 2006) (10)
British	35	22,86	48,57	28,57	47,14	52,86	(David et al 2005) (11)
Caucasians							
Moroccan pop.	100	52	28	20	66	34	Our study
Afro-American	85	54,12	35,29	10,59	71,76	28,24	(Williams et al 2003) (12)
South of Afr.	342	6140	33,92	4,68	78,36	21,64	(Luke Esau et al 2008) (2)

Figure 1: Determine the Frequency of the 5-HTTLPR Polymorphism in the Moroccan Population Using PCR



Note: M – Marker, 1. génotype S/S, 2. génotype L/S, 3. Genotype L/L.

RESULTS AND DISCUSSION

The results found that the frequency of allele Short (S) is about 34% and the allele Long (L) is 66% (Table 1). Several studies showed that the frequency of the allele (L) was varying in a decreasing gradient from the South Africa population (78.36%) to the Asian population with L allelic frequency of 19 and 29% respectively (Luke Esau et al., 2008; Murakami F et al., 1999 and Hong C et al., 2003). The European population has an intermediate allele frequency (L: 60%) (Jacob C et al., 2004) (Table 1). In Moroccan population, our results can be explained by data history. In fact, Morocco, as a north-west African country, was populated by Caucasian populations. It has been the site of important trade routes from the 11th century which contribute to the strengthening of ethnic mixing and gene flow between sub-Saharan Africa and Europe; Our frequencies (L = 66%,S = 34%) are located between African and European. These finding are in harmony with the hypothesis of the heterogeneity and genetic mixing of the Moroccan population (Paluku They-They T et al., 2010).

CONCLUSION

In conclusion, we can say that the results obtained concerning the distribution of 5-HTTLPR allele in the Moroccan population is intermediate between the African and the European population; this result is explained from a population point of view by the migration flow and the mixing of genes between these populations over time. In This study, we identified the allele frequencies of 5-HTTLPR polymorphism in the Moroccan population. It opens the prospect for association studies in different psychiatric diseases especially. To a better understanding of the pathological effect of various serotonin, further investigations should be carried in other polymorphisms of 5-HTTLPR.

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