

Frequencies of secretors and non-secretors of ABH group substances among Sudanese population

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Abstract

Background: The secretor gene (Se) is the gene that controls the presence of ABH and Lewis blood group substances to appear in soluble state in body fluids (e.g., saliva, semen, sweat, etc). According to the presence or absence of this gene the people are classified as secretors genotype (SeSe or Sese) and non-secretors (sese). Although the secretor gene prevalence is known internationally, especially in Caucasians, there is few if any information and literature regarding the prevalence of secretor status among African and Arab population so the present study aimed to determine the frequencies of ABH secretor status among the Sudanese population.

Materials and Methods: A total of 100 Sudanese families (566 apparently healthy individuals), all were residents of Khartoum City were investigated for the presence of salivary ABH substances during the period between January 2012 and April 2013. Saliva samples were collected and analysed by haemagglutination inhibition test

Result: The gene frequencies for Se and se were 0.219 and 0.781 respectively, while the phenotype prevalence rates for (SeSe), (Sese), and (sese) were 12% (68/566), 19.8% (112/566) and 68.2% (386/566) respectively.

Conclusion: The prevalence of the secretor gene in Sudan is greatly different from the rest of the world and that might be due to different ethnic background involved in this study.

Key words: Frequencies, ABH secretor status, population

{**Citation:** Abdel Rahim Mahmoud Muddathir, Imad Fadl-Elmula, Ream Elzain Abdelgadir, Abdel Salam Ibrahim Bashir. Frequencies of secretors and non-secretors of ABH group substances among Sudanese population. American Journal of Research Communication, 2015, 3(4): 127-131} www.usa-journals.com, ISSN: 2325-4076.

Introduction

The secretor gene (Se) is the gene that controls the presence of ABH and Lewis blood group substances to appear in soluble state in body fluids (e.g., saliva, semen, sweat, etc). It is inherited as an autosomal dominant fashion and normally mapped to locus 19q13.3 [1]. According to the presence or absence of this gene the people are classified as secretors genotype (SeSe or Sese) and non-secretors (sese). Homozygosity for null alleles at this locus occurs in approximately 20% of most population [2] and yields the non-secretor phenotype, which characterized by absence or substantial reduction in the amounts of soluble A, B and H substances in the saliva.

In Caucasian population about 80% are secretors (genotype SeSe or Sese) and 20% are non secretors (genotype sese) [3], although the secretor gene prevalence is known internationally, especially in Caucasians. There is few if any information and literature regarding the prevalence of secretor status among African and Arab population, hence the study aimed to determine the frequencies of ABH secretor status among the Sudanese population.

Material and Methods

Materials

Demographic data were obtained randomly from the members of 100 Sudanese families (566 apparently healthy individuals) resident in Khartoum city. Of these, 127 were female and 348

were male; Age ranged between 2-70 years, mean 36 years. All individual lived in Khartoum province during January 2012 and April 2013. Ethical clearance was obtained from Al Neelain Ethical Review Board and informed consents were signed by all subjects.

To determine the secretory gene phenotype of this population 5 ml of saliva was collected from each individual.

Methods

Collection and processing of Saliva

After proper rinsing of mouth with distilled water and discarding first few drops, 2 ml of saliva was collected in a dry sterile universal container. For processing the saliva was transferred to a glass test tube and placed in a boiling water bath for 10 minutes to destroy the enzymatic activity which would inactivate the ABH substances and will also destroy the anti-A and anti-B which are often present in secretions. It was then cooled and centrifuged for 5 minutes at 1000 g. then supernatant was collected and diluted with an equal volume of normal saline to detect the ABH secretor status using haemagglutination inhibition method [4].

Results

The frequency of ABH non-secretor status showed higher percentage (68.2%) compared with secretor status (31.8%) among the studied population. Furthermore the gene frequencies for Se and se were 0.219 and 0.781 respectively, the gene frequency have been calculated using the gene frequency equation which state that $(2 \times \text{no of homozygous} + \text{no of heterozygous}) / 2 \times \text{no of the total population}$ while the phenotype prevalence rate for (SeSe), (Sese) and (sese) were 68(12%), 112(19.8%) and 386(68.2%) respectively. Among females the

prevalence of secretor and non-secretor were 31.7% and 68.3% while in males were 32.1% and 67.9% respectively (Table 1).

Table 1 .Contingency table for secretor and non-secretor

Gender	Secretor No (%)	Non-secretor No (%)	Total
Male	70 (32.1)	148 (67.9)	218
Female	110 (31.6)	238 (68.3)	348
Total	180 (31.8) 	386(68.2)	566

Discussion

The secretor person's genotype is either (SeSe or Sese) genotype, but the non-secretor has (sese) genotype only so in order to determine the genotype of the parents or their offspring, the results have been interpreted by looking for the obtained secretor status at the whole family. The secretor person's genotype is either (SeSe or Sese) genotype, but the non-secretor have (sese) genotype only, so the genotype result will be one of the three options, namely (SeSe), (Sese) or (sese). Therefore if both parents are non secretor (sese) then their offspring will defiantly be also non-secretors (sese). Secondly, if one of the parents is a secretor and the other is a non-secretor the presence of a non-secretor offspring will ensure that the genotype of the secretor parent is heterozygous (Sese) and the third possibility if the parents and their offspring are secretors and in this case we have one of the two possibilities either the parents and the offspring have a homozygous genotype (SeSe) or a heterozygous

genotype (Sese) and this phenomena appeared only in twelve families of our studied population.

The prevalence of the secretor gene in Sudan is greatly different from Caucasians [3], Jewish [5], Spanish population[6], and that might be due to different ethnic background involved in this study. There is need for further study to identify the risk predisposition of the non secretor status among our population to cancer of the stomach and duodenal since several reports have pointed to this causative association in other parts of the world.

Acknowledgments

The authors thank all the student volunteers from College of technological Sciences and their family, who participated in this study. We are also thankful to the Arkweet medical centre laboratory especially his director Khalid Mohamed Elhassen for providing the laboratory facility to do this work.

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