International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Evaluation of Salivary Secretory Status of ABO Blood Group Antigens using Hemagglutination Inhibition Method

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Abstract: ***ABO blood grouping is still a helpful test procedure in the early phases of criminal investigations, even though DNA profiling has emerged as the primary tool for individualizing biological evidence. Because a person's blood type remains constant throughout their lives, blood is regarded as one of the most crucial materials for crime scenes and disaster scenes. Antigens are produced from the body in a variety of ways in addition to blood, including saliva, nasal secretions, tears, semen, urine, sweat, etc. 40 Samples were used in the investigation and hemagglutination inhibition test was performed to detect the secretor status of blood. From the present study the percentage breakdown for each group of secretors and non-secretors assuming that A group has 80% secretors and 20% non-secretors, B group has 73.3% secretors and 26.7% non- secretors, AB group has 100% non- secretors, and O group has 90% secretors and 10% non- secretors. According to the study, blood group O has a higher secretory rate (90%) than other blood groups.***

Keywords: Saliva, ABO blood group, Secretor, non-secretor, Hemagglutination-inhibition method

1. Introduction

The term “blood group” refers to the entire blood group system which contains red blood cell antigens which are specifically controlled by a series of genes which can be linked closely to the same chromosome or can be allelic. Karl Landsteiner discovered the ABO blood type system in 1990. Before DNA typing was widely used, the ABO blood group system was a crucial component for forensic serological testing of blood and other fluids. Eighty percent of people are secretors, which mean that antigens found in blood are also present in other bodily fluids like saliva.

Those who secrete blood group antigens in bodily fluids such saliva, sweat, tears, semen, and serum are referred to as ABO secretors; those who do not disclose their antigens are referred to as non-secretors. For being a "secretor" or "non-secretor," this is known as your "secretor status." An individual classified as a "secretor" will release antigens specific to their blood type. Individuals belonging to group O, for instance, will release the H antigen, while those in group A will release both the A and H antigens, and so on. It goes without saying that a "non-secretor" or weak secretor will have little to no antigen in their body fluids. Individuals inherit their secretor status and ABO blood group separately.

The A, B, and H genes carry the ABO blood group antigens, whereas the Se (Se/Se & Se/se) gene is in charge of the secretor state. A person is not a secretor if they inherit the recessive gene se/se with the exception of cerebrospinal fluid (CSF). Saliva is one of the most abundant and readily available sources. For the ABO blood group, the H, Fucosyltransferase 1 (FUT 1) gene codes. The ability of the secretor, the Fucosyltransferase 2 (FUT 2) gene, to produce blood group antigens into bodily fluids and secretions is determined by its interaction with the FUT 1 gene.

Secretor status can be used to identify patients who may be at High risk of developing specific diseases as well as to resolve ABO inconsistencies in individuals whose blood group cannot be determined by conventional blood grouping. To conclude the purpose of the current study was to assess the salivary secretory status of ABO blood group antigens.

2. Method

This study was conducted in Department of Pathology, Total Forty (40) Saliva samples from different blood group individuals were taken and analysed. Collect 3-5ml saliva in a clean wide mouth container after rinsing the mouth. To encourage salivation, ask the patient to chew a rubber band or chewing gum.

2.1 Blood collection and grouping

For blood grouping one milliliter of venous blood was taken by syringe and transferred to EDTA containing tubes. Immediately after collection, blood group was determined by agglutination method using Commercial antisera.

2.2 Preparation of saliva and Analysis

Test tubes with saliva were placed in boiling water bath for 10 minutes minute to inactivate enzymes and allowed to cool. Cooled test tubes were centrifuged for 10 minutes at 3000 rpm. After discarding the supernatant, clear saliva was collected using pipette. For control test tube we added one drop of saline in each.

To test for secretor status, an inhibition or neutralization test is done using saliva. ABH antigens are glycosphingolipids or glycoproteins. The principle of the test is that if ABH antigens are present in a soluble form in a fluid (e.g., saliva) they will neutralize their corresponding antibodies and the antibodies will no longer be able to agglutinate red cells possessing the same antigens. Therefore, the presence of a negative result showed the positive Secretion status.

3. Result

3.1 Distribution of secretors among ABO blood groups

Blood Group	*Frequency*	*Secretor*	*% of Secretion*
A Group	10	08	80
B Group	15	11	73.3
AB Group	05	-	0
O Group	10	09	90

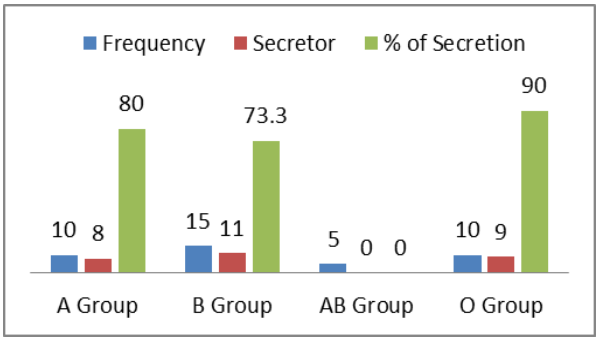

Figure 1: Distribution of Secretors among ABO blood groups

3.2 Distribution of non-secretors among ABO blood groups

Blood Group	*Frequency*	*Non Secretor*	*% of Non-Secretion*
A Group	10	02	20
B Group	15	04	26.7
AB Group	05	05	0
O Group	10	01	10

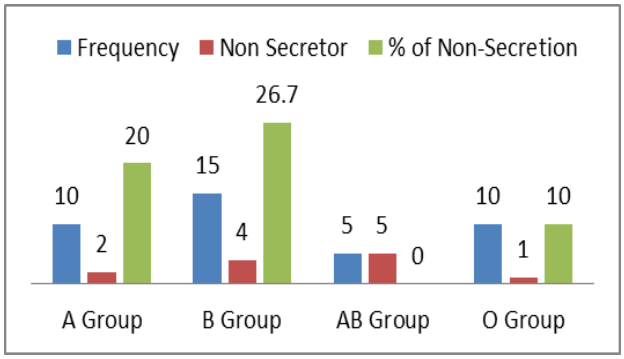

Figure 2: Distribution of Non Secretors among ABO blood groups

4. Conclusion

This prospective study found saliva is not only a protective fluid, important for oral pH maintenance and have antifungal, antiviral system in oral cavity but considering its secretory status of blood antigens it is valuable and significant for blood group determination in crime cases In the present study, A group has 80% secretors and 20% non-secretors, B group has 73.3% secretors and 26.7% non-secretors, AB group has 100% non-secretors, and O group has 90% secretors and 10% non-secretors. According to the study, blood group O has a higher secretory rate (90%) than other blood groups. Hemagglutination inhibition method is a better method in the determination of secretor status from saliva. This method may be helpful in identification of individual in medico legal cases.

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