Sudan University of Sciences and Technology

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The Prevalence of Secretor Status among Students of Almanagil University of Science and Technology

معدل انتشار إفراز فصائل الدم في سوائل الجسم وسط طلاب جامعة المناقل للعلوم والتكنولوجيا

A dissertation Submitted for Partial Fulfillment of the Requirements of M.Sc Degree in Medical Laboratory Sciences

(Hematology and Immune hematology**)**

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الآية

بسم الله الرحمن الرحيم

قال تعالي :

إِنَّمَا أَمْرُهُ إِذَا أَرَادَ شَيْئًا أَن يَقُولَ لَهُ كُن فَيَكُونُ ﴿٨٢﴾

فَسُبْحَانَ الَّذِي بِيَدِهِ مَلَكُوتُ كُلِّ شَيْءٍ وَإِلَيْهِ تُرْجَعُونَ ﴿٨٣﴾

صدق الله العظيم

سورة يس(الايات 82-83)

Dedication

To who taught me how to be available number in community

My father soul…

The essence of the life, meaning of humanity and everlasting warmth

For my mother.

To who supply me with strength to achieve my aims

My brother walid.

To all my love sisters, brothers ,my husband, and my daughters.

To all my teachers and friends.

To my roselte of life my sun Mohammed

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Firstly I thank ALLAH who provide me the power to accomplish this project.

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for my Colleagues support us in coordinator and good cooperation.

For Almangil university students from whom I was collected the samples of this research.

Abstract

The secretion of the ABH antigen in body fluid play important role in body defense. Secretors reduce incidence of diseases of mouth, esophageal Stomach cancer, epithelial dysplasia .

The aim of this study is to determine the prevalence of secretor status in Almanagil university students during period 20 .2June.2022 *to*10.6.2022 in the lab of medical laboratory collage .The study was conducted on hindered and fifty students, forty three samples from males and one hundred seven from female. their age between 18-22 years .

samples collected randomly from students which is capillary blood for blood grouping and saliva to detect the prevalence of secretor status among each gender and blood group which was analyzed manually by slide method for ABO grouping and slide method (haemagglutination inhibition) for secretors status ,The data analyzed statistically by SPSS version 20 using chi square and the result as flow:-.

64% was secretors and 36% non secretors in study population ,according to gender the prevalence of secretors in females was 46.7 % higher than males which was17.3, prevalence of secretor among blood group found the blood group O (31.3%SE) ,(19.3 % se)was highest prevalence then A blood group was (18%SE),(6%se) blood group B was (13.3%SE),(9.3%se) and in AB blood group was (1.3% SE) ,(1.3%se).

This study concluded that secretors are more prevalent in Sudanese population and have an added degree of protection against the environment,parteculary with respect to microoganisms and cancer.

مستخلص البحث

يلعب إفراز فصائل الدم في سوائل الجسم دورا مناعيا في حماية الجسم من دخول الإحياء الدقيقة الممرضة وكذلك حماية الجسم من سرطانات الجهاز الهضمي بما في ذلك الفم ,المرائي , المعدة والأمعاء .

تهدف هذه الدراسة لمعرفة نسبة الأشخاص المفرزين لفصائل الدم في سوائل الجسم في الفترة من2021.2—10.4.2021 في طلاب جامعة المناقل للعلوم والتكنولوجيا .أجريت هذه الدراسة علي 150 عينه من الطلاب40 من الزكورو107 من الإناث وتتراوح أعمارهم من18–22 سنه حيث أخذت العينات بطريقه عشوائية من الدم الطرفي لمعرفة فصيلة الدم وعينه من اللعاب لاختبار إفراز هذه الفصيلة في اللعاب والبيانات الناتجة تم تحليلها عن طريق برنامج تحليل البيانات الاحصائيه للحزم الاجتماعية النسخة العشرين باستخدام الاختبار الفرضي مربع كأي وكانت النتائج كما يلي :-

علي مستوي مجتمع الدراسه64 % مفرزين و36% غير مفرزين,ووجد إن معدل الإفراز عند الإناث (46.7%) و الرجال(17.3%) ووجد اعلي إفراز للانتيجينات في الأشخاص الذين فصائلهم(0) (31.3%SE) (19.3 %se) ثم فصيلة الدم A (18 %SE)، (6.0%se) فصيلة الدم B (13.3%SE) (9.3% se) وفصيلة الدم AB(1.3%SE) (1.3 % se.)

الخلاصة: أثبتت هذه الدراسة إن إفراز فصائل الدم في السودانيين تشكل نسبه مرتفعه وبالتالي تعزز المناعة ضد أمراض وسرطانات الجهاز الهضمي .

List of contents

Chapter Three Materials And Methods

CHAPTER Four Results

C**HAPTER Five Discussion, conclusion and Recommendation**

List of tables

List of abbreviations

Symbols	**Meaning**
CSF	Cerebral spinal fluid
SE	Secretor
FUT1	Fucosyl trans ferase 1
FUT2	Fucosyl trans ferase2
FUT3	Fucosyl trans ferase3
leb	Lewis b
lea	Lewis a
GIT	Gastro intestinal tract
RBSc	Red blood cells
LADII	Leukocyte Adenosine Deficiency syndrome
GDP	Glucose diphosphate
SCD	Sickle cell disease

CHAPTER I

Introduction

Blood group forms a comparatively small field of study but they have an important place in genetics, Clinical medicine and immunology. They are available tools in forensic sciences

The blood groups have been discovered by Landsteiner in 1901, a total of 30 blood group systems have been described .each system is a series of red cell antigens, determined either by a single genetic locus or by very closely linked loci.(**Deice and Lewis, 2017**).

Almost all blood group genes are expressed as co dominant antigens. In 1926 it was found that A and B antigens were not only present on red cells but they were also present in soluble form in saliva.

In 1930, Putkonen noted that a person could be either secretor or non-secretor with respect to his genetic ability to secrete ABH blood group substances in secretions. .

It is now known that ABH blood group antigens (A, B and H) are found on red blood cells, lymphocytes, platelets, tissue cells, body fluids (except CSF) and in secretions.

The ABH antigens present in red cells have been demonstrated in most tissues of the body, including platelets and leukocytes. The ability to secrete soluble ABH antigens is controlled by the secretor (Se) gene that is separate from the ABH system. About 80% of the population have the dominant secretor (Se) gene that controls one's ability to secrete soluble ABH antigens. These individuals (secretors) distinctly have soluble ABH substances in their plasma and secretions (i.e., saliva, semen, and sweat).(**Reinholdmunker,Md& et al)**

Basic differences between secretors and non-secretors are qualitative and quantitative components of their saliva, mucus and other body secretions. if people are secretor they will

secret antigens according to their blood group :for example group B people will secret B antigen. ABO antigen secretion is controlled by secretion gene (SE). **(Saboor M, et al, 2014)**
Approximately 80%of Caucasian people possess the Se gene and are secretors, the other 20 % are non-secretors. **(Red GE &et al , 2018).**
and the frequency of these gene is 50% in most ethnic group, but Aboriginal Australians, Inuit, and some Native American frequency of nearly 100%, while the frequency is only 22% in south India**.(Geoff Daniels,2013)**

Expression of the antigens in the Lewis blood group is also affected by secretor status: non-secretors cannot produce the Le(b)antigen **(Jeffrey McCullough ,2016)** .

Secretor status can be determined through genotyping or through serologic methods. In the serologic method, the person's saliva is boiled, then added to reagents containing antibodies against the A, B, and H antigens. Red blood cells expressing these antigens are then added to the saliva-reagent mixtures. If the person is a secretor, the antibodies will bind to the antigens in their saliva rather than the red blood cells, and will not cause red blood cells to agglutinate.
(Geoff Daniels,2013)

Secretor status testing was historically used in forensic science, but this has been made obsolete by advances in DNA testing. **(Suzanne Bell (2009).**

1.2 Rationale

The ABH antigens on the cell surface (secretors) act like gate keepers and determine what is allowed into the body for nourishment and what is foreign to the body. In other words they distinguish from friend and foe. Hence, non-secretors have a higher incidence of autoimmune disorders, diseases of mouth, gastrointestinal tract, cardiovascular disorders, esophageal cancer, and epithelial dysplasia as compared to secretors. And also Non-secretors have a weak immune system against attack of foreign invaders (micro-organisms and certain agents), as they are allowed to enter and then dealt with in a more delayed due to secretor status variability it is highly recommended that patients with complex conditions are screened for their secretor status. This enables the clinician gain a deeper understanding of their condition and their predispositions So that further modifications can be made since several report has pointed to this causative association in other parts of the world This enhance us to make studies to identify the risk predisposition of the non secretor status among our population.there are previous study done in secretor status and conducted in family and we known that the SE gene is inheritance from parents to spring if there was many families non secretors it cause different in result ,hence the study aimed to determine the frequencies of ABH secretors status in Sudanese population among Almanagil university student .

1.3 Objective of This Study

General objective:-

To determine The Prevalence of Secretor Status in Students of Almanagil University of Science and Technology

Specific objectives:-

1. To determine the prevalence of secretor status among each gender.
2. To determine the prevalence of secretor status among each ABO blood group.

CHAPTER II

Literature Review

2.1 ABO System:-

Discovery of the ABO system by Landsteiner marked the beginning of safe blood transfusion .the ABO antigens although most important in relation to transfusion, are also expressed on most endothelial and epithelial membranes and are important histocompatibility antigens. **(Deice and Lewis, 2017).**

2.1.1 ABO Antigens and Encoding Genes:-

There are four main blood groups: A, B , AB, and O **,** the expression of ABO antigens is controlled by three genetic loci: ABO located on chromosome 9 and FUT1(H)and FUT2(Se),both of which are located on chromosome 19.the genes from each locus are inherited in pairs as mendelian dominant each genes code for a different enzyme (glycosyltransferase) .which attaches specific monosaccharide's onto precursor disaccharide chains. there are four types of disaccharide chains known to occur on red cells, the type one disaccharide chain is found in plasma and secretions and is substrate for the FUT2(Se)gene ,where as types 2,3 and 4 chains are only found on red cells and are substrate for the FUT1 (H)gene. FUT2(dominant allele Se). **(Deice and Lewis, 2017)**

The Se gene codes for the production of the trans- ferase, L-fucosyltransferase. This enzyme promotes the transfer of L-fucose to the terminal galactose of type 1 chains and forms H substance in the secreted fluids. The A and B transferase enzymes are found in the secretions of A and B persons regardless of their secretor status. Therefore, when the H substance is found in secretions, A and/or B antigens will be formed if the correspond- ing transferase enzymes are present. (**Sheryl A. Whitlock , 2010).**

Blood group antibodies

The ABO blood group antigens are unusual in that naturally occurring antibodies occur in the plasma of subjects who lack the corresponding antigen, even if they have not been transfused or

been pregnant .The most important of these natural antibodies are anti-A and anti-B. They are usually immunoglobulin M (IgM), and react optimally at cold temperatures (4°C) so, although reactive at 37°C, are called cold antibodies. Immune antibodies develop in response to the introduction – by transfusion or by transplacental passage during pregnancy – of red cells possessing antigens that the subject lacks. These anti- bodies are commonly IgG, although some IgM antibodies may also develop, usually in the early phase of an immune response. Immune antibodies react optimally at 37°C (warm antibodies). Only IgG antibodies are capable of transplacental passage from mother to fetus and the most important immune antibody is the Rh antibody, anti-D.(**A. Victor Hoff brand ,2016)**

2.2 Secretors and non-secretors:

The ability to secrete A ,B and H substances in a water - soluble form is controlled by Secretors have H substance in the saliva and other body fluid together with A substances, B substances or both , depending on their blood group .only traces of these substances are present in the secretions of non-secretors ,although the antigen are expressed normally on their red cells and other tissues. an individual's secretor status can be determined by testing for ABH substance in saliva. (**Deice and Lewis, 2017**)

2.3 Lewis System:-

The Lewis antigens(lea and leb)are located on soluble glycosphingolipids found in saliva and plasma and are secondarily absorbed into the red membranes from the plasma. The le gene at the FUT3(LE) locus is located on chromosome 19 and codes for afucosyltransferase ,which acts on an adjacent sugar molecule to that acted on by the se gene . Where se and le are present, the leb antigen is produced; and where le but not se is present, lea is produced; and where le is not present, neither lea nor leb is produced. (**Deice and Lewis, 2017**)

2.3.1 Lewis Antigens

In 1948 Grubb [167] made the observation that people with Le(a+) red cells were mostly non-secretors of ABH. Subsequently, the following general rule has been established for red cell

Lewis phenotypes in adults: Le(a+ b–) red cells come from ABH non-secretors; Le(a–b+) red cells come from ABH secretors; Le(a–b–) red cells come from ABH secretors or non-secretors. Grubb [168] later proposed a theory to explain the inheritance of the Lewis groups which, following family investigations, was confirmed and expanded by Ceppellini [169]. Basically, the theory of Grubb and Ceppellini states that the presence of Le a in saliva is controlled by one locus (now called LE or FUT3) and thus Leb might result from an interaction between the products of the Lewis and secretor genes. People with both Lewis and Secretor (Se) genes have

Lea and Leb in their saliva and Le(a–b+) red cells, whereas those with a Lewis gene, but homozygous for the non-secretor al- lele (se), have only Lea in their saliva and Le(a+ b–) red cells. The Lewis and Secretor loci were shown by family studies to be genetically independent [170], al- though they are on the same chromosome The theories of Grubb and Ceppellini have now mostly been verified by biochemical evidence, al- though the situation is more complex in people from Eastern Asia and the Southern Pacific region, where a fourth red cell phenotype, Le(a+b+), is common.(**Geoff Daniels , 2002**)

2.3.2. Biochemically Related Blood Group Systems:

H, Lewis and I

H antigen is the biochemical precursor of A and

B (see Fig. 3.2). It is synthesized by an a1,2-fucosyltransferase, which catalyses the transfer of fucose from its donor substrate to the terminal Gal residue of its acceptor substrate. Without this fucosylation neither A nor B antigens can be made . Two genes, active in different tissues, producea1,2-fucosyltransferases:

FUT1, active in meso-dermally derived tissues and responsible for H on red cells, and FUT2, active in endodermally derived tissues and responsible for H in many other tissues and in secretions. Homozygosity for inactivating mutations in

FUT1leads to an absence of H from red cells and therefore an absence of red cell A or B, regardless of ABO geno-type. Such mutations are rare, as are red cell H-deficient phenotypes. In contrast, inactivating mutations in FUT2are relatively common and about 20% of Caucasians

(non-secretors) lack H,A and B from body secretions despite expressing those antigens on their red cells. Very rare individuals who have H-deficient red cells and are also H non-secretors (Bombay phenotype) produce anti-H together with anti-A and -B and create a severe transfusion problem.

Antigens of the Lewis system are not produced by elytroid cells, but become incorporated in to the red cell membrane from the plasma. Their corresponding antibodies are not usually active at37°C and are not generally considered clinically significant. Lea and Leb are not the products of alleles. The Lewis gene (FUT3) product is an ABO antibodies seldom cause hemolytic disease of the newborn and when they do it is usually mild. The prime reasons for this are (i) IgM antibodies do not cross the placenta; (ii) IgG ABO

antibodies are often IgG2, which do not activate complement or facilitate phagocytosis; and (iii) ABO antigens are present on many fetal tissues

and even in body fluids, so the hemolytic potential of the antibody is greatly reduced.

(Michael F.*et al* 2005)

2.3.3 Disease Association With Lewis Antigens

Lewis antigens may be lost from RBCs as a result of infectious mononucleosis complicated with hemolysis, severe alcoholic cirrhosis, and alcoholic pancreatitis.

Patients with fucosidosis may have increased expression of Lewis antigens in their saliva and on their RBCs. Glycoconjugates with Leb activity mediate attachment of Helicobacter pylori.

a major causative agent of gastric ulcers, to gastric mucosal epithelium. RBCs from patients with leukocyte adhesion deficiency (LADII) syndrome are Le(a b), and are Bombay phenotype, due to a mutation in the GDP- fucose transporter.

Severity of SCD and risk of ischemic heart disease may be increased in patients with the Le(a b) phenotype. Renal graft survival is inferior in patients lacking Lewis antigens, suggesting that Lewis antibodies may play a role in graft rejection.(**Marion E Roid *et al* 2004**) .

2.3.4 Why is secretors testing necessary?

- These ABH antigens on the cell surface (secretors) act like gate keepers and determine what is allowed into the body for nourishment and what is foreign to the body. In other words they distinguish from friend and foe .(**poonam woike ,et al (2016)**
- Non-secretors on the other hand, have a weak immune system against attack of foreign invaders (micro-organisms and certain agents), as they are allowed to enter and then dealt with in a more delayed but more sophisticated fashion .
  (**poonam woike ,et al (2016)**
- Saliva of ABH secretors contains additional carbohydrate compounds in the mucin that aggregate certain bacteria and decrease their activity. Non-secretors have high incidence of diseases of mouth, esophageal cancer, epithelial dysplasia as compared to secretors ABH soluble substances in intestinal secretions increase the brush border hydrolase enzyme activity that has significant effects on bacteria and lectin adherence to the microvilli of the intestine.
- Soluble ABH substances in intestine prevent the attachment of H. pylori to the gut wall and decrease the incidence of H.pylore infections.
- ABH secretor status is also important for the growth of normal flora which is responsible for the normal functioning of gastrointestinal tract. It has been found that some bacteria in the GI tract produce ABH degrading enzymes and use ABH substances for constant food supply. Bacteria capable of degrading blood group "B" antigen produce enzymes that allow them to detach the terminal alpha-D-galactose and use these sugars for food. Blood group "A" degrading bacteria have similar capability with respect to N-acetylgalactoseamine. (**Saboor M, et al. (2014))**
- On the other hand absence of ABH substances in intestinal and urogenital tract secretions allow microorganisms adherence and increase the risk of duodenal ulcer, celiac disease, urinary tract infections and persistent candida infections. **(Saboor M, et al. (2014**));

CHAPTER III

Materials and Methods

3.1 Study Area:-

The research was a cross sectional study conducted for the evaluation of ABH secretor and non-secretor status in Almanagil city which is located in Aljazeera state in the Sudan.

The study conducted in the period from February 2021- to June2022 .included 150 student at defined age 19-23 old

3.2 Study Population :-

This study done in Almanagil university of science and technology Sudan and their ages between 19-23 years old.

3.3 Sample Size:-

Hundred and fifty samples were enrolled in this study, forty three samples from males and one hundred seven from female..

3.4 Sample Collection:-

By finger prick under sterile condition three drops of a capillary blood from each student is collected and placed immediately on a clean slide and then collected from same student about 2 ml of saliva in a dry , sterile containers.

3-5 Materials and Methods :-

3.5.1 ABO Blood Group Reagent:-

Commercial prepared Anti sera of A, B , D are used for detection of blood groups in slide method ,This anti sera contain monoclonal antibodies of immunoglobulin class IGM as their reactive component. the Properties of this monoclonal antibodies in sera clone-anti A- anti B agglutinate in a saline and are reactive at room temperature and used in slide, tile and tubes test.

3.5.2 ABO Grouping:-

3.5.2.1 Principle:-

Antigen –antibody reaction ; in which known antibodies are used to detect unknown antigens on red cells surface.

3.5.2.2 Slide method:-

Commercial anti-A _anti B _and anti D was used in the detection of blood grouping .The

3.5.2.2.1procedure:-

On a clean slide we placed 3drops of sample ,Then added anti A _anti B_ anti D to each drops and mix well by wooden stick , Read the reaction by the evidence of agglutination present of specific antigen macroscopically with in 5 min.

3.6.1Secretors Status Determination:-

3.6.2 Principle:-

The antigen in saliva reacts (as neutralized) with their corresponding antibody .there for no free antibody is available to react with the antigen on the reagent RBCs used in the test. This negative reaction means the presence of ABH- soluble antigens and indicates that the individual is a secretor.

3.6.3 Methods:-

3.6.4 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. **(Muddathir, et al., 2015)**

1: 32 dilution was used for anti-sera A and B and 1:8 was used for anti-sera H. (**Poonam. Woike, et al 2016) (**undiluted saliva contain non specific glycoprotein that can inhibit anti sera and lead to incorrect result) . one drop of diluted anti sera added to an appropriately labeled tube anti-B, anti-A and H with a drop of diluted saliva and incubated for 30 min then Transferred one drop of the incubated antibody/ saliva / saline mixtures to another test tubes .and added one drop of 3% suspension group A cells ,B cell and O cell to test tubes .according to corresponding blood groups Mix thoroughly. Incubated at room temperature for 1-- 1 ½ hours. Read the result macroscopically.

3.6.5 Control:-

-one drop of saline is used in place of diluted saliva as negative control .and-saliva from known secretor and non secretor was tested in parallel with test saliva.

3-6-6 Interpretation of Result:-

In Non Secretor observe Agglutination of RBCS by anti sera saliva mixtures and in Secretor No Agglutination of RBCS by anti sera saliva mixtures.(as result of Neutralization reaction).

3.7. Data analysis

The data was computed and analyzed to obtain the prevalence of secretors using statistic package for social science (SPSS) program version 20.

The statistical analysis was performed by using chi squire crosstab.

CHAPTER IV

Results

4.1 .Description of study population

This study conducted in Almanagil university on hindered and fifty subject, in a period from February to June 2022 in serological lab of medical laboratory collage .

The study aimed to determined prevalence of secretor status among the student .from each student collected capillary blood sample and saliva ,the data obtained is analyzed by SPSS version 20 and the result as flow:-

The study was included 43 male and 107 females show in table 4.1.at the level of study population there were 96 (64%) secretor and 54 (36%) non secretor. and table 4.2 show the secretors among genders ,26(17.3%) males secretors and 17 (11.3%) non secretors

In females 70 (46.7%) secretors and 37 (24.7%) non secretors ,the (table 4.4) show the secretors among blood groups, the O blood group was high incidence of secretors which was 47 (31.3%) and non secretors were and 29 (19.3%) non secretors, the second was A blood group 27 (18%) of secretors and 9(6%) non secretors ,in B blood group the secretors were 20 (13.3%) and 14 (9.3%) non secretors and the minimum and equal prevalence of secretors and non secretors in AB blood group 2 (1.3%).

Table 4.1 Frequency and Percentage of Secretors and non Secretors Among Study Population.

Secretor Status	Frequency	Percent
Secretor	96	64.0 %
Non secretor	54	36.0%
Total	150	100.0%

Table 4.2 Frequency and percentage of Secretors and non Secretor in Gender.

Gender		Secretor	Non Secretor	Total
MALE	Count	26	17	43
	% of Total	17.3%	11.3%	28.7%
FEMALE	Count	70	37	107
	% of Total	46.7%	24.7%	71.3%
Total	Count	96	54	150
	% of Total	64.0%	36.0%	100.0%

Table 4.3 Distribution of Secretors and non Secretors in Regard to Blood Groups.

Blood group		Secretor	Non secretor	Total
O	count	47	29	76
	% of total	31.3%	19.3%	50.7%
A	Count	27	9	36
	% of Total	18.0%	6.0%	24.0%
B	Count	20	14	34
	%of Total	13.3%	9.3%	22.7%
AB	Count	2	2	4
	%of total	1.3%	1.3%	2.7%
	% of Total	64.0%	36.0%	100.0%

CHAPTER V

Discussion, Conclusion and Recommendations

5.1 Discussion

This is an analytical of cross sectional study that aims to measure the prevalence of secretors status in Almangil university students on 150 subject 43 male and 107 female .the samples collected and analyzed in serological lab of the university.
In this study found the secretors were 64% and the non secretors were 36% this results similar to results of study conducted in Pakistan by Muhammad Saboor and et al 2014 in which the secretors were 64.4% and non secretors were 35.6 % while it was different to study conducted in Sudan by Muddather and et al 2015 in which the results were 31.8% secretors and 68.2% were non secretors .it thought that the different was come from the study population; in Muddether ,s study population was families in Khartoum city and we known that the SE gene is inheritance from parents to spring if there was many families non secretors it cause different in result.

The result of this study in prevalence of secretor in gender (females and male) tow third was secretor respectively that agree with previous study of saboor ,s study that mention earlier .while disagree with study of Abdel Rahim .M, and et al that mention above which were result is third of male and female are secretors .result was agree in the prevalence of secretor in blood group O 61.8% , A 75%, and AB 50% with secretor of Muhammad Saboor blood groups secretors O, A ,AB and disagree in secretor of blood group B which in this study was 58.8% and Saboor's study was79.5% .

5.2Conclusion

This study is concluded to that secretors are more prevalent in Sudan and have an added degree of protection against the environment,parteculary with respect to microoganisms and lectins. is also helpful to identify weaker varient of ABOgroup it,s important to know your secretor status as identifying the outcome of this important gene can deramaticlly enhance the result of personalised medisine.

5.3 Recommendation

The determination of secretor gene by PCR (polymerase chain reaction) because the collection and processing of saliva sample so difficult.

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Appendix (1)

Reagents:

Commercial prepared Anti sera of A, B , D are used for detection of blood groups in slide method ,This anti sera contain monoclonal antibodies of immunoglobulin class IGM as their reactive component. the Properties of this monoclonal antibodies in sera clone-anti A- anti B agglutinate in a saline and are reactive at room temperature and used in slide, tile and tubes test.

Saliva supernatant was collected and diluted with an equal volume of normal saline to detect the ABH secretor status using haemagglutination inhibition method ,undiluted saliva contain non specific glycoprotein that can inhibit anti sera and lead to incorrect result .

1: 32 dilution for anti-sera A and B and 1:8 dilution for anti-sera H .which are used to detect of secretor of ABH in saliva ,this dilution offer appropriate neutralization.

Appendix (2)

Questionnaire

Sudan University of Science and Technology

College of Graduate Studies

Department of Hematology

Study for determination The Prevalence of Secretor Status in Students of Almanagil University of Science and Technology

-Name:

-Age:

-Gender:

-ABO group:

-Secretor:

-Non Secretor

-Date: