

## METHODS OF STAPHYLOCOCCUS AUREUS EMPHASIZING

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### REVIEW, RESEARCH ARTICLE

#### Abstract

*Staphylococcus aureus* is a gram-positive bacteria that causes a great variety of clinical diseases. The infections caused by this pathogen agent are frequent in the media taken in the community but also in those taken in the hospital. *Staphylococcus aureus* is an important human and animal pathogen agent, in part due to the production of superantigen exotoxin production (SAg). The specter of diseases mediated by SAg varies from relatively benign food intoxications up to the syndrome of the toxic shock that jeopardizes the life. The main SAg secreted by *S. aureus* include TSS 1 (TSST-1) toxin and the enterotoxin serotypes (SE) A to Q, with the exception of F.

**Keywords:** exotoxin, pathogen, intoxications

#### INTRODUCTION

The antimicrobial resistance represents a main problem on the global level, being caused, widely, by the inadequate and uncontrolled utilization of the antimicrobial products, inclusively over prescription, the administration of the sub optimal doses, the insufficient period of treatment, and the wrong diagnosis that leads to the unfit choosing of the antimicrobial product. The resistant microorganisms are transmitted among patients and the factors of resistance are transferred among bacteria, both appearing more frequently in the units providing medical services. In Europe antibiotic resistance is in continuous growth, the European Agency for Drugs relates that annually over 380 000 Europeans suffer of infections caused by bacteria resistant to drugs and approximately 25 000 of the people from EU die for this cause.

For the accomplishing of the process of nutrition it is mandatory that the nutrients would infiltrate inside the cell to be metabolized.

Microorganisms are found most often in habitats where the content of nutrients is very reduced so that for the growth it is important their transport and concentration in the cell. In this situation the transport is made against the normal gradient of concentration, with energy consumption, by active transport and group translocation.

The active transport – transport in the cell is assured even in the absence of the gradient of concentration and is accomplished with energy consumption.

The transport is activated following the energy set free by transformation of ATP in ADP. A culture medium represents a complex nutritive substrate, with role of food, that has to assure to the microorganism that will be cultivated, the necessary quantity of water, sources of carbon, azote, mineral substances, factors of growth, substances that would supply the quantity of energy and all the elements used by the cell in the processes of growth, reproduction and maintaining the vital functions.

#### MATERIAL AND METHODS

For the performing of the study we used also the archive, registered in the specific program of the computer from the laboratory of S.C. Diaser, Oradea, in the computerized data base of the unit, respectively.

Necessary materials for the performing of the examination:

- A recipient of collection (collection recipient with collecting spoon) with transport medium

- Wooden spatula

- Latex gloves

For the collection of fecal matter it has to be collected a sample of fecal matter of 5-10g introduced in the collection recipient of fecal matter with transport medium. If the stool is liquid, it will be collected 5 ml. It is recommended to be chosen a liquid, mucous and bloody portion, if there is one. Don't collect quantities larger than 10g because it will reduce the chances of isolating the pathogen bacteria.

## RESULTS AND DISCUSSIONS

*Staphylococci* enterotoxins are exotoxins produced by *Staphylococcus aureus* that possesses emetic and super antigenic properties. Before this research, there were six enterotoxins characterized, staphylococci enterotoxins of A to E type and H type. *Staphylococci* enterotoxins (SE) cause *Staphylococci* food intoxications and symptoms of shock in some cases of toxic shock syndrome (SST). SE are, also, superantigen that are defined by their unique capacity to stimulate practically all the T cells whose receptor of T cells (TCR) bears a certain element V $\beta$ . Contrary to the conventional antigens, the superantigens are not processed, but they connect the molecules of the major complex of histocompatibility (MHC) 2<sup>nd</sup> class outside the

channel of connection of peptide and they form a trimolecular complex with TCR. Superantigens stimulate the production of cytokines, as would be interleukin-1 (IL-1), IL-2, gamma interferon (IFN- $\gamma$ ) and the factor of alpha tumor necrosis. The direct methods emphasize the identification of the microorganism by microscopy, considering the native, colorless products or of different colors.

The microscopic examination on gram colored smears, made of pathologic products, disclose first of all the presence of leucocytes, of which the majority are destroyed and spherical cocci with the diameter of 0,5-1 $\mu$ m, Gram positive, disposed in batches, in pairs or isolated, intra and extracellular.

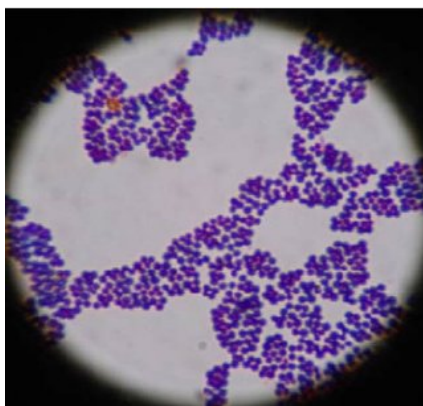


Fig.1. Gram positive Cocci, with predisposition in batches. *Staphylococci aureus*

On the direct smear form the Gram colored clinical sample, the staphylococci have an aspect of gram positive or gram variable cocci, isolated in pairs, in short chains or batches intra and extracellular. They can be hardly differentiated from micrococci, streptococci although usually the streptococci appear more frequently as chains of diplococcic and the staphylococci as chains of distinct individual cells. The description of the smear will include a significant appreciation of the types of cells and microorganisms. The characteristic aspect in clusters of grapes on smear can be described under the form: "gram positive cocci with aspect of staphylococci".

## CONCLUSIONS

On the smear gram colored or with methylene blue, made from cultures on solid medium, the staphylococci appear under the form of cocci, perfectly round, disposed in irregular batches, similar to the grapes clusters and on those made from samples or cultures of liquid medium they can appear isolated, in pairs, tetrad or short chains of 3-4 cells.

The staphylococci are gram positive but in conditions of metabolic stress they can become gram variable.

Some staphylococci negative coagulase have proved their pathogen capacity. This new aspect of the staphylococci ecology were delineated especially in the last three decades in direct relation with the utilization of large scale of the invasive procedures.

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