

Залежно від цілей навчання дидактичні ігри можуть бути начальними (набуття нових знань), контролюючими (перевірка і закріплення знань) та узагальнюючими (узагальнення та систематизація знань) [2].

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## FORMATION OF KNOWLEDGE ABOUT THE FEATURES OF THE STRUCTURE OF THE BIOLOGICAL LIQUID OF SALIVA IN THE COURSE OF MEDICAL CHEMISTRY

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In the training of dentists, much attention is paid to the study of chemical disciplines. Medical chemistry, which is taught in medical schools in the first year, despite its fundamentality, usually has the status of a general subject. The main functions of which are to provide a link between pre-university and university stages of chemical education, gives students fundamental knowledge to study other disciplines, to understand the chemical picture of nature, and is a necessary component of special medical disciplines.

In terms of medical chemistry, students get acquainted with the structure and properties of the main biological fluids of the human body. Special attention of dental students is paid to modern ideas about the chemical composition and properties of saliva. When studying the material, students pay attention to the following issues: organic and inorganic components of saliva and their role; biologically active components of saliva and their physiological role as well; regulation of saliva composition; features of saliva composition in various diseases; the possibility of using biochemical parameters of saliva for the diagnosis of dental diseases.

Table. The main components of the saliva solution.

The main components of saliva				
Water 99,4%	bactericidal substances (lysozyme)	mucin	salts of various acids, trace elements and cations of some alkali metals	ptyllian amylase maltase

During the study of the peculiarities of the structure of this biological fluid, the following chemical concepts are revealed: buffer systems, electrolytes, micellar structure, the structure of the micelle as a whole.

The topic "Acid-base balance and pH of biological fluids" reveals the role of the main components of saliva in maintaining homeostasis in the oral cavity. Saliva is very important for taste. In a liquid medium in which chemicals are transferred to taste receptor cells. Saliva maintains the pH of the oral cavity. The normal pH of saliva is 6 to 7, which means that it is slightly acidic. The pH of saliva can vary from 5.3 (low flow) to 7.8 (maximum flow).

The value of the protective function of saliva is revealed in the topic "The role of buffer solutions in the biosystems of the body's buffer systems". Buffer support is provided by various inorganic salts, which contribute to the creation of the necessary acidity for the normal functioning of the enzyme system. They also create the necessary charge on the surface of the chyme, which helps to stimulate peristaltic waves, mucus of the inner mucous membrane lining the gastrointestinal tract. Also, these

systems contribute to the mineralization of tooth enamel and its strengthening. The topic of dispersion of the system considers the peculiarities of the structure of saliva. Saliva is a colloidal system that contains aggregates of rather small water-insoluble particles (0.1 - 100 nm), which are in a dispersed state.

A substance that has a dispersed form, create the "core", which interacts with the adsorption of electrolyte ions (stabilizer), located in the aqueous phase. The stabilizer molecules dissociate in water, as a result of which a double electric layer is formed around the nucleus - adsorption and diffuse. The whole complex, which consists of a water-insoluble nucleus, a dispersed phase and two layers of stabilizer, is called a micelle. It is believed that the insoluble nucleus of the micelle forms calcium phosphate  $[\text{Ca}_3(\text{PO}_4)_2]$ . Monohydrophosphate molecules accumulate on the surface of the nucleus, which are contained in excess of saliva. Proteins (particularly mucin), which bind large amounts of water, help to distribute the entire volume of saliva between the micelles, as a result of which it is structured, becomes highly viscous, and becomes immobile.

In an acidic environment, the charge of the micelle can be halved because monohydrophosphate ions bind protons. They are replaced by dihydrogen phosphate ions -  $\text{H}_2\text{PO}_4^-$ , which do not participate in the process of enamel remineralization and reduce the resistance of the micelle. Alkalinization leads to an increase in the number of phosphate ions that interact with calcium ions. This leads to the formation of poorly soluble compound  $\text{Ca}_3(\text{PO}_4)_2$  which precipitates in the form of tartar. Changes in the structure of micelles in saliva also cause the formation of stones in the ducts of the salivary glands and the development of salivary stone disease.

The topic "Deposition and dissolution reactions" discusses the deposition processes that occur in saliva. Of all 14 fluids in our body, only 3 in pathology are prone to stone formation - saliva, gall bladder and urine. This is due to a number of features, namely: they are supersaturated with hydroxyapatite; they have significant pH fluctuations (in saliva in the range of 5 - 8, in the gallbladder - 5.6 - 8, in the urine 5 - 7.5); in these liquids the concentration of phosphate significantly exceeds the concentration of calcium [1].

The issue of prevention and treatment of gingivitis, periodontal disease and periodontitis is urgent, because the prevalence of these diseases in Ukraine among adults is 50-70%. To develop preventive measures and selection in the future professional activity of adequate methods of therapy of these dental diseases, knowledge of the chemical composition and properties of oral fluid is required. Medical chemistry lays the foundation for solving these problems.

### References

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## ДОСВІД ВИКОРИСТАННЯ ХМАРНИХ СЕРВІСІВ ТА СОЦІАЛЬНИХ МЕРЕЖ ДЛЯ ЕФЕКТИВНОГО НАВЧАННЯ ХІМІЇ В ЗАГАЛЬНООСВІТНІЙ ШКОЛІ

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Сьогодні складно уявити викладання хімії без використання сучасних технологій навчання. Сучасний урок передбачає реалізацію новітніх методик, де засобами нерідко є гаджети, онлайн платформи, хмарні сервіси.

Потреба в подібних сервісах для освіти продиктована необхідністю мати приватний ресурсний простір вчителя, учня і, як варіант, батьків, які можуть перетинатися певним чином, створюючи групи.

Впровадження хмарних технологій у процес навчання хімії забезпечує позитивні тенденції у формуванні інформаційної компетентності учнів.