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## ECOLOGICAL CHARACTERISTIC OF THE ORAL MICROBIOTA

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Microbiota of the oral cavity is important for the reactivity of the body, it plays a significant role in protecting our body from various diseases. The correct and in-depth study of the biological properties of the microflora of the oral cavity, the peculiarities and pathogenesis of the qualitative and quantitative composition of microorganisms, the characteristics of nonspecific and immune protective mechanisms confirms that the immunity of the oral mucosa has a significant effect on the formation of general immunity.

*Keywords:* mucosal immunity, oral microbiota, body reactivity.

One of the main factors protecting the internal environment of the body from the aggressive influence of the external environment is the normal microflora of the mucous membranes (oral cavity, nasopharynx, respiratory system, gastrointestinal tract, urogenital system) and skin. When the microbiocenosis of mucous membranes is disturbed and the bacterial population is unhindered, the reactivity of the organism is reduced, the cellular and humoral factors of mucosal protection are weakened, which ultimately leads to the development of pathological conditions. Moreover, the microbiological factor determines the development not only of infectious diseases, but also due to modulation of the immunological reactivity of the organism is the leading one in the development of autoimmune, allergic, oncological and other diseases [1; 2].

Human microbiota is still poorly understood. The in-depth study of the composition and properties of human microbiocenosis, as well as the identification of an association of microbiota with various diseases, is important. In this regard, the research is actively carried out, aimed at studying human microbiota, assessing the level of "microbiological load", determining the characteristics of the immune system response in the conditions of the influence of the factors of the external and internal environment.

The study aimed to determine the quantitative and qualitative composition of oral microflora of healthy donors.

The study included 30 students (donors) aged from 20 to 26 of the International Sakharov Environmental Institute of Belarusian State University, who gave written informed consent to the collection of biological material. To get the microbiota, smears were made by a standard procedure using a sterile cotton swab placed in a test tube.

The composition of microbiota of the oral cavity in healthy individuals is found to be characterized by a certain stability. At least 100 species of bacteria can be detected in the mouth, and their composition varies depending on local conditions. Approximately 30–60 % of the whole microflora of the oral cavity is facultative and obligatory anaerobic microorganisms, which include streptococci, lactobacilli, spirochetes, actinomycetes, etc. The following types of streptococci represent the largest group of oral bacteria: *Str. mutans*, *Str. mitis*, *Str. sanguis*, etc. In addition, the oral cavity contains strict or facultative anaerobes of the family *Lactobacillaceae*, which due to the fermentation of carbohydrates with the formation of lactic acid and lower pH create favorable conditions for the growth of normal microflora and prevent the development of pathogenic microorganisms.

Permanent microorganisms are often associated with two major diseases: caries and periodontal diseases. Apparently, these diseases occur after the imbalance among resident species in a given microbiocenosis under the influence of certain factors. In order to imagine the process leading to caries or periodontal diseases, and the contribution of microorganisms to the development of these diseases, it is necessary to know the ecology of the oral cavity, the mechanisms for the formation of normal microbiota, the factors regulating the homeostasis of the oral ecosystem. Special attention should be given to the state of oral microbiota after medical manipulations.

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## ANALYSIS OF METHODS OF TREATMENT FOR CNS TUMORS USING MEDICAL LINEAR ACCELERATORS

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One of the methods of treatment of CNS tumors, which is used in combination with surgical treatment and chemotherapy, is external beam radiotherapy. Linear accelerators are the most useful radiotherapy equipment. They can provide precise dose delivery to the target volume being relatively easy to use, inexpensive and safe. Modern linear accelerators are multi-modal devices and give us an opportunity to choice among several methods of irradiation. Each of these methods have some advantages in treatment of a specific CNS tumor case. For this reason, it is important to make the right decision when choosing one of them. It must be suitable for the very specific case, taking into consideration all medical and physical aspects. The right analysis of these modern methods lets us provide treatment of a high quality.

*Keywords:* CNS tumor, medical linear accelerator, external beam radiotherapy, precision irradiation

Tumors of the central nervous system (CNS tumor) are a class of non-cancerous and cancerous growths localized in the brain and spinal cord. The important factors of choosing methods for treatment of these diseases are: the genesis of the tumor (primary or secondary), the grade of a tumor (high-grade tumor or low-grade tumor), the stage of the disease, etc.

One of the methods of treatment, which is used most often in combination with surgical treatment and chemotherapy, is external beam radiotherapy. The most useful radiotherapy equipment in the treatment of CNS tumors are linear accelerators (linac). Extremely important matter in the radiotherapy of CNS tumors is the fact that their location is always critical and requires a precise dose delivery to the target volume, in order not to damage adjacent tissues and organs, which can cause serious reducing of quality of life (blindness, deafness, inability to speak, etc.) or even death (for instance, during sessions of radiosurgery). Nowadays, linear accelerators can successfully solve this problem being relatively easy to use and inexpensive (for example, in comparison to proton accelerators), and it's safe and multimodal as well (if to compare with gamma-therapy apparatus). This is due to their wide range of optional features: the choice of radiation energy, varying dose rate, the use of beams with or without flattening filtration (FF-mode and FFF-mode), choice of treatment methods (static or with modulated intensity).

Since linacs were first used in medical practice, they have been evolved with well-engineered technologies and nowadays they can support the wide set of methods for treatment of CNS tumors: 3DCRT (3-dimensional conformal radiation therapy), IGRT (image guided radiation therapy), IMRT (intensity-modulated radiation therapy), SRT/SRS (stereotactic radiation therapy/stereotactic radiosurgery), RapidArc/VMAT (volumetric modulated arc therapy). Though the latest methods are very complex and have high functionality, at the same time, old ones are not completely replaced so far (for example, 3DCRT), which means that each of them still has some advantages in a specific cancer cases. For instance, 3DCRT methods are still actual for irradiation of the entire brain because of its simplicity and relatively quick realization, besides it saves time and money spending on the treatment without losing of medical care quality for the patient. More modern intensity-modulated methods, such as IMRT and VMAT, give us the possibility to provide high-dose precision irradiation while minimal dose on healthy tissues and organs, which cannot be achieved by using 3DCRT techniques. For example, due to the intensity-modulated methods only, it became possible to provide hypo fractionated SRT and boost methods.

Since modern linear accelerators are multi-modal devices and give us an opportunity to choice among several methods of irradiation, it is important to make the right decision when fixing on one of them. It must be suitable for the very specific case, taking into consideration all medical and physical aspects. The right analysis of these modern methods lets us provide treatment of a high quality.