

Klimchenya Y.V.

**RECENT DEVELOPMENTS OF MEDICAL HEMOSTATIC
BIO-ADHESIVE AGENTS**

Tutor: lect. Kruglik A.D.

Foreign Language Department

Belarusian State Medical University, Minsk

Hemorrhage is a blood leakage caused by damage of blood vessels from the circulation to surrounding tissues, body cavities or outside the human body. It occurs as a result of open wounds, accidents, pathological processes in the body. According to the statistics provided by scientists from McGill University, about 2 million people a year die from bleeding of various origins.

In addition, bleeding can occur during surgery and pose a threat to the life and health of the patient. For example, in the case of acute blood loss, there may not be the right volume of suitable blood for a particular patient. At first glance, in hospitals, preventing bleeding is not a problem, since there are various ways and techniques to do it: clamps, sutures, tamponade, etc. At the same time, the sudden bleeding, for example, after an already performed surgical intervention (a cesarean section, operations involving large vessels of the bloodstream) and as well as after divergence (or removal) of sutures can lead to complication of the patient's condition or even death.

Currently, scientists and practitioners are faced with the task of creating (searching) such means that could effectively, safely and rapidly stop bleeding throughout the postoperative period (or after any other medical care).

The analysis of medical literature shows that one of these agents can be medical bio-adhesives, which will include or work as cells of biological creatures capable of regeneration or special substances with adhesive properties, that are produced by certain organisms. The advantage of medical bio-adhesive agents is a renewability and biodegradability, so they will not affect the environment. In recent time, active developments in this direction have been carried out by researchers from McGill University. In October 2022, Author Guangyu Bao, a recently graduated PhD student under the supervision of Professor Jianyu Li of Department of Mechanical Engineering, developed a medical bio-adhesive agent, inspired by the adhesive abilities of mussels and flatworms, called Liquid-infused microstructured bio-adhesives (LIMB).

Developers noticed that their medical bio-adhesive can help to prevent bleeding, when applying pressure is difficult or the surface of the wound is too bleeding for other medical "glue".

The singularity of medical bio-adhesives is that they are structures that can be in contact with the body without rejection until the wound is completely closed. An important aspect of bio-adhesives is their safety for the human body, like hypoallergenicity and non-toxic dissolution in it. This will be especially important if such adhesives are going to be used against internal hemorrhage.

The creators report that their medical bio-adhesive uses suction to absorb blood, clear the surface for adhesion, and bond to the tissue providing a physical seal. The entire application process is quick and pressure-free, which is suitable for non-compressible hemorrhage situations, which are often life-threatening.

A very important property of this tool is the ability to remove this material without the threat of re-bleeding. It is noted that it is safe to remain in the human body until this bio-adhesive is completely absorbed in the human's body.

In addition, the authors suggest the use of their medical bio-adhesive for delivering drugs to provide therapeutic effects. For example, mixing this bio-adhesive agent with some medicines.

Thus, this modern development of researchers from McGill University is unique. In this connection, representatives of the biomedical sciences of the Republic of Belarus should direct their attention to the possibility of carrying out developments in this field, taking into account the experience of other scientists.

It is expected that such domestic product will be less costly than the use of a foreign example, will increase the competitiveness of our medicine and will allow effective care in cases of hemorrhages in Belarus.