DEVICES MADE IN LABORATORIES

DEVICE FOR FIXING A SMALL LABORATORY ANIMAL WITH AN INSTALLED DORSAL CAMERA UNDER A MICROSCOPE

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In experimental biology and medicine, the use of methods is relevant*in vivo*studies of living tissue of a laboratory animal at the cellular and organ levels over a long period of time. Providing direct visualization, these methods are considered the most informative for studying physiological and pathological processes. Thus, dorsal chambers are used to study the vascular system [1, 2], allowing for microscopic visualization of blood cells and drug transport in a skin fold on the back of a small laboratory animal, usually a mouse, over several days. The dorsal chamber, consisting of two symmetrical parts, compresses this fold and allows observations to be made through a transparent

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window using a standard microscope in normal or fluorescent light. To conduct observations under a microscope, the animal with the dorsal chamber installed must be securely fixed on the microscope stage so that the dorsal fold is located in the focal plane of the objective. Usually, specially designed optical systems are used to solve this problem, which, on the one hand, affects the technical and economic indicators of the experiment, and on the other hand, limits the possibilities of using this technology outside the framework of specialized laboratories. The work presents a device for fixing a small laboratory animal with an installed dorsal camera, which allows the use of a standard inverted microscope designed for cell experiments.

Fig. 1a, b shows the device in disassembled and assembled form. It consists of a base *1* with a hole for microscope objective positioning, a container *2* in the form of an elongated parallelepiped, which houses the laboratory animal. The container has a horizontal protrusion with a hole designed to accommodate the dorsal chamber *5* , installed on the animal (Fig. 1c). From above, the animal lying on its side is pressed by a clamp *3* with a longitudinal slot providing air access and observation capability. After installation in the container protrusion, the dorsal chamber is securely fixed with a pressure plate *4* . All main structural elements of the device are made of biocompatible polymer using 3D printing.

To conduct the study, the assembled device with the fixed small laboratory animal is placed on the microscope stage. Fig. 1d shows an example of a microphotograph obtained during the study of the mouse vascular system in fluorescent light.

Unlike a similar system for fixing small animals with an installed dorsal chamber [1], the proposed device provides reliable protection of the microscope surface from biological fluids, while the degree of animal fixation is practically independent of its size. The advantage of the proposed solution compared to the known device [2] is that in our case, after securing the animal, the dorsal fold is positioned symmetrically relative to the body, which reduces errors associated with the effect of fixation on blood flow.

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FIGURE CAPTION

Fig. 1. Device in disassembled form (**a**) and assembled (**b**): *1* - base with hole for microscope objective lens, *2* - container, *3* - bracket with longitudinal slot, *4* - pressure plate, *5* - dorsal chamber; **c** - mouse with chamber, **d** - system of blood vessels in fluorescent light.

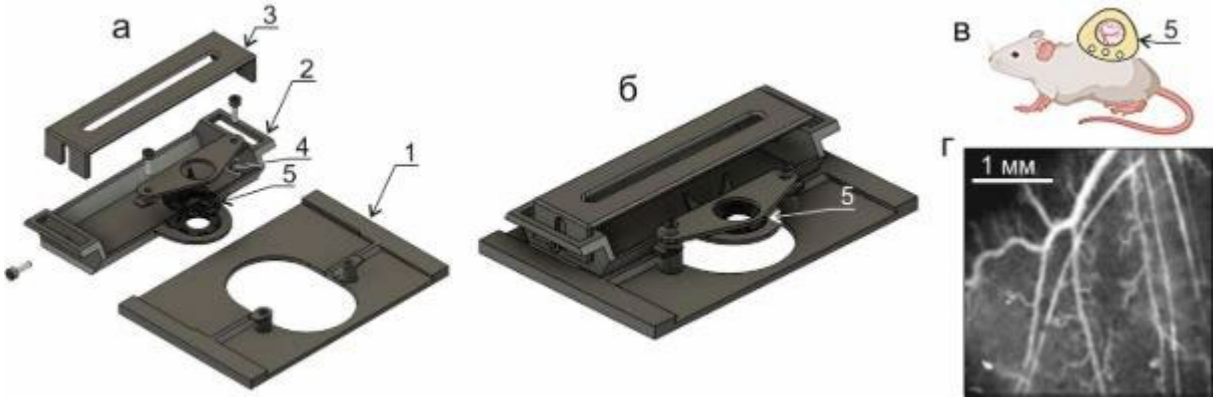

Fig. 1