

# TPP TubeSpin Bioreactor in Space


One more application area for cell culture bioreactors can be provided by spaceflight practice: Fruit flies went in a two-month space travel, withstood the test and returned back to earth alive and unharmed. Good sterile gas exchange was very important for the sustenance of the insect.

When performing studies with biological objects in long-term unmanned space flight, we face the problems such as the risk of microbial contamination of the housing for living organisms, microgravity-induced decrease in gas exchange, which impair the habitability conditions, and substantial mechanical impacts on construct elements caused by linear and impact accelerations during spacecraft launch and recovery.

These suggest the use of high-performance gas-permeable membranes in experimental devices, which enable sufficient oxygen influx along with effective microorganism interception. In long-duration experiments with

*Drosophila melanogaster* fruit fly considerable inner space for actively moving stages of developing insect are also essential.

In the *Drosophila* experiment at Foton-M #4 satellite flight, July–August 2014, the TPP TubeSpin Bioreactor 600 was a key element of the device developed by the Russian Federation State Research Center Institute of Biomedical Problems RAS (IBMP), Moscow, Russia. Air entered the device via gas-permeable membrane mounted in the bioreactor cap. Jelly nutrient medium was molded on the bioreactor bottom side, leaving approximately 400 cm<sup>3</sup> of free space for flying. The Foton flight was 1.5 month in duration. At the return to the

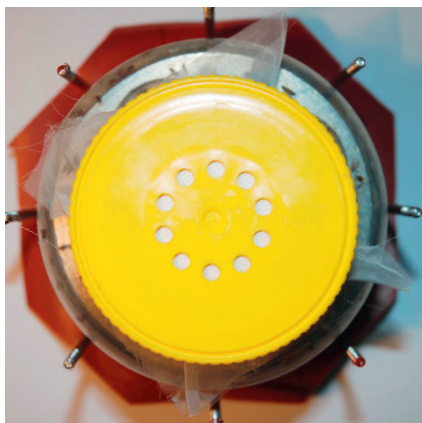
Earth, the fruit flies showed manyfold population growth thus confirming efficiency of gas transfer in microgravity conditions and high strength properties of the TubeSpin Bioreactor 600. 

[www.tpp.ch](http://www.tpp.ch)

Noykem Ltd., the TPP dealer in Novosibirsk (Russia) has generously supported the experiment in space.

In Switzerland, the TPP Bioreactor 600 is available through [www.faust.ch](http://www.faust.ch)

*Thanks to the sales force of Noykem and Olga Larina with her scientists of the FGBUN SSC RF Institute for Biomedical Problems (Moscow) for kindly providing information and photos of the experiment!*



Good sterile gas exchange was very important for the sustenance of the insect. *Drosophila melanogaster* flies successfully withstood the test and returned back to earth alive and unharmed.



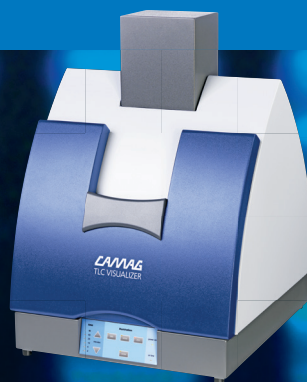
Flying apparatus immediately after completion of the experiment. The bioreactors were experiment equipment, as well as house and dining room for flies (Pictures: Sales force of Noykem and the scientists of the FGBUN SSC RF Institute for Biomedical Problems, Moscow).

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