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Biology in Space (8)

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CELL FUSION IN SPACE: PLASMA MEMBRANE FUSION IN HUMAN FIBROBLASTS DURING
SHORT TERM MICROGRAVITY**Abstract**

This abstract reiterates the importance to carry out research of human cells in space. In the advent of space exploration and colonisation, study on the effects of microgravity of human growth cells such as Fibroblasts are imperative. This experiment was previously carried out in the 1970's and the results yielded were non satisfactory. With technology by our side, further observations must be conducted.

A fibroblast is a type of biological cell that synthesizes the extracellular matrix and collagen, produces the structural framework (stroma) for animal tissues, and plays a critical role in wound healing. The experiment was conducted by the Department of Cell Biology, Erasmus University, Netherlands. It involved a sounding rocket that simulated microgravity. During short-term microgravity in sounding rocket experiments (6 min.) the cytoskeleton under-goes changes and therefore it is possible that cell processes which are dependent on the structure and function of the cytoskeleton are influenced. A cell fusion experiment, initiated by a short electric pulse, was chosen as a model experiment for this sounding rocket experiment. Confluent monolayers of primary human skin fibroblasts, grown on coverslips, were mounted between two electrodes (distance 0.5 cm) and fused by discharging a capacitor (68 F; 250 V; 10 msec) in a low conductive medium. During a microgravity experiment in which nearly all the requirements for an optimal result were met, results were found that indicated that microgravity during 6 minutes did not influence cell fusion since the percentage of fused products did not change during microgravity. Within the limits of discrimination using morphological assays microgravity had no influence on the

actin/cortical cytoskeleton just after electrofusion. However, by increasing the duration of micro-gravity to 4-5 days, further observations can expect to yield results that would conclude if humans could survive long interstellar journeys void of gravity or atleast, a natural one !