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Different Reaction of Biosynthetic System of Human Dermal Fibroblasts and Fibrosarcoma Cells to Plant Hormones

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Plant hormones are signal molecules regulating plant growth and development. Some plant hormones are known as medicine, while the effect of other hormones is less known and therefore needs to be characterized. The aim of this study was to investigate the effect of 2 mM concentration of plant hormones abscisic acid (ABA) and gibberellic acid (GA) on the biosynthetic system (endoplasmic reticulum (ER), Golgi apparatus, acidic compartment vesicles) of cultured human dermal fibroblasts and HT1080 human fibrosarcoma cells. Using light and electron microscopy, we demonstrated that the components of the biosynthetic system of these cell lines reacted differently to ABA and GA. In particular, the expansion of ER cisternae was observed in dermal fibroblasts after exposure to GA, but in fibrosarcoma cells – after exposure to ABA. The redistribution of the Golgi apparatus around the nucleus occurred in dermal fibroblasts after both ABA and GA treatment, but was not observed in fibrosarcoma cells. However, the expansion of Golgi apparatus cisternae was observed in fibrosarcoma cells after ABA treatment. The changes of acidic compartment vesicles were observed in dermal fibroblasts after incubation with ABA and only on the ultrastructural level, and displayed as the appearance of numerous vesicles with multilayered content in the lumen. On the contrary, in fibrosarcoma cells the differences were revealed after both ABA and GA treatment and were detected by lysotracker staining. Thus, the response of the biosynthetic system in the connective-tissue cells to ABA and GA differs in normal and tumor cell lines, and also from the response described previously for the cells of epidermoid origin.

Keywords: abscisic acid, gibberellic acid, biosynthetic system, fibroblasts