

HISTOCHEMICAL ALTERATIONS OF TUMOR AND LUNG TISSUE IN THE ISOLATED PERFUSED HUMAN LUNG AFTER SURGERY

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The isolated perfused human lung model might offer the opportunity to study pharmacological reactions and interactions under physiological conditions. With respect to the rising molecular possibilities in treating human lung diseases, a model of human lung tumor and 'normal tissue' perfusion becomes of rising importance to push targeted therapies towards clinical application. This study investigates physiological, histological, and histochemical alterations of lung and tumor tissue during isolated perfusion of human lung resections. Right after resection, a total of 18 human lung resections from patients suffering of bronchial carcinoma have been isolated, ventilated, and perfused under physiological conditions with a modified Krebs-Henseleit solution over a period of 30, 60, 90, 120, and 240 min. Changes in perfusion pressure, pH, and lung weight gain were measured before and during perfusions. After each experiment histochemistry of lung tissue by NADH, ICAM, and VEGF were performed to determine lung tissue vitality and endothelial damage as well as histological edema formation in HE-sections. After 90 min of perfusion, immunochemical loss of vitality and an increasing incidence of edema formation occurred. Perfusion over a period of over 4 h led to significant edema formation in lung and tumor tissues accompanied by loss of vitality and significant histological alterations. Isolated ventilation and perfusion of human lung resections within this set up is safe for pharmacological studies over a period of 90 min. Increased edema formation and immunochemical changes occur in tumor and lung tissues thereafter. This model might be suitable and ideal to study tumor targeted therapies in human tissue in an experimental set-up prior to clinical studies.