Pulmonary diseases

A connection between chronic-obstructive pneumo-emphysema and an enzymopathy, the lack of *alpha-1-antitrypsin*, is said to exist in that persons affected by this anomaly suffer 15 times more frequently from chronic destructive pulmonary diseases than the average population; however, the alpha-1-antitrypsin is not supposed to influence the so-called senile emphysema.

Alpha-1-antitrypsin, a glycoprotein having a molecular weight of about 60 000, inhibits trypsin, chymotrypsin, plasmin as well as elastolytic and collagenolytic enzymes, including those of leukocytary origin. It is supposed that in cases of lacking alpha-1-antitrypsin the proteinases are not inhibited and that the latter can freely exert a destructive effect on structures of pulmonary tissues.

W. v. LANGENDORFF's (1974) tests on female Sprague-Dawley rats weighing 200–250 g were based on these ideas. A pulmonary emphysema was produced by injecting intravenously 1–2 mg of thermolysin in 0.2 ml of physiological saline solution. *Thermolysin*, a proteolytic enzyme from thermobacteria produces a high elastolytic activity at a neutral pH. The injuries are irreversible.

Fetal pulmonary tissue (30 mg/kg of bodyweight) injected into these rats 2 days before the destructing injection of enzymes brought about a protective effect persisting for 2–3 weeks even if several doses of thermolysin were applied. More injections of pulmonary tissue repeated at intervals of 14 days extended this elastin-protective effect for prolonged spaces of time. Tests for the pressure volume and histochemical qualities (hematoxilin-eosin; elastin staining after VERHOEFF) provided identical results. Injured pulmonary tissue was not regenerated by the injection, developed emphysemata resisted every influence. This protective effect was not seen with cells of fetal connective tissue.

Developmental biology

The lung develops like a gland from a tube of cylindrical epithelium separated from the mesenchyme by a basal membrane (P. BRUNNER, 1982). In the first 4 years of age the structures present at birth develop only few bronchial ramifi-

cations and alveoli are formed anew. The organism must for the whole life have enough of what is present at birth (HIERONYMI, 1960). The total of alveoli is estimated at 60 million to 1 milliard, their surface at 5 m^2–200 m^2.

Senile processes in the lung affect chiefly the fibre system so that the loss of elasticity is the crucial point. According to P. BRUNNER (1982), the changed structures of the elastic fibres with the dwindling retraction power and the growing constituent of collagen are of primary importance. The decrease of the alveolar septa, dilation of the alveolar ducts, reduction of the alveolar net capillaries, calcareous and bony stiffening of the bronchial breathing skeleton form the «senile lung» morphologically. The decreasing spectrum of functions causes the clinical symptoms.

Clinical data

on the possibilities and indications of cell-therapeutic methods for pulmonary diseases are scarce and vary. The authors agree as to that acute, inflammatory diseases of the lungs and respiratory passages constitute contraindications.

Bronchial asthma

is regarded by many as contraindication for its chiefly allergic genesis; others, above all experienced practicians, think bronchial asthma one of the fields in which cell therapy brings about results that cannot be obtained with the classical methods. A final judgment cannot yet be given as cell therapy has so far been used for a merely negative selection i. e. when all other methods had failed. If one decides on cell therapy, the choice of tissues to be used ought to be sufficiently wide. Apart from the fetal pulmonary tissue, adrenal gland, thymus, fetal connective tissue or placenta should be taken into consideration. J. BUSCHA gave 1981 a catamnestic report on the clinical results following cell-treatment in bronchial asthma.

Contrary to the belief, widely held until now, that asthmatic subjects should not be treated with fetal cells because of the high risk of allergy, such patients have in fact been treated for more than 15 years. The author reviews, from her own point of view, 88 patients with asthma, in some cases severe and often in combination with multiple allergies, treated over the past 3 years. None of the patients of this group showed a higher risk of allergy than other completely non-allergic patients, and in fact they reacted rather less frequently. Asthma attacks occurred on only three occasions after the treatment while the patients were still hospitalized and under observation, and a status asthmaticus was never observed.

Fifty-six of these 88 patients themselves reported on the effect of the treatment.

Thirty-six patients reported an improvement in their asthma, while 11 patients showed improvement in other pathological conditions and in their general wellbeing, but no effect on their asthma. One patient reported definite deterioration of his asthmatic condition. The remaining 8 patients showed no effects of any kind after the treatment.

These experiences encourage the inclusion of asthma in the indications for cytotherapy, since a proportion of these patients can apparently be helped by this treatment, successfully and without any significant risk.

Obstructive pulmonary emphysema

is also the subject of new studies (A. C. GIANOLI). The significance of the few results substantiated by the pulmonary-function test must still be established.

The senile emphysema of the lung is part of the involution. As far as the vitality of the aged is impaired essentially by the reduction of pulmonary functions, it is advisable to include pulmonary tissue in a general combined revitalizing therapy.