

The Nucleolus

constitutes an optically outstanding structure (or 2–3) within the nucleus. A rounded, oval to polymorphous irregular body, the nucleolus (pars granulosa) is closely connected with the lighter areas of the pars fibrosa (amorpha) and the perinucleolar chromatin. The granules of the pars granulosa have a di-

ameter of 150 Å, the filaments of the pars fibrosa about 50 Å (fig. 4, 8).

Whereas the nucleolus, electron-optically, is usually more compact than the neighbouring chromatin substance, it contrasts as a brighter area in the light microscope by panchromatic staining. DNA staining (FEULGEN) leaves the nucleolus invisible in the nucleus, differential staining of nucleic acid (methyl-

green pyronin) distinguishes the DNA from the RNA areas of the nucleus.

The nucleolus is integrated into the function of the nucleus and has no membrane. Its purpose is to produce ribonucleic acid (RNA) after the information pattern of the DNA of the nucleus, and to yield it as a mediator of information to the cytoplasm. The M-RNA regulates the synthesis of the ribosomes of the en-

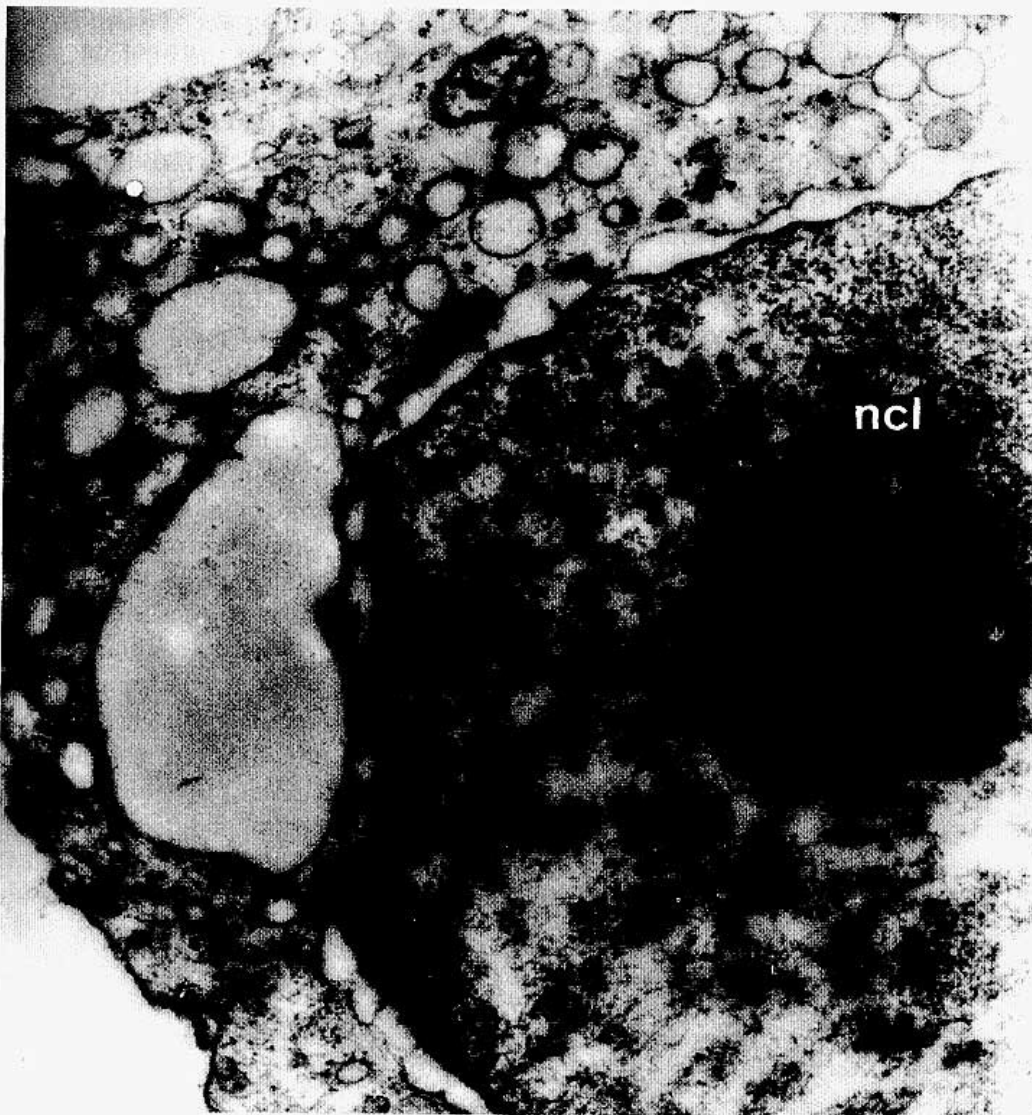


Fig. 8:

Nucleolus (ncl), in which the more compact pars granulosa can be clearly distinguished from the lighter areas of the pars amorpha (fibrosa). Immunocyte in the stage of secretion, final magnif. 1:18,000.

doplasmatic reticulum. Metabolic cells therefore contain large or several nucleoli near to or in close contact with the nuclear membrane.

The nucleolus can usually be seen well in the «resting nucleus». During the division of the nucleus it disappears

between the prophase and the prometaphase. The RNA synthesis is stopped from the middle of the prophase to the end of the telophase; as soon as the nuclei and the cell membranes of the daughter cells have been retransformed to organelles, the nucleolus reappears.

Function

The biological function of the nucleus is to control the genetic information by means of the nuclear DNA and its morphological aggregates, the chromosomes. The «genetic check point» as an ecological unit inside the cell is separated by a double membrane from the cytoplasm, the «economic space of the cell». The necessary metabolism is effected

through the nucleopores. The most active metabolic part of the nucleus is the nucleolus, point of the synthesis and collecting centre of the ribonucleic acid. There are direct relations through the nucleolus and the nucleopores to the space of cytoplasm, here especially to the centriol and the ribosomes of the endoplasmatic reticulum.