



Figure 1. Corrosion preparation of the hepatic blood vessels of a one day old piglet. 1 – afferential collector; 2 – hepatic artery; 3 – caudal cava vein (efferential collector); 4 – plural portal-and-caval anastomosis.



Figure 2. Corrosion preparation of the hepatic blood vessels of a 20 day old piglet. 1 – afferential collector; 2 – caudal cava vein (efferential collector); 3 – postanastomotic branches; 4 – portal vein.

plural portal-and-caval anastomosis is transformed in shallow intraorganical veins on the border of the caudal and left lateral lobes of liver. The coiled and long capillaries are disposed among such veins. The lobules of primitive structure are formed in parenchime of the organ, not having expressed scopes with each other (50.3%), and also lobules are formed with clear scopes from septal connecting tissue (28.6%). The parenchime of spongy structure (21.1%) is saved mainly in the subcapsular area of the liver. The hearths of hemopoiesis are not found out in thr hepatic parenchime. The 20 days old piglets have complete obliteration of temporary anastomotic veins; the sinusoidal network, incident to the other areas of the hepatic parenchime, is formed between afferential and efferential veins in the location area of the plural portal-and-caval anastomosis in one day old piglets. The anastomosis become short treelike veins (Fig. 2). The lobules of the completed structure (59.6%) predominate above primitive ones (40.0%) in parenchime of the liver. The spongy parenchime only saves 0.4%. Thus the hepatic blood vessels and tissue components are characterized by the stuctural-and-functional uncompleteness in accordance with the degree of the organism maturity of animals. Obliteration of the temporary hepatic veins in piglets during their neonatal period on the background of forming the lobules in the parenchime of classic structure, and the disappearance of hemopoietic hearths. To our opinion, it is related with settling the definitive functions of the organ.

Розен ВВ и др. (1991) Половая дифференцировка функций печени. М.: Медицина.–336.

Смирнова ЮГ (1967) О кроветворении свиной после рождения. С.-х. биология. 2:2.–316-318.

Kaman J (1968) Der Umbau des Ductus Venosus beim Schwein. II. Posnatales Stadium. Anat. Anz.122:5.–476-486.

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Fractal organisation of tissue growth patterns in canine trichoblastomas

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Canine Trichoblastoma are hair follicle tumours of different subtype constituted by epithelial component (hair germ) and mesenchymal component (dermal papilla) which closely interact. The architecture and the epithelial growth patterns of the different histological subtypes, namely Ribbon type, Trabecular type, Granular Cell type and Spindle cell type, were cha-

characterised by fractal analysis (Mandelbrot 1983) and conventional morphometry. The architecture and the epithelial growth patterns of the different subtypes were characterised by fractal analysis. The Fractal Dimension (FD) was determined from the slope of the regression line describing the fractal region within the bi-asymptotic curve experimentally established by means of the FANAL++ software (Losa and Nonnenmacher 1996). The FD obtained from masks and outlines after grey threshold segmentation of tumour epithelial components showed self-similar fractal properties. Masks but not outlines of canine trichoblastoma subtypes showed significant different FD values ranging from 1.75 to 1.85 thus enabling a complete discrimination of different histological types. Trichoblastoma subtype with the higher amount of mesenchymal stroma (Losa and Alini 1993) displayed an epithelial component with the lowest FD, indicative of less complex growth patterns. The FD data suggest that an iterative morphogenetic process, involving both the hair germ and the associated dermal papilla, may be responsible for the tumour architecture (De Vico et al 2005) and emphasizes the advantages of fractal analysis in the objective characterization of tumour growth.

Mandelbrot BB (1983) *The fractal Geometry of Nature*. Freeman, San Francisco.

Losa GA, Alini M (1993) Sulfated proteoglycans in the extracellular matrix of human breast tissues with infiltrating carcinoma. *Int J Cancer* 54:552-557.

Losa GA, Nonnenmacher TF (1996) Self-Similarity and fractal irregularity in pathologic tissues. *Modern Pathol* 9(3):174-182.

De Vico G, Peretti V, Losa GA (2005) Fractal organization of feline oocyte cytoplasm. *Eur J Histochem* 49(2):151-15.

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Photopigment coexpression in the mammalian retina

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In mammals, each cone had been thought to contain only one single type of photopigment. It was not until the early 1990s that photopigment coexpression (dual cones) was first reported. In a well known laboratory animal, the house mouse, the distribution of color cones shows a characteristic division. Whereas in the upper retinal field the ratio of short wave to middle-to-long wave cones falls in the usual range (1:10), in the ventral retinal field M/L-pigment expression is completely missing. In the transitional zone, numerous dual cones are detectable (spatial photopigment coexpression). In some other species without retinal division, dual cones appear during development, suggesting that M/L-cones develop from S-cones. Dual elements represent a transitory stage in M/L-cone differentiation, and disappear with maturation (transdifferentiation, transitory photopigment coexpression). These two phenomena seem to be mutually exclusive in the species studied so far.

Recent comparative studies performed by our group reported other types of retinal photopigment coexpressions in adult specimens without retinal division. Dual elements either occupy the dorsal peripheral retina, or make up the entire cone population.

In an African diurnal rodent, *Otomys unisulcatus*, a few dual cones appear in peripheral localization. These cones morphologically resemble developing elements raising the question as to whether these are postmitotic cells in the phase of differentiation. Strong immunoreactivity against PCNA (Proliferating Cell Nuclear Antigen) in this region suggests that, at least in this species, retinal maturation or regeneration continues even in adults. Intensive studies are on the way to detect a similar phenomenon amongst available laboratory animals.

In two of the examined species, the Siberian hamster, and the African pouched mouse the entire cone population is made up of dual elements. This is the first observation proving that all cones of a retina are of dual nature. These species are good models for the study of molecular control of opsin expression and renders them suitable sources of dual cones for investigations on the role and neural connections of this peculiar cone type.

In the developmental studies performed, the retinal maturation of several species was examined to test the hypothesis of transdifferentiation. Whereas in all species studied, S-pigment expression, if present, precedes that of the M/L-pigment, dual cones are not always detectable. They are either present in a smaller or larger number or are completely missing from the