

Structure and ultrastructure of microvessels in the kidney seen by the corrosion casting method

Simone Sangiorgi, Alessandro Manelli, Marina Protasoni, Marcella Reguzzoni, Terenzio Congiu and Mario Raspanti

Laboratory of Human Morphology – L. Cattaneo – University of Insubria – Varese
Via Monte generoso 71 – Varese
e-mail: simo.med@libero.it

Key words: Corrosion Casting Technique, Scanning electron microscope.

SUMMARY

Scanning electron microscopic observation of corrosion casts is the finest technique to describe spatial patterns of microvessels in many organs, giving a readily interpreted representation of their vascular architecture without interference from surrounding tissues. We focused on the renal cortex of guinea pigs to make an in-depth morphological analysis of structural and ultrastructural details left by the cells on the resin cast. In addition, we made a qualitative description of normal variants usually observed in glomerular disposition, arteriolar morphology or capillary arrangement in the space to shed more light on the relationship between vascular tissue and surrounding cells. The study also disclosed some examples of vascular adaption to physiological and pathological conditions occurring in renal microvessels such as many systems essential to flow regulation, filtration and excretory processes.

At lower magnification, all major vessels can be readily distinguished: interlobar, arciform and interlobular arteries and veins, along with a web of peritubular and capsular capillaries. At higher magnification, the glomeruli become visible and the afferent and efferent arteries and the tortuosity the inner vessels can be distinguished. In some of them, the resin, due to the narrowing sizes, suddenly stopped leaving a half-casted glomerulus. This helped to reveal its internal circulation characterized by thin capillaries with a high degree of bi or trifurcation.

In addition, we confirmed the close correspondence between cellular ultrastructural detail (pores, corrugations of cellular membrane, perivascular cell branches) and the impressions left on the resin visible only at high magnifications.

INTRODUCTION

The corrosion casting technique, useful in 3D visualization of vascular structures (Murakami T., 1971; Hodde K.C. et al., 1980; Lametschwandtner A. et al.,