EDITORIAL

ATVB In Focus

Smooth Muscle Cells

Giulio Gabbiani, Göran K. Hansson

One of the implications of the original observation by Benditt and Benditt that human atheromatous plaques have the features of a monoclonal proliferation is that arterial smooth muscle cells (SMCs) are heterogeneous and that possibly a distinct SMC subpopulation exhibits the propensity to migrate into the intima and to participate in atheroma formation. This has inspired an important number of investigations with the aim of isolating and defining distinct SMC phenotypes or of identifying different SMC precursors during development and/or pathological situations.

Evidence has been produced that SMCs in culture may display distinct phenotypic features, eg, spindle-shaped or epithelioid morphology. These populations have been shown to derive from tissues with different biological characteristics, such as normal media and intimal thickening after endothelial injury or normal media of newborn versus old rats. It has also been shown that SMC populations and clones with these distinct morphologies can be isolated from the same tissue, eg, normal media. Most of this work has been performed with the rat as experimental animal, but more recently, these observations have been extended to other species, such as cow, dog, and pig, and albeit sporadically, human.

It has also been attempted to identify markers of the different phenotypes, with some success in the rat model, but unfortunately, results in rodents are not necessarily applicable to other species and to humans in particular. A significant impulse to this conceptual approach has been given by the demonstration that circulating or bone marrow-derived cells can contribute to the architecture of several tissues including the vessel wall.

The present series of reviews ATVB In focus will explore several aspects of SMC differentiation and of normal and pathological arterial wall formation, with a special emphasis on the role of SMC heterogeneity. We are happy to start with the very hot topic concerning SMC origin and the role of circulating stem cells in the formation of transplant arteriosclerosis.

Our aim is to present ATVB readers with the possibility of considering the many facets of SMC heterogeneity during development as well as physiological or pathological phenomena; in this way we hope to encourage new ideas, experiments and results.

References


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