

**THE ROLE OF TYROSINE KINASE IN THE ADHESION AND FUSION OF MYOBLASTS**

EDYTA WRÓBEL and JERZY MORACZEWSKI

Department of Cytology, Faculty of Biology, Warsaw University,  
Miecznikowa 1, 02-096 Warsaw, Poland

The protein tyrosine kinase plays a principal role in signal transduction. It is the most important enzyme connected with growth factor receptors. The non-receptor tyrosine kinase is also localized in the focal contacts (the areas of the cell membrane where cells are in contact with the extracellular matrix), and it is named Focal Adhesion Kinase (FAK). FAK participates in cell attachment, spreading and migration. In our investigations, we were particularly interested in changes in the structure of focal contacts and the role of proteins participating in cell fusion during the differentiation of satellite cells. Satellite cells (also called adult myoblasts) are stem myogenic cells located between the basal membrane and the plasmalemma of muscle skeletal fibers in adult skeletal muscles. They are required for skeletal muscle regeneration.

Various cytoskeletal proteins, cell-extracellular matrix adhesion proteins and cell-cell adhesion proteins are the substrates for FAK. Many of them act in the adhesion, fusion and differentiation of myoblasts. We focused this study on the role of tyrosine phosphorylation of M-cadherins and  $\beta$ -catenins. The phosphorylation and dephosphorylation of these proteins are the main mechanisms which regulate their distribution and function in myoblast fusion.

The cadherins are calcium-dependent, transmembrane intercellular adhesion proteins. M-cadherin is a protein that plays a key role in the development of striated muscle. The cytoplasmic tails of the cadherins usually complex with the cytoplasmic proteins:  $\alpha$ -catenins,  $\beta$ -catenins, and plakoglobin. The use of microscopy and cytochemical methods allowed the localization of M-cadherins,  $\beta$ -catenins and FAK in differentiating myoblasts isolated from fast twitch (extensor digitorum longus – EDL), and slow twitch (Soleus) muscle. We demonstrated that FAK is localized in the focal contacts of myoblasts, and that M-cadherins and  $\beta$ -catenins are found in the cell membrane between fusing myoblasts. We also showed that M-cadherins,  $\beta$ -catenins and FAK could form complexes (co-immunoprecipitation).