Immunoelectron microscopy
Methods and protocols
Steven D. Schwartzbach and Tetsuaki Osafune (eds)
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The tribute that the scientific community has to pay to this technique is impressive: thanks to immunoelectron microscopy the scientist's dream to link structure (*form*) and *function*, one of the dreams that shaped even the phylosopical reflection of our predecessors, well, this dream has became nearly a full reality while it was just *fact and function*, a battle between a dead body (*structure*) and a ghost (*function*). Immunoelectron microscopy provided in fact some of the first examples of our technical capacity to show how the form of a structure is so deeply linked to its functional activity. In a perspective view it has been something conceptually forerunner of present day synthetic biology and molecules design capacities to provide us with new functions or the way to modify/alter those functions we are interested in.

Stressing this historical view I think we have to thank Max Ferdinand Perutz and John Cowdery Kendrew *for their studies of the structures of globular proteins* (so reads the reason to award the 1962 Nobel Prize in Chemistry), who came first in showing us examples of structure-function relationship. With much more clear words, Steven D. Schwartzbach (Dept. of Biology, University of Memphis, Memphis, USA) and Tetsuaki Osafune (Dept. of Life sciences, Nippon Sport Science University, Yokohama, Japan), the two volume's Editors wrote in their preface: *Immunoelectron microscopy is the technique that bridges the information gap betweeb biochemistry, molecular biology and ultrastructural studies placing macromolecular functions within a cellular context*.

From these words it descends quite clearly that they decided to include several chapters (1-8) devoted to the necessary molecular biology tools for a successful application of the immunoelectron microscopy techniques, the topics of which range from the expression of epitotes to the production of polyclonal, monoclonal and antipeptide antibodies not forgetting the preparation of colloidal gold particles and their conjugation to proteins. Interestingly enough, these chapters deal not only with animal cells but also with plants (something often neglected) when considering the expression of epitote-tagged proteins in plants (chapter 2). The second part of the volume deals with the microscopy toolbox (chapters 9-26) where methods for cryoultramicrotomy, rapid freeze-replacement fixation, immunolabelling protocols for animals, plants and algae distinguishing between the advantages and disadvantages of pre- and post-embedding techniques. Proteins colocalization (chapter 20), 3D reconstruction of intracellular antigen distribution (chapters 21, contributed together with chapter 9 by the two editors themselves, and 22) and immunogold staining for scanning electron microscopy (chapter 24) are some of the very interesting topics presented in the usually highly detailed step-by-step protocols of the Springer protocols series.

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