

# Introduction

Techniques for manipulating neural systems in general and neuroendocrine systems in particular have matured greatly compared to the era in which nerve cell destruction and electrical stimulation provided our main tools. In theory, nerve cell groups connected with hormonal systems should offer strategic advantages to the stem cell biologist because of the wealth of chemically understood regulatory steps to exploit. While the current volume cannot provide a comprehensive review of the quickly evolving applications of stem cell biology, it does provide a first view of some of the early successes and new possibilities.

For example, the striking successes of Lorenz Studer with dopamine-expressing neurons may not only prove to be of surpassing importance for Parkinson's disease but may also shed light on dopaminergic neuron participation in basic processes of behavioral reward. Inna Tabansky, in addition, portrays how neuroendocrine neurons derived from stem cells can provide models of disease processes that then could be attacked under well-defined *in vitro* conditions. In a different type of presentation, Alon Chen provides a vision of how stem cell biology could be applied in a neuroendocrine system crucial for responses to stress: the corticotropin-releasing hormone system.

The final chapter, from the highly experienced developmental biology lab of Karine Rizzoti and Robin Lovell-Badge at the Crick Institute, presents an overview from both outside and inside the central nervous system of the likely contributions of such work to the new field of regenerative medicine.

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