
Preface

Advances in Life Sciences and Biotechnology have historically relied on the ability to replicate the building blocks of life in vitro, in order to elucidate their mode of action. Much biotechnological progress in the last 40 years has been focused on developing more efficient analysis and synthesis technologies for both DNA and proteins. However, while orders of magnitude reduction in costs for DNA sequencing and synthesis was achieved during the last decade, the throughput and cost of technologies for protein production and engineering have changed comparatively little.

Cell-free protein expression is a rapid and high-throughput methodology for conversion of DNA-encoded genetic information into protein-mediated biochemical activities. It holds the promise to narrow the technological gap between DNA and protein technologies and provide a platform for broad application of synthetic biology principles in the Life Sciences.

Cell-free technologies have developed in two opposite but complementary directions: scale-up and miniaturization. Scale-up aims to produce preparative amounts of high-value recombinant proteins rapidly and without involvement of a recombinant host. Miniaturization aims to extract the most information out of the smallest amount of the largest possible number of proteins or protein variants at the lowest possible cost. Combination of both directions is expected to provide us with a powerful platform for protein analysis, engineering, and manufacturing.

This book is aimed to bring together the key opinion leaders of cell-free technology development and provide case studies and detailed protocols for application of cell-free methodology. The book aims to cover the main directions in the development of cell-free technologies including several recently developed cell-free systems. The book also presents a number of applications of cell-free systems that range from discovery of biofuel enzymes to in vitro assembly of viruses.

Target groups: Biochemists, bioengineers, biotechnologists, cell biologists, and chemical and synthetic biologists.

St. Lucia, QLD, Australia

*Kirill Alexandrov
Wayne A. Johnston*

Cell-Free Protein Synthesis

Methods and Protocols

Alexandrov, K.; Johnston, W.A. (Eds.)

2014, XI, 313 p. 66 illus., 31 illus. in color., Hardcover

ISBN: 978-1-62703-781-5

A product of Humana Press