Methods in Cell Physiology

Edited by
DAVID M. PRESCOTT

VOLUME V

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PREFACE

Volume V of this treatise continues to present techniques and methods in cell research that have not been published or have been published in sources that are not readily available. Much of the information on experimental techniques in modern cell biology is scattered in a fragmentary fashion throughout the research literature. In addition, the general practice of condensing to the most abbreviated form materials and methods sections of journal articles has led to descriptions that are frequently inadequate guides to techniques. The aim of this volume is to bring together into one compilation complete and detailed treatment of a number of widely useful techniques which have not been published in full detail elsewhere in the literature.

In the absence of firsthand personal instruction, researchers are often reluctant to adopt new techniques. This hesitancy probably stems chiefly from the fact that descriptions in the literature do not contain sufficient detail concerning methodology; in addition, the information given may not be sufficient to estimate the difficulties or practicality of the technique or to judge whether the method can actually provide a suitable solution to the problem under consideration. The presentations in this volume are designed to overcome these drawbacks. They are comprehensive to the extent that they may serve not only as a practical introduction to experimental procedures but also to provide, to some extent, an evaluation of the limitations, potentialities, and current applications of the methods. Only those theoretical considerations needed for proper use of the method are included.

Finally, special emphasis has been placed on inclusion of much reference material in order to guide readers to early and current pertinent literature.

DAVID M. PRESCOTT

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Chapter 1

Procedures for Mammalian Chromosome Preparations

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I. Introduction

Since chromosome analyses of mammalian cells have been used in recent years for studies on a variety of biological problems, it is considered appropriate to present the various techniques in one chapter for easy reference. However, for every technique different laboratories have their own modifications and idiosyncrasies. It is, therefore, not feasible to cover all the variations. This chapter simply describes some of the procedures currently used in this laboratory. This does not mean that our systems are the best—it only proves that we have our own idiosyncrasies.

II. Animal Materials

A. Procurement of Animals

If the experimental materials involve only the standard laboratory animals (e.g., laboratory mice, Norway rats, and Syrian and Chinese hamsters) their procurement is no problem since they are commercially available. However, if the animals to be used are not standard laboratory strains, one must use other means to obtain them. There are a number of ways to do this, all of which can be pursued simultaneously.

1. Buying

Many animals can be purchased from dealers, and there are numerous dealers who are anxious to sell any kind of animal to you from lions and chipmunks to skunks. The problem is that prices are high, and, in most cases, there are no accurate locality data for each specimen. Since one must sometimes deal with dealers, a catalog should be handy for easy consultation. "Zoos and Aquariums in America" by William Hoff, American Association of Zoological Parks and Aquariums, Oblebay Park, Wheeling, West Virginia, will prove useful.

2. Begging

This is naturally the best way of getting what one wants at very low cost. It is financially impractical if not impossible to buy an elephant just to get a piece of tissue for chromosome studies. Thus, zoos are useful for such purpose providing that the investigator can enlist the cooperation of zoo directors and veterinarians. Other potential sources such as game farms, primate centers, special laboratories, are all worth exploring.