ed among Europeans and North Americans, with only one Asian (Nishida) and no African or South American. They represent a range of humanistic, natural historical, and social scientific disciplines and perspectives, but there is no voice from the biomedical community. Language studies with great apes weigh heavily in the arguments of several authors for their having highly developed intellectual abilities, sensibility, and personalities.

It may be imprudent for sponsors of the Great Ape Project to premise their case on current genetic information, as some authors in this volume (Goodall, Fouts and Fouts, Miles, Patterson and Gordon, Diamond, Dunbar, Ryder) do to varying degrees. Although chimpanzees and humans may express approximately 98.4% genetic (DNA) similarity overall, this still leaves many individual genes that differ. We do not know the functional meaning of the genetic data. Tagging humans as "great apes" will cause a semantic muddle—like the argument from genetics, it is, at best, marginal to the case for improved treatment of our nearest relatives. Instead, their sensibility, intellectual abilities, and personalities must carry the day.

Despite frequent mention of the genetic closeness of humans, chimpanzees, bonobos, and gorillas, the topic of possible hybridization between people and African apes is merely mentioned (Clark, Ryder) in *The Great Ape Project*. Bonobos and chimpanzees, which have the same number of chromosomes ($2n = 48$), can produce hybrids, and siabons have been produced via interbreeding siamang ($2n = 50$) and lar gibbons ($2n = 44$). We cannot deny the possibility that humans ($2n = 46$) and chimpanzees could birth hupanzees. Of course, such radical experiments should be unnecessary to establish universal humane treatment of apes.

The Great Ape Project surely would stimulate discussion in classes on conservation, ethics, morality, law, personality, and human nature. It should be read by all practicing and would-be primatologists and laboratory technicians, particularly those who work with captives. My unranked top ten picks among the variable chapters are those by Goodall, Miles, Bekoff, Corbey, McGinn, Rollin, Mitchell, Francione, Noske, and Sapontzis.

One would be foolhardy to predict the impact of the book on public policy. The best hope of subscribers to the Great Ape Project is to expand lobbies that protect the lives and dignity of these magnificent creatures and to extend the mandate to embrace all beasts that evidence personalities. Like people, they can return great joy to those who love them and attempt to understand them on their own terms. The bottom branch is that policy-makers must bend to a largely emotional appeal that deeply prods our moral, spiritual being—the essence of humanity.

I am skeptical that *The Great Ape Project* holds the answer but am at a loss to suggest viable options. The enlistment of analogies to injustices that men visit upon slaves (usually people of color), intellectually impaired persons, women, children, and gender extenders is unsettling in ways that would deter me from supporting the declaration on great apes were I not already intimately acquainted with them. Such comparisons neither promote the equal dignity of all humans nor lead to a full appreciation of the adaptive complexes and novel capabilities of apes. Though none of the science fiction (Regan, Miller) in *The Great Ape Project* is as compelling as Boulle's *La planète des singes*, some of its anecdotes (Rollin, Cantor, Swart) are gripping.

Now we need published precise plans on the nature of the proposed "special territories in our countries" (p. 6) that are to accommodate liberated captives and how they are to be governed and supported financially. Second, it is imperative that the biomedical community inform debate by setting forth an inventory of specific remedies that have resulted from recent use of great apes as humanoid models and test subjects. They also should provide detailed accounts of why other means—tissue culture, genetic manipulation, computer models, observations on human patients and naturally afflicted nonhuman subjects—cannot serve instead during quests for treatments and cures. Third, all nations that have indigenous populations of apes should respond vigorously to the international call for their conservation via hands-off approaches to their habitats and bodies. Finally, we should work and, for those so inclined, pray for peace and good will toward all animals and their ecosystems.

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Vignettes: Research Accoutrements

There is no going back to the more primitive arrangements of 30 or 40 years ago. Only a scientist who is already of Nobel Prize class can now get away with blowing his own glassware, preparing his own standard reagents, answering his letters (belatedly!) in longhand and composing his papers on a portable typewriter at a tiny desk in an odd corner of a crowded laboratory.

—*John Ziman*, in *Prometheus Bound: Science in a Dynamic 'Steady State'* (Cambridge University Press)

When I see a beautifully computer-prepared, full-color slide, what first goes through my mind is "this guy obviously doesn't have enough to do."

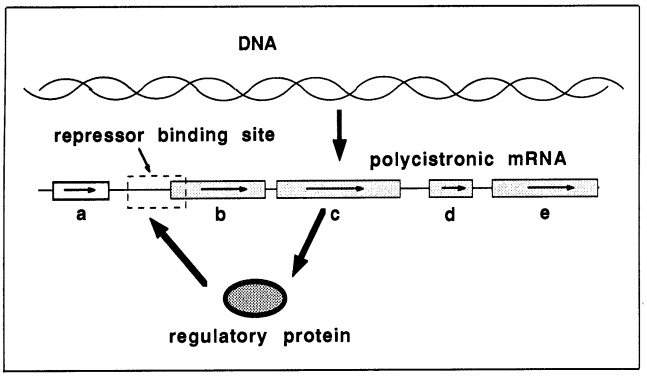
—*Peter J. Feibelman*, in *A Ph.D. Is Not Enough! A Guide to Survival in Science* (Addison-Wesley)

Mechanisms of Control

Translational Regulation of Gene Expression 2. JOSEPH ILAN, Ed. Plenum, New York, 1993. xxiv, 493 pp., illus. $95.

Messenger RNA and translational regulation have come a long way since the early 1960s, when mRNA was thought of as a short-lived intermediate and control mechanisms were thought to be centered on transcription. In the late '70s Charles Yanofsky and his colleagues demonstrated that, besides transcriptional regulation by repression, the genes of the *trp* operon of *Escherichia coli* are subject to translational regulation by transcription termination, known as attenuation. This mechanism has been shown to be a common regulatory control in bacteria as well as in eukaryotic cells and their viruses.

Translational regulation of gene expression has been increasingly recognized as an important control in cell growth and development. Protein synthesis is a significant metabolic process in the cell and one of the major consumers of energy; its products (enzymes, growth factors, stress proteins, and so on) must be carefully regulated. Translational regulation proceeds through an enormous diversity of mechanisms, many of which are detailed in this timely book, which is an



"General regulatory scheme for translational regulation. The messenger encoding a ribosomal gene carries a repressor binding site generally located at close proximity to a ribosome loading site. This overlap induces competition between the ribosome and the ribosomal repressor protein for binding at this site. After binding of the repressor, translational coupling blocks the expression of the downstream reading frames." [From *Translational Regulation of Gene Expression 2*]

extension rather than a revision of its eponymous predecessor. Several of the regulatory modes described here seem to be characteristic of a variety of eukaryotic or bacterial systems. Some of them involve trans-acting proteins that bind to special cis-acting regions of an mRNA as a general way to regulate the synthesis of specific proteins. Ribosomal frameshifting and readthrough of stop codons also contribute to modulation of gene expression, especially of the reverse transcriptase gene in retroviruses. New and interesting results showing that some of the protein-synthesis initiation factors act as proto-oncogenes suggest that additional mechanisms of control may await discovery.

The contributions to this book vary in quality. Hatfield's opening paper, which deals with a two-ribosome model for attenuation, is particularly clear and informative. Data and examples are cited from the *trp* operon and *ilvGMEDA* attenuators. Hatfield argues that functional and structural differences between them cannot be accommodated by a single model and that their mechanisms of action must be different. A careful discussion of the assumptions underlying these conclusions not only provides new insight but suggests new areas of investigation.

The rate-limiting step of protein synthesis is often initiation, and several papers deal with regulation of this process. Merrick and Anthony provide a detailed examination of translation of bicistronic mRNAs. They describe three initiation mechanisms—5′ m^7G cap-dependent initiation, internal initiation, and reinitiation—and convey the limitations of our ability to correlate and predict the type of initiation from structural information, giving the reader a sense of the direction of future research.

Disappointing are some contributions that contain excessive jargon, limiting their potential audience. Given the book's emphasis on mechanism, it is surprising that little structural information is offered. Insights regarding protein and RNA structure, along with quantitative data, would have provided a molecular basis for possible regulatory pathways. To some extent this omission reflects the current state of the field, although the tat-TAR interaction in HIV mRNA has been characterized both structurally and functionally. A useful integration of structural and functional information is provided by Portier and Grunberg-Manago, who discuss the biological mechanisms and possible control by structural elements, such as pseudoknots.

Although this book does not pretend to be a complete catalog of control mechanisms, the examples have been carefully chosen, and enough of them are sufficiently well presented to make this a useful volume for those interested in translational regulation of gene expression. As our knowledge of RNA structure and proteins associated with translational control mechanisms increases, we should begin to be able to describe these mechanisms in detailed molecular terms.

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The Anarchist AIDS Medical Formulary. A Guide to Guerrilla Immunology. Selected Essays. Charles R. Caulfield with Billi Goldberg. North Atlantic, Berkeley, CA, 1993. xvi, 155 pp., illus. Paper, $12.95.

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