GEN Biotechnology
Volume 1, Number 1, 2022

DOI: 10.1089/genbio.2022.29009.hes

GEN Biotechnology

EDITORIAL

GEN Biotechnology and the New Age of Bioinnovation

Hana El-Samad

Biotechnology is the best hope we currently have for conquering our health and environmental challenges. Whether it is the fashionable cloth fabric made of mushrooms, the engineered cells that obliterate diseased tissue, the all-mighty transgenic plants and the promise of biopesticides, or the nanotechnology that protects vaccine mRNA molecules long enough to rev up our immune system, biotechnology is at the heart of the most remarkable progress of the past few decades.

In truth, biotechnology is as old as the dawn of human civilizations. In a feat of serendipitous biotechnology, Sumerians and Babylonians used yeast to prepare beer as early as 6000 BC. Manipulation of microorganisms, plants, and animals continued through the ages, and became more systematic with the fundamental breakthroughs of the 19th century—as Louis Pasteur and Robert Koch established the role of microorganisms in disease, how to harvest bacterial colonies, and how to use them for vaccines. Carl Ludwig established a procedure for keeping animal organs alive under *in vitro* conditions, and Gregor Mendel investigated the hereditary "factors" of pea plants.

The establishment of these "factors" as genes, and the discovery of restriction enzymes and ligases to cut and then paste genes across organisms, ushered the genetic engineering revolution of the 20th century. In the 1970s, genetically engineered bacteria became the routine host to manufacture human proteins, such as the human growth protein somatostatin and insulin. For many, this was the dawn of the "age of biotechnology."

So, what is different now? The answer is—both nothing and everything!

Nothing because like our ancestors (those from 6000 BC and a few decades ago), we know that our most valuable resources are the biological treasures and innovations in our genomes and in the genomes of the trillions of species with which we share our earth. *Everything* because our shots on goal have become exponentially more frequent and fruitful now that we can mine, manipulate, and analyze these genomes at unprecedented scale, speed, and accuracy.

But that is not all—breakthroughs in how to synthesize, modify, read, edit, and write DNA make modern genetic engineering an affair closer to a computer than a typewriter. Progress in protein engineering means that we can augment the engineering toolbox with new molecular inventions in addition to those offered to us by evolution. And computational methods are helping us decipher the rules and principles of these components (both new and borrowed from nature) and learn how to compose them reliably in more complex circuit configurations.

A New Age

With all of this and more, we are entering yet another new "age of biotechnology." I am exhilarated to say that our new journal *GEN Biotechnology* will be the platform and voice of this new age.

For 40 years, *Genetic Engineering & Biotechnology News* (GEN) magazine has covered the biotech industry like no other. Over that time, GEN's parent company, Mary Ann Liebert, Inc., has built a formidable stable of peer-review titles including *Human Gene Therapy*, *Tissue Engineering*, *The CRISPR Journal*, *Soft Robotics*, *Health Equity*, and *The Journal of Women's Health*. Finally, we are launching a marquee peer-review journal bearing the famous "GEN" logo that will, we trust, make its mark just as its sister magazine has since the dawn of the biotech industry.

Our intent is to make *GEN Biotechnology* the premier platform for the most exciting and rigorous discoveries and technologies across the entire industry—from human health and the environment to plants and materials. But that is only the starting point. As I settle into my new role as chief editor, here are few more ambitions:

GEN Biotechnology will be the meeting place of opinions. It will be where the vision of the field is formed and constantly updated, and where discussions about successes as well as failures and lessons learned, will thrive.

GEN Biotechnology will be intentional in the voices it amplifies—not only of those who already have a microphone, but also of those who are just discovering the power of their voices and ideas. With diversity comes innovation. And innovation through diversity will power our journal forward.

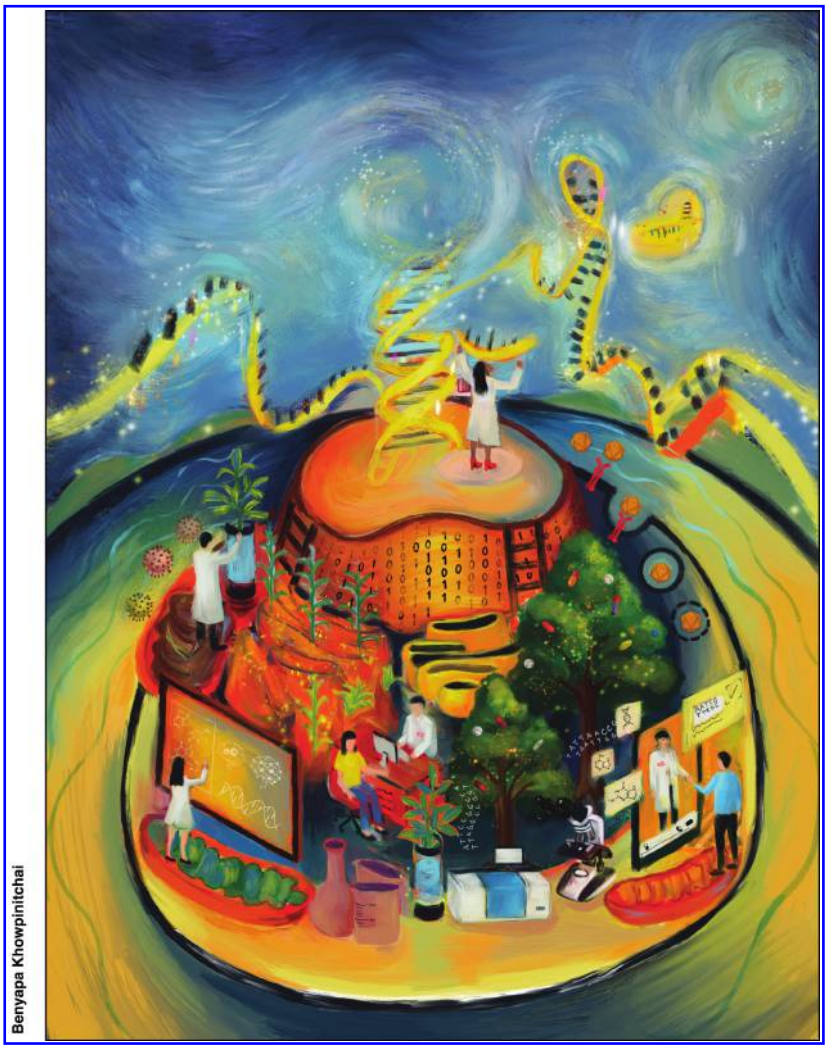
In a field where the fundamental and applied often intersect, *GEN Biotechnology* will pioneer the collaborative voice of academia and industry.

And in a world where biotechnology is one of our strongest bets against our health and environmental woes, *GEN Biotechnology* will seek innovative solutions devised by research communities everywhere for both their local and our shared global challenges.

The Debut Issue

Despite a very tight timeline, we are proud to present a vibrant and exciting debut issue that illustrates the verve, quality, and breadth of research and analysis we aim to showcase going forward. That begins with the stunning cover art, designed by Benyapa Khowpinitchai, a talented young researcher from Thailand who is about to embark on her PhD. (We first spotted Ben's

Kuo Family Endowed Professor, Department of Biochemistry and Biophysics, University of California at San Francisco, San Francisco, California, USA, E-mail: Hana.El-Samad@ucsf.edu



talent on Twitter last summer when her design was selected for a Cold Spring Harbor Laboratory symposium program.)

In this inaugural issue, we present a wide range of exciting topics in the biotechnology field, including a commentary on blockchain in biotech from Martin Leach and colleagues, an exclusive interview with Rudy Tanzi on paradigm shifts in tackling Alzheimer's disease, a review on gene editing for crop improvement from Wendy Srnic (Corteva), a long-read perspective on the seminal contributions of breakthrough prize winner Pascal Mayer and the dawn of next-gen sequencing, and a tasty smorgasbord of predictions on the future of biotech as part of GEN's 40th anniversary celebration last October.

We also feature a pair of excellent feature stories from members of the GEN editorial team: "Views & News" pieces that cover biotech's emerging original research, including critical analyses of nanopore peptide sequencing by Yujia Qing and Hagan Bayley and the rise of xenobots from Will Ratcliff.

This debut issue includes our first two original research articles, one of which is a collaboration between Andrew Ng (Outpace Bio), structural biologist David Baker (University of Washington/Howard Hughes Medical Institute), and my own group, in which we build circuits using *de novo* designed protein heterodimers. This study shows the power of using computationally designed proteins for cell engineering, enabling new biotechnological and therapeutic applications. In future issues, we will be placing a premium on publishing research advances in all areas of biotechnology.

Team Building

In the space of just a few months, I have enjoyed getting to know my new teammates (virtually) at the Mary Ann Liebert publishing company based outside New York. In particular, I look forward to working with our talented senior editor, Fay Lin, who has taken the bold step to leave academia after obtaining her PhD from UCLA in 2021 and will be involved in all aspects of peer review, editing, and journal design. We are ably assisted by Executive Editor Kevin Davies, who 30 years ago launched *Nature Genetics* and more recently was instrumental in the launch of our sister publication *The CRISPR Journal*.

I am also grateful to the support of a talented and experienced team in New York involved in all facets of journal production and promotion, led by Editorial Director Sophie Reisz, Marketing Director Katie Ryan, Head of Production Larry Bernstein, GEN President Marianne Russell, and of course Mary Ann Liebert herself.

One critical thing that sets *GEN Biotechnology* apart is the talented and diverse editorial advisory board that is already beginning to take shape. I am so grateful for these individuals who share our aspirations for the journal and look forward to further growth in the months ahead. (To learn more about my overall vision for *GEN Biotechnology,* please read my interview with Fay Lin on page 21.)

This promises to be an exciting journey. Colleagues, let us build our meeting place—*GEN Biotechnology*—together!