



Welcome to **DNA 2.0's Gene Synthesis & Protein Engineering** newsletter. The Newsletter keeps you up to date on trends and breakthroughs affecting molecular biologists who are interested in achieving their project goals better, faster and at lower cost. For more detailed gene synthesis and protein engineering information, log onto our web site at [www.dnatwopointo.com](http://www.dnatwopointo.com).

1455 Adams Dr. Menlo Park, CA 94025 March 2004

## CODON OPTIMIZATION

A cornerstone of modern biotechnology is the ability to express functional proteins in heterologous hosts. Unfortunately, many heterologous proteins are difficult to express, expressed at low levels or expressed with high level of translational errors.

With **DNA 2.0's** rapid and low cost custom gene synthesis, it is possible to redesign the entire gene sequence to maximize the likelihood of high protein expression. Our in-house software **Protein-2-DNA** has been designed to quickly and efficiently assist in the design of codon optimized genes. This is a service we provide free of charge to our customers.

With this Newsletter, we have included a review (**Trends in Biotechnology – June 04 issue**) that describes the underlying science of codon optimization, and how to do it. We also list all of the publications we could find that compare protein expression yields between codon optimized and wild type genes in heterologous systems. We think it is a useful primer for anyone interested in codon optimization and heterologous expression.

Please let us know if you need more information.

## SYNTHETIC GENE DEVELOPED AS NEW NANOMATERIAL

Self-building nanostructures are becoming reality. Scripps scientists have recently designed and synthesized a single-stranded DNA building block for future nanomaterial scaffold that can be mass-produced.

A 1,700 nucleotide DNA strand that spontaneously folds into an octahedron was recently made by Gerald Joyce and coworkers at Scripps Research Institute (Nature 2004, 427:618-621). The octahedron structure is only 22 nanometers across and can easily be mass-produced by DNA polymerase. Each edge of the octahedron consists of a unique DNA sequence resulting in a non-symmetric structure. Having different sequences on each edge makes for many unique addressable attachment sites for proteins or other DNA binding entities. The unique sites can further be used to sort or organize the nano-octahedrons. Using the same strategy it should be possible to build cubes, pyramids and many other structures.

Nano-scaffolds like these have a huge number of potential applications ranging from sensors, templates for cell growth or carrier of other nanostructures. Many different compounds can be attached to the surface or incorporated into the octahedron cage. Networks of nano-octahedrons can be used to build larger structures. The sky is the limit.

The efficient gene synthesis process developed by **DNA 2.0** is ideally suited to take advantage of this new and exciting application. We are following the developments in this area closely so that our customers can take full advantage of the latest tools available for design and synthesis of DNA based nanomaterials.

## THE NEW DNA 2.0 PRICING STRUCTURE FOR CUSTOM GENE SYNTHESIS

We have yet again lowered our prices for short genes. Our \$2.95/bp price now goes all the way down to 340bp DNA fragments.

Please inquire for long genes, academic discounts, bulk discount, gene variant discount, custom cloning and vector alternatives.

Length	Price	Turnaround
0 - 339bp	\$1,000 Flat rate	10 days
340 - 830bp	\$2.95/bp	10 days
831 - 1,000bp	\$2,450 Flat rate	10 days
1,001 - 1,675bp	\$2.95/bp	10 days
1,676 - 1,800bp	\$4,950 Flat rate	15 days
1,801- 3,000bp	\$2.75/bp	15 days
>3,000bp	Please ask for quote	

Genes shorter than 1,675bp are **Guaranteed** within 15 business days, and genes between 1,676bp and 3kb are **Guaranteed** within 20 business days.

## DNA 2.0 IN WIRED MAGAZINE!!!

Read more in the recent Wired magazine article about **DNA 2.0**, tomatoes, Descartes and Deep Blue's 36<sup>th</sup> move against Kasparov. One morning when I wake up it will all make sense.

[www.wired.com/news/culture/0,1284,62539,00.html](http://www.wired.com/news/culture/0,1284,62539,00.html)