CODEX DNA

SOLA ENZYMATIC DNA SYNTHESIS WEBINAR

Codex DNA presentation | March 2022

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This presentation includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties as well as our own estimates of potential market opportunities. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. We believe that these third-party sources and estimates are reliable, but have not independently verified them. Our estimates of the potential market opportunities for our products include several key assumptions based on our industry knowledge, industry publications, third-party research and other surveys, which may be based on a small sample size and may fail to accurately reflect market opportunities. While we believe that our internal assumptions are reasonable, no independent source has verified such assumptions. The industry in which we operate is subject to a high degree of uncertainty and risk due to a variety of important factors that could cause results to differ materially from those expressed in the estimates made by third parties and by us.

AGENDA

Topic	Presenter
Codex DNA Mission and Overview	Todd Nelson
Industry Introduction and Key Definitions	Dan Gibson
Chemical Synthesis, Challenges with Current Technologies and Solutions	Dan Gibson
Enzymatic DNA Synthesis	Dan Gibson
SOLA	Dan Gibson
The SOLA Opportunity & Codex DNA's Strategy	Todd Nelson
Future Applications for SOLA	Todd Nelson
Investor Q&A	Panel: Todd Nelson, Dan Gibson, Jennifer McNealey

CODEX DNA MISSION AND OVERVIEW

Designed to Shape the Future of Healthcare and Technology

OUR MISSION

At Codex DNA, our mission is to apply breakthrough technologies for designing and building DNA that will address important healthcare and technology markets

DAN GIBSON, CODEX DNA'S CHIEF TECHNOLOGY OFFICER

THE GENOMIC REVOLUTION ENABLED DECREASING COSTS + INCREASING SCALE FOR SEQUENCING, OR READING DNA

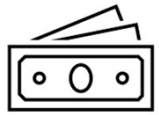
THE NEXT REVLOUTION WILL BE DRIVEN BY SYNTHETIC BIOLOGY APPLICATIONS THAT "WRITE" OR RE-CODE DNA TO ADDRESS LARGE OPPORTUNITIES IN HEALTHCARE + TECH

2001
Sequencing of the human genome

Thousands of genomes sequenced (10,000+ readers sold)

2020
Millions of DNA fragments need to be built & tested (potential for 10,000+ writers)

Large TAMs that require automation to unlock value



PACBIO

ion torrent

illumina

CODEX DNA

POTENTIAL FOR 10,000+ BENCHTOP "DNA WRITERS" SERVING LARGE RAPIDLY GROWING MARKETS

CODEX DNA

PURPOSE BUILT PORTFOLIO

Commercial Technologies

Gibson Assembly

Industry's #1 technology for building and cloning DNA. Kits contain building blocks to allow BioXp systems to produce synthetic DNA (genes), mRNA and protein

BioXp Automation

On-market push-button automation platforms for vaccine and biologics discovery, gene editing and genome engineering—*these systems rapidly build DNA (genes), mRNA and Proteins*

Future Technologies

SOLA

SOLA or Short Oligo Ligation Assembly is a Leading Enzymatic DNA Synthesis (EDS) development platform for synthetic biology—eventually integrated into the BioXp to drive the desktop biology printing revolution

Cell Based Solutions

VmaX cells are used for rapid cloning and bioproduction. They are the fasted growing organism on earth

BREAKTHROUGH TECHNOLOGIES THAT ACCELERATE THE PACE OF DISCOVERY

LONG HISTORY OF ENZYMATICALLY ASSEMBLING DNA

RESEARCH ARTICLE

Complete Chemical Synthesis, Assembly, and Cloning of a *Mycoplasma genitalium* Genome

Daniel G. Gibson, Gwynedd A. Benders, Cynthia Andrews-Pfann
Holly Baden-Tillson, Jayshree Zaveri, Timothy B. Stockwell, Anushka
Mikkel A. Algire, Chuck Merryman, Lei Young, Vladimir N. Noskov, J
Clyde A. Hutchison III, Hamilton O. Smith*

genome, we needed to establish convenient and reliable methods for the assembly and cloning of much larger synthetic DNA molecules.

Strategy for synthesis and assembly. The native 580,076-bp *M. genitalium* genome sequence (*Mycoplasma genitalium* G37 ATCC 33530 genomic sequence; accession no. L43967) (*3*)

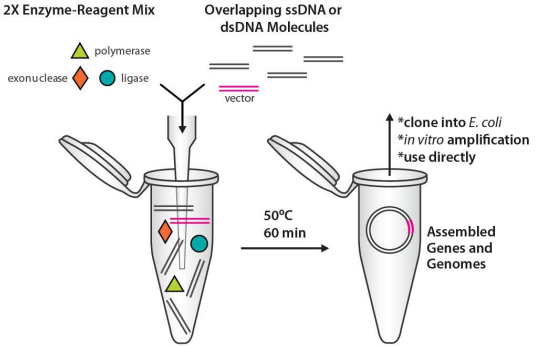
Enzymatic assembly of DNA molecules up to several hundred kilobases

Daniel G Gibson[1], Lei Young[1], Ray-Yuan Chuang[1], J Craig Venter[1,2], Clyde A Hut Hamilton O Smith[2]

We describe an isothermal, single-r assembling multiple overlapping DN concerted action of a 5′ exonuclease and a DNA ligase. First we recessed single-stranded DNA overhangs that then covalently joined them. This as to seamlessly construct synthetic ar pathways and entire genomes, and engineering tool.

overlapping DNA molecules and then incubated at 50 °C for as few as 15 min (Online Methods). This approach dramatically simplifies the construction of large DNA molecules from constituent parts.

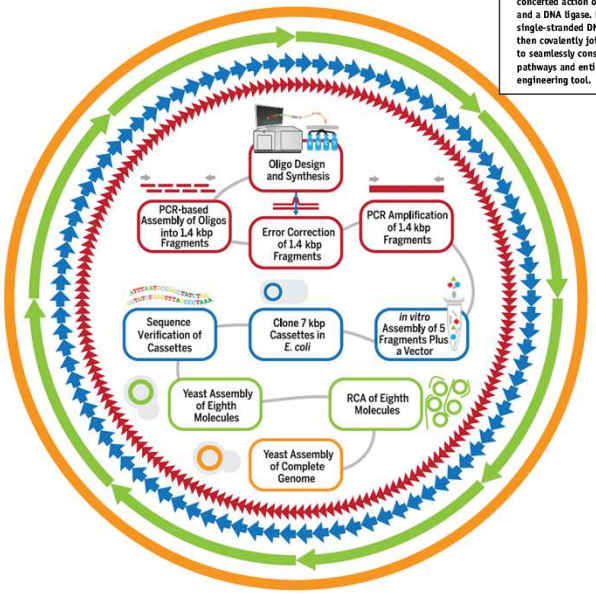
Exonucleases that recess double-stranded DNA from 5′ ends will not compete with polymerase activity. Thus, all enzymes required for DNA assembly can be simultaneously active in a single isothermal reaction. Furthermore, circular products can be enriched as they are not processed by any of the three enzymes in



CHAPTER FIFTEEN

ENZYMATIC ASSEMBLY OF OVERLAPPING DNA FRAGMENTS

Daniel G. Gibson[1]



RESEARCH ARTICLE

Creation of a Bacterial Cell Controlled by a Chemically Synthesized Genome

Daniel G. Gibson,[1] John I. Glass,[1] Carole Lartigue,[1] Vladimir N. Noskov,[1] Ray-Yuan Chuang,[1] Mikkel A. Algire,[1] Gwynedd A. Benders,[1] Chuck Merryman,[1] Sanjay Vashee,[1] Radh Cynthia Andrews-Pfannkoch,[1] Evgeniya A Thomas H. Segall-Shapiro,[1] Christopher H. Hamilton O. Smith,[2] J. Craig Venter[1,2]*

We report the design, synthesis, and assem JCVI-syn1.0 genome starting from digitize into a *M. capricolum* recipient cell to creat synthetic chromosome. The only DNA in th including "watermark" sequences and othe mutations acquired during the building pro and are capable of continuous self-replica

crude *M. mycoides* or *M. capricolum* extracts, or by simply disrupting the recipient cell's restriction system (*8*).

We now have combined all of our previously established procedures and report the synthesis, assembly, cloning, and successful transplantation of the 1.08-Mbp *M. mycoides* JCVI-syn1.0 genome, to create a new cell controlled by this synthetic genome.

Chemical synthesis of the mouse mitochondrial genome

Daniel G Gibson[1], Hamilton O Smith[2], Clyde A Hutchison III[2], J Craig Venter[1,2] & Chuck Merryman[1]

We describe a one-step, isother synthesizing DNA molecules fro The method cycles between *in vi* amplification until the desired l demonstration of its simplicity the entire 16.3-kilobase mouse 600 overlapping 60-mers.

Chemical synthesis of long DN

and estimate that one individual could reconstruct the entire 16.3-kb molecule in just 5 d (**Supplementary Fig. 1**).

We recently described a one-step, isothermal *in vitro* recombination system capable of joining overlapping double-stranded DNA molecules up to hundreds of kilobases long[7]. The assembly reaction mixture in this system contains three separate enzymes (T5 exonuclease, Phusion polymerase and *Taq* ligase) that work in harmony to join multiple DNA fragments. In a typical reac-

RESEARCH

RESEARCH ARTICLE SUMMARY

SYNTHETIC BIOLOGY

Design and synthesis of a minimal bacterial genome

Clyde A. Hutchison III,*† Ray-Yuan Chuang,† Vladimir N. Noskov, Nacyra Assad-Garcia, Thomas J. Deerinck, Mark H. Ellisman, John Gill, Krishna Kannan, Bogumil J. Karas, Li Ma, James F. Pelletier, Zhi-Qing Qi, R. Alexander Richter, Elizabeth A. Strychalski, Lijie Sun, Yo Suzuki, Billyana Tsvetanova, Kim S. Wise, Hamilton O. Smith, John I. Glass, Chuck Merryman, Daniel G. Gibson, J. Craig Venter*

define core sets of conserved genetic functions, using the methods of comparative genomics. Often, more than one gene product can perform a particular essential function. In such cases, neither gene will be essential, and neither will necessarily be conserved. Consequently, these approaches cannot, by themselves, identify a set of genes that is sufficient to constitute a viable genome. We set out to define a minimal cellular genome experimentally by designing and building one, then testing it for viability. Our goal is a cell so simple that we can determine the molecular and biological function of every gene.

RESULTS: Whole-genome design and synthesis were used to minimize the 1079-kilo pair (kbp) synthetic genome of *M.* JCVI-syn1.0. An initial design, based on

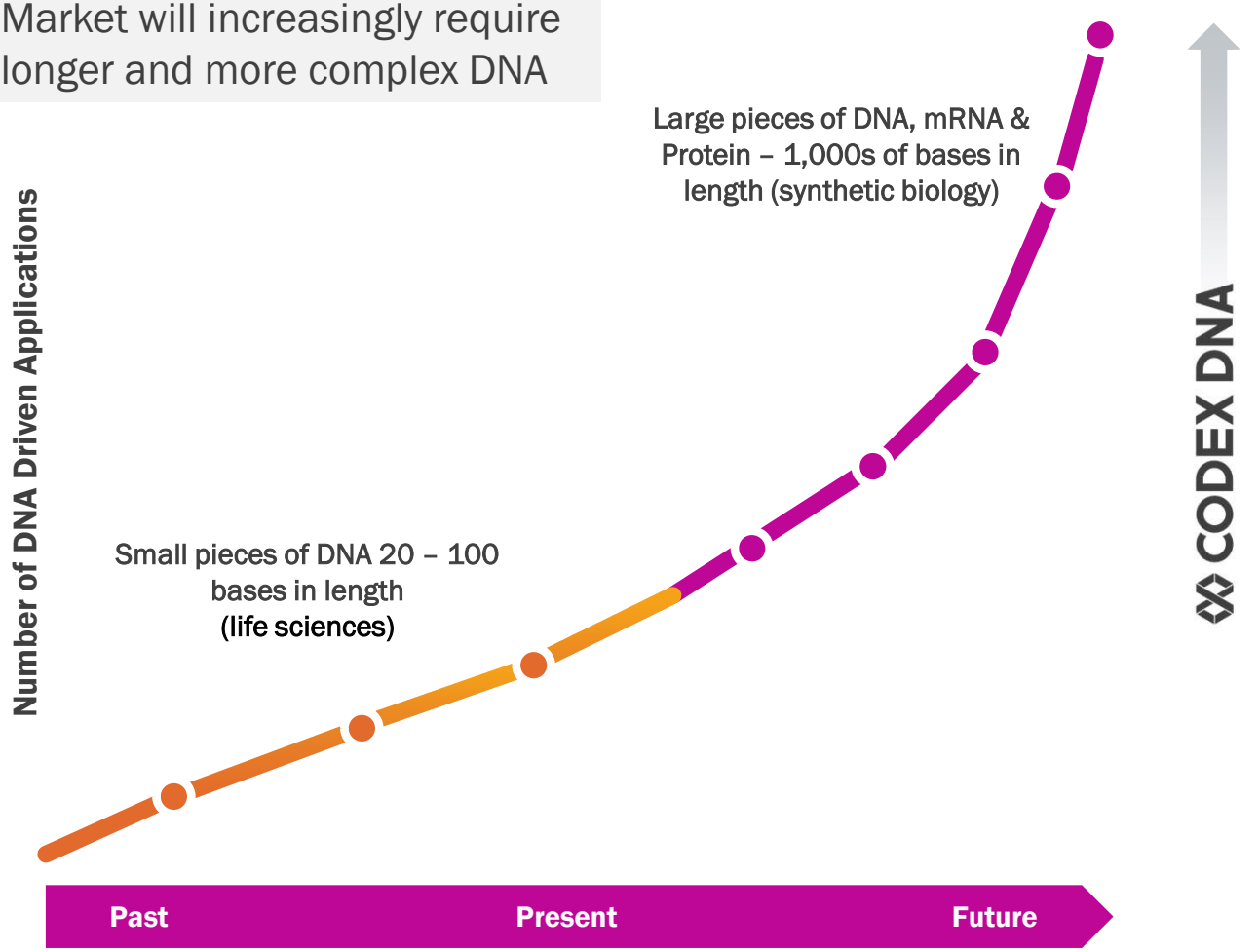
CODEX DNA

THE MARKET FOR DNA DERIVED PRODUCTS HAS EVOLVED

Both the number and complexity of applications using DNA has increased dramatically:

- Biologics
- Vaccines
- Precision Medicine
- Genome Engineering
- Cell & Gene Therapy

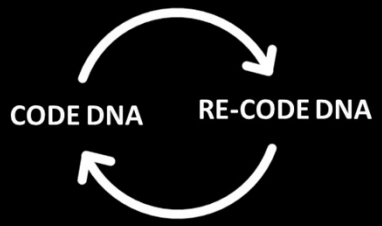
Market will increasingly require longer and more complex DNA

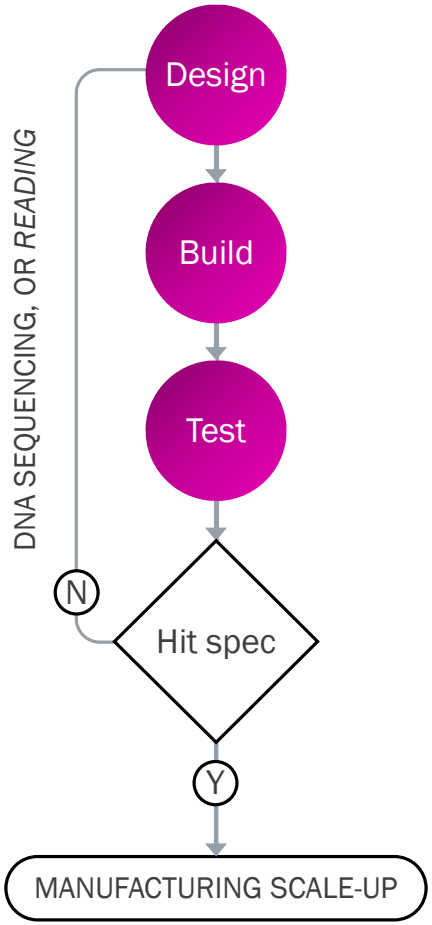


CODEX DNA

WHAT WE ENABLE

We enable the ***rapid*** "writing" or "building" of synthetic forms of **DNA, mRNA** and **proteins**





APPLICATIONS

Biologics
Solutions to design, build and test biologic constructs against drug targets

mRNA VACCINES & THERAPEUTICS
Solutions to develop vaccines for emerging viruses and pathogens

CELL AND GENE THERAPY
Solutions to improve CAR-T / TCR therapies

GENOME & CELL PATHWAY ENGINEERING
Solutions for diagnostics and manufacturing

DNA Data Storage
Solutions to store digital files

CODEX DNA

OUR STRATEGY

Our ability to drive deep customer relationships using a unique hybrid approach enables value creation

Our go to market strategy is a combination of direct and distributed selling channels for automation solutions and Biofoundry services and leveraging our technology portfolio and capabilities to engage in value creating partnerships

Automation Platforms

Biofoundry Services

Partnerships

- Value-proposition selling
- Penetrate workflows
- Use direct + distributor channels
- New markets + new products

- Leverage tech-stack
- Deep partnerships
- Potential for large deals with attractive economics
- Access to end markets

INDUSTRY INTRODUCTION AND KEY DEFINITIONS

DEFINITION OF OLIGONUCLEOTIDE (OLIGO)

- Short stretch of DNA or RNA between 20-100 bases
- Single-stranded DNA is the most common format
- Directionality with a 5’ end and 3’ end
- Designed to base-pair with DNA

5’---GATCCATAGATTCATTGCCATGGACTTC---3’

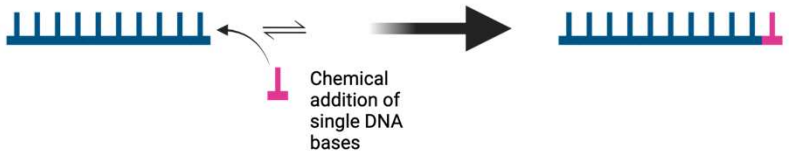
Applications:

- PCR primers to amplify DNA
- Primers for DNA Sequencing
- Probes for diagnostics or enrichment
- Oligonucleotide therapeutics
- Building blocks for synthetic DNA

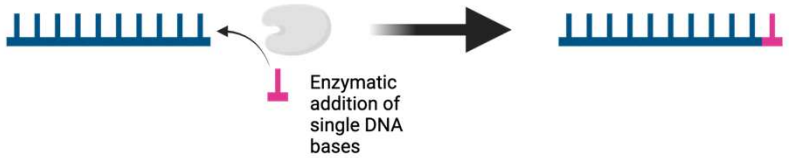
OVERVIEW OF OLIGO SYNTHESIS APPROACHES

Single DNA bases added at each cycle

Traditional Phosphoramidite Chemistry



TdT Enzymatic DNA Synthesis



Blocks of DNA bases added at each cycle

SOLA Synthesis

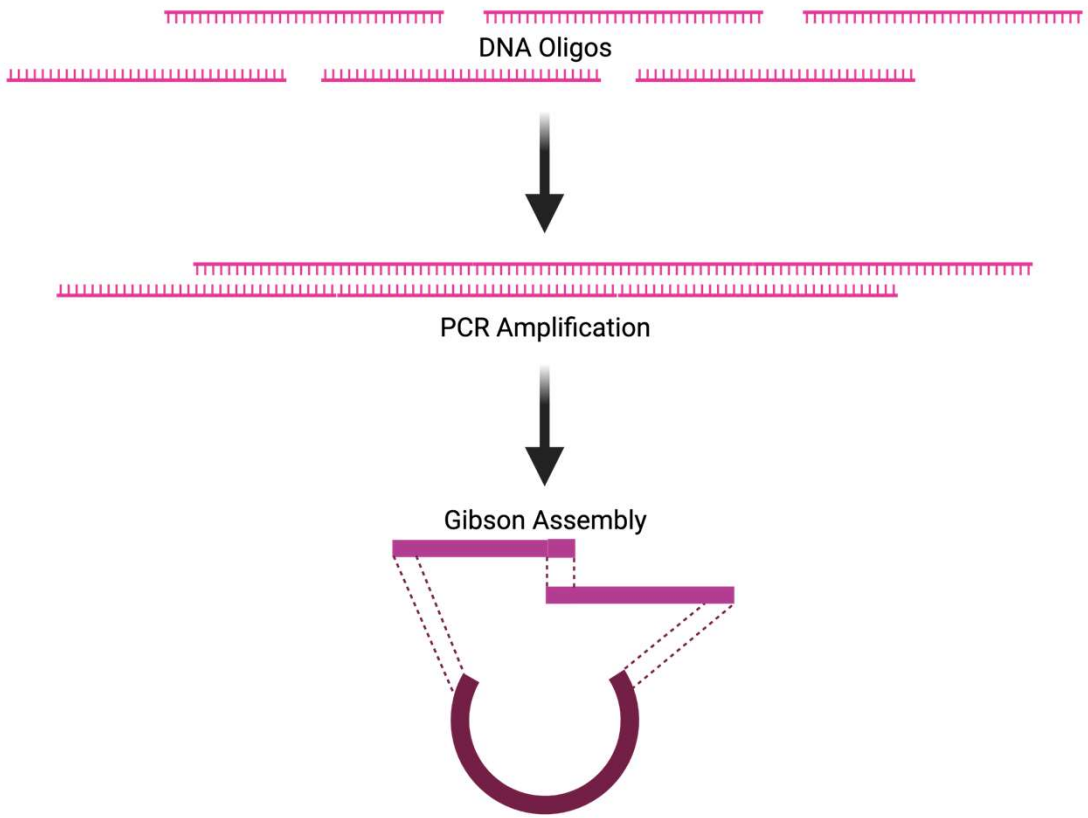
Our proprietary program in development

CODEX DNA

OVERVIEW OF DNA SYNTHESIS AND ASSEMBLY APPROACHES

Synthesis of single gene fragments

Gene fragments, genetic pathways & whole genomes



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CHEMICAL SYNTHESIS, CHALLENGES WITH CURRENT TECHNOLOGIES AND SOLUTIONS

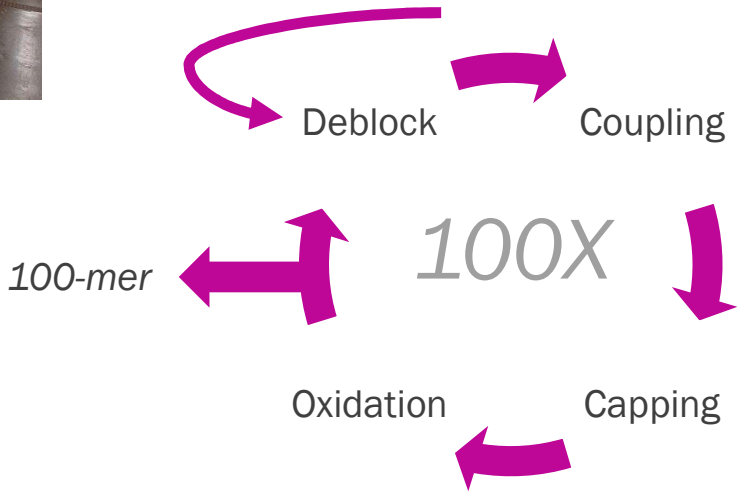
PHOSPHORAMIDITE CHEMICAL SYNTHESIS – SINGLE BASE ADDED AT EACH CYCLE

Centralized Manufacturing

Benefits to consumer

- Labor free
- High-throughput options
- No hazardous waste

Single Bases



100-mer

Decentralized Manufacturing

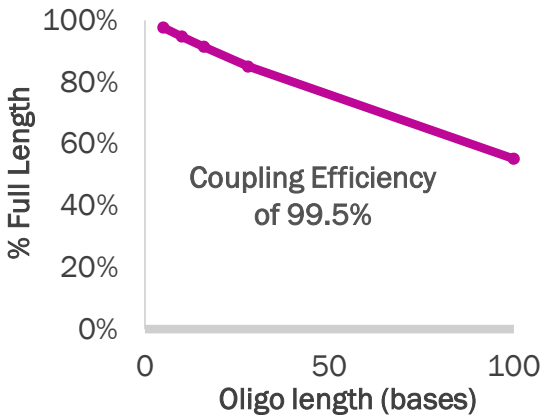
Benefits to consumer

- Faster turnaround time
- Build anytime
- Control of quality and supply

CODEX DNA

CHALLENGES WITH CHEMICAL SYNTHESIS

FIDELITY



- Single mutation can inactivate assay
- Requires error elimination methods
- Adds time and costs

COST

- DNA synthesis is expensive
- $0.10 per base of DNA
- $300 per gene
- $6,000 per genetic pathway
- $200,000 per genome
- Significant investment for 1 design

WASTE

- Generates several liters of non-aqueous toxic waste per 96-well plate of oligos
- Trichloroacetic acid
- Ammonium Hydroxide
- Excess reagents used to drive reactions to completion

CODEX DNA

ENZYMATIC DNA SYNTHESIS

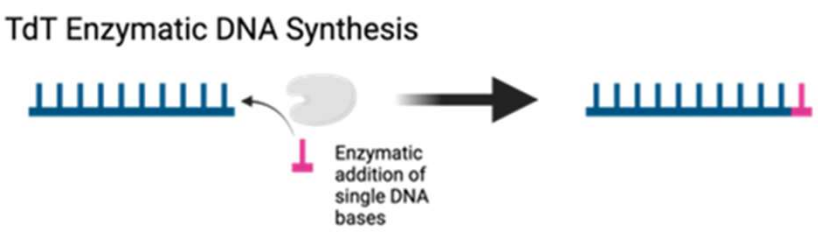
ENZYMATIC DNA SYNTHESIS (EDS)

Definition: an alternative approach to chemical oligonucleotide synthesis, involving the use of enzymes to construct synthetic DNA

- Enables a safe, planet friendly, scalable solution to making DNA
- Suitable for both centralized and decentralized DNA synthesis

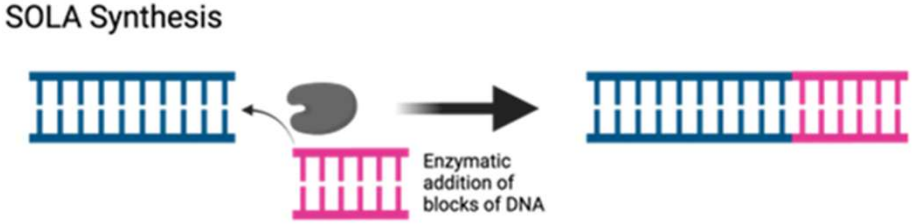
ENZYMATIC DNA SYNTHESIS APPROACHES

TdT



- Expensive
- Limited build length
- Applications limited to short DNA oligos
- High error rates as build size increases
- Reduction of hazardous waste

SOLA

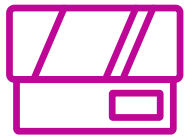


- Industry leading coupling efficiency
- Flexibility
- Ability to build ≥ 2,000 bp
- Reduction of hazardous waste
- Broad applications including:
  - CRISPR Guides
  - NGS Probes,
  - PCR primers
  - Gene, RNA and Protein Synthesis

SOLA

OUR EDS SOLUTION: SOLA (SHORT OLIGO LIGATION ASSEMBLY)

Short Oligo Ligation Assembly is our proprietary EDS technology



EXAMPLE, SIZES MAY VARY:

Stage I molecules

~ 3,000 small building blocks assembled into 10-mer oligos

SOLA EDS

Stage II molecules

10-mers assembled into 16-mer oligos

SOLA EDS

Stage III molecules

16-mers assembled into 28-mer oligos

SOLA EDS

Stage IV molecules

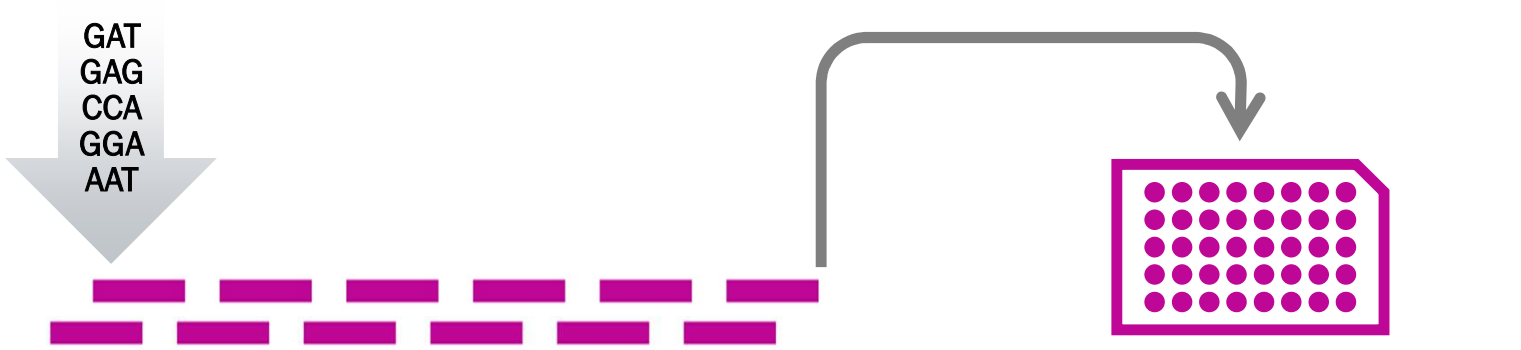
28-mers assembled into 100-mer oligos

SOLA EDS synthetic oligos ranging in length from 10-mers to 100-mers will be produced on our benchtop BioXp Oligo Printer System and BioXp DBC systems

Various downstream life sciences applications including CRISPR-Cas9 guide RNAs, NGS Probes, variant libraries, PCR primers and synthetic biology applications for gene synthesis, mRNA synthesis and protein synthesis

When integrated into the BioXp DBC System, SOLA EDS 100-mer oligos can be used to potentially build ***any*** gene in ***any*** genome using Gibson Assembly

ADVANCING DNA SYNTHESIS WITH SOLA



Our approach is designed to use a universal set of very small building blocks to build *any* DNA sequence

Customer orders our product as make-to-stock item

ADVANTAGES OVER ALTERNATIVE ENZYMATIC AND TRADITIONAL DNA SYNTHESIS CHEMISTRIES

FIDELITY

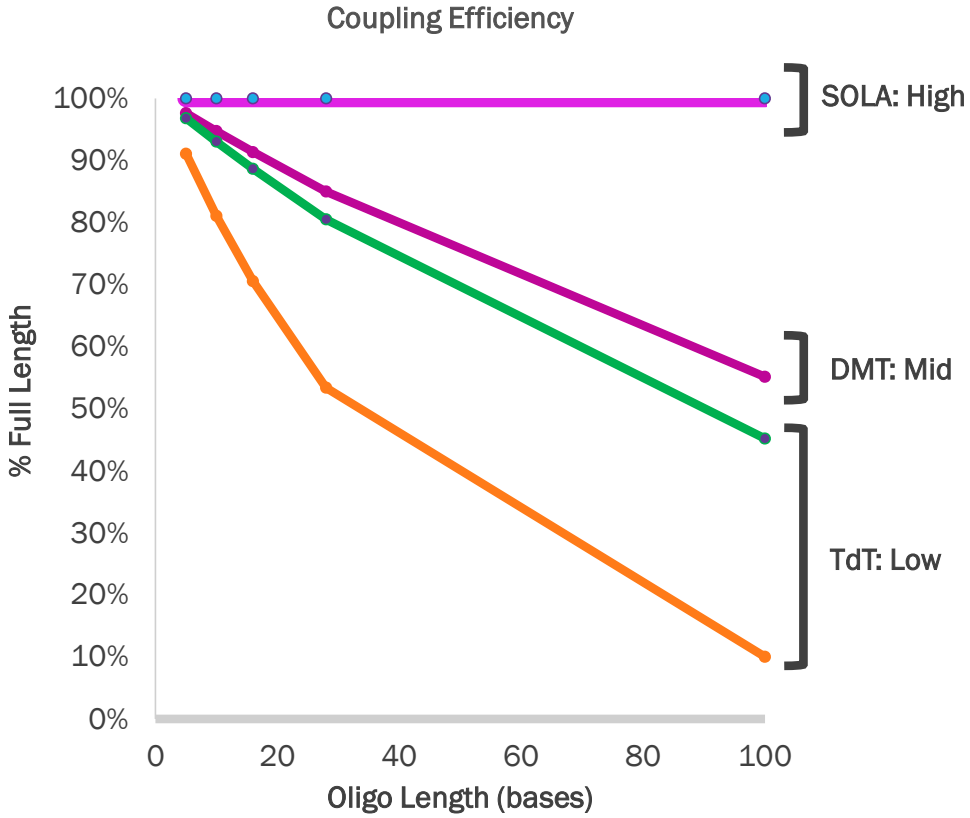
BUILDABILITY

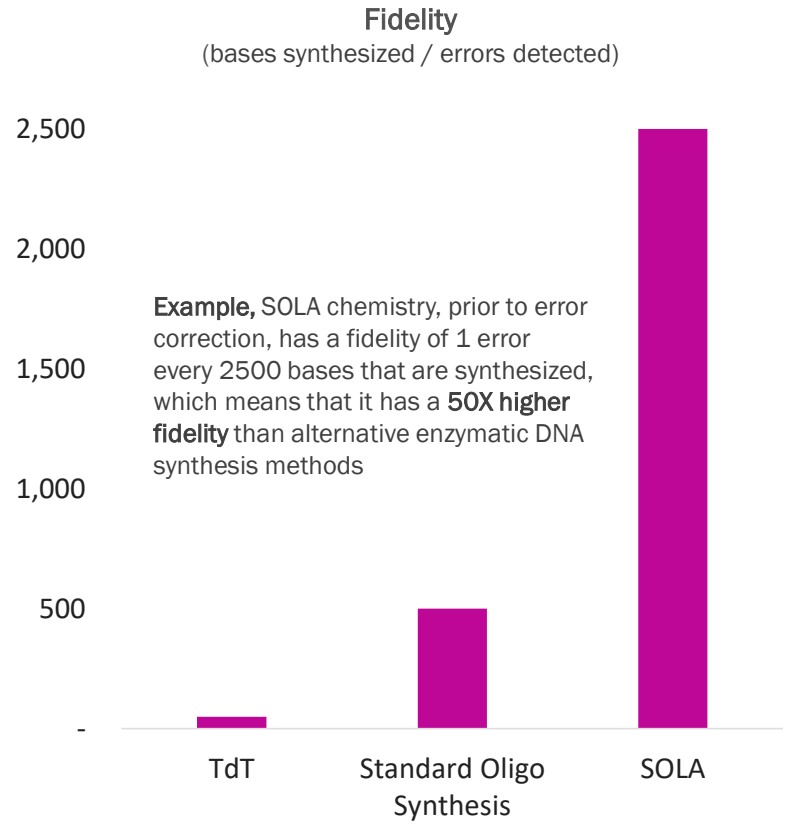
COST

SPEED + THROUGHPUT

QUALITY

SOLA HAS VERY HIGH COUPLING EFFICIENCIES AND FIDELITY





HIGH COUPLING EFFICIENCIES AND HIGH FIDELITY MAKE SOLA THE LOGICAL *SOLUTION* FOR SYNTHETIC BIOLOGY APPLICATIONS

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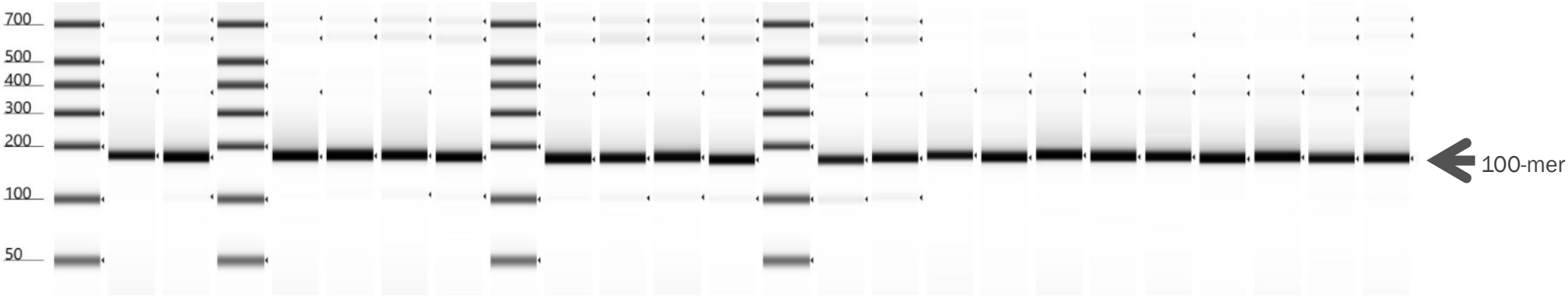
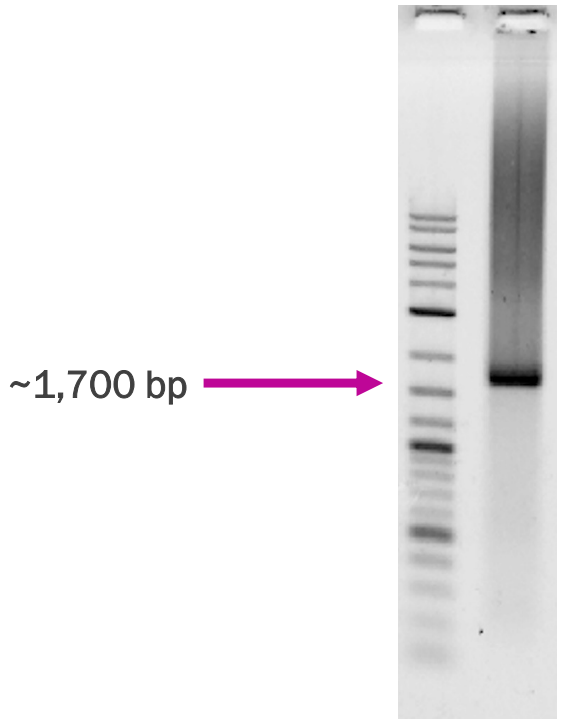
ROBUSTNESS: SOLA EDS USED TO BUILD REPLICATES FOR A LARGE VIRAL GENE



100% success rate using SOLA EDS for building 22 X 100-mer replicates for a segment of the HA flu gene.

EXAMPLE: HIGH FIDELITY CONSTRUCTION OF FULLY-SYNTHETIC 1.7 KB HEMAGGLUTININ (HA) GENE FROM INFLUENZA VIRUS



Success of Fully Synthetic Gene Assembly

Gel image shows the assembly of the fully synthetic ~1.7 kb H1 flu gene.

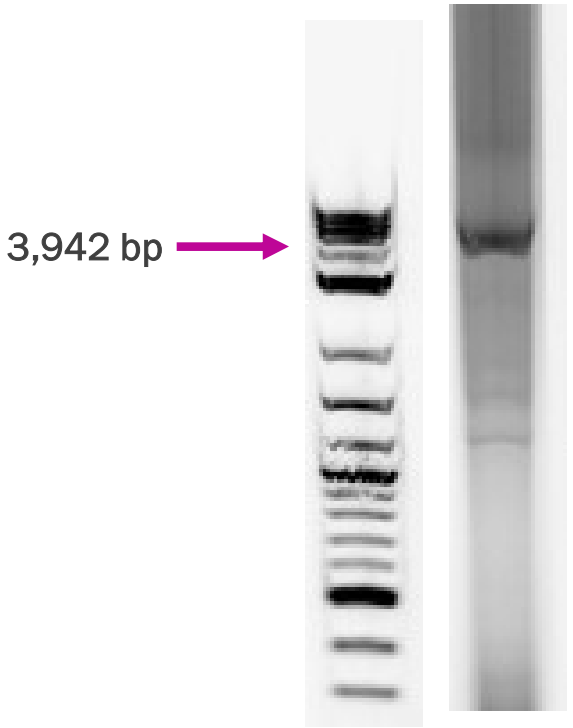
Method of Assembly

The fully synthetic ~1.7 kb H1 flu gene was derived from 32 overlapping SOLA generated 100-mers.

Confirmation of Error Rate

The full-length gene was confirmed by cloning and DNA sequencing and determined to have an error rate of approximately 1 error per 6,000 bp, *prior to* applying enzymatic error correction

EXAMPLE: HIGH FIDELITY CONSTRUCTION OF FULLY-SYNTHETIC 3.9 KB SARS-COV-2 SPIKE GENE



Success of Fully Synthetic Gene Assembly

Gel image shows the assembly of the fully synthetic 3,942 bp Spike gene.

Method of Assembly

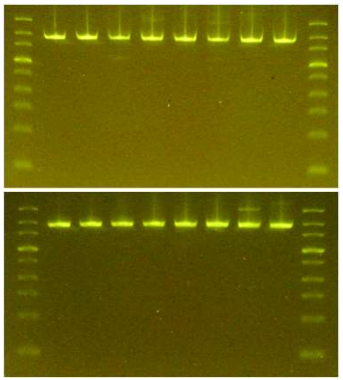
The fully synthetic ~3.9 kb Spike (Delta) gene was derived from 72 overlapping SOLA generated 100-mers.

Confirmation of Error Rate

The full-length gene was confirmed by cloning and DNA sequencing and determined to have an error rate of approximately 1 error per 5,400 bp, *prior to* applying enzymatic error correction.

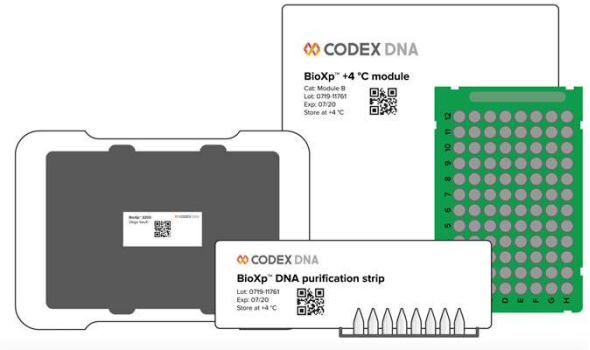
AUTOMATION: SOLA EDS BIOXP™ INTEGRATED WORKFLOW

SOLA EDS generated overlapping 100-mer DNA



QC Gel of 16 KRAS 100-mers

BioXp Kit



BioXp Instrument

dsDNA

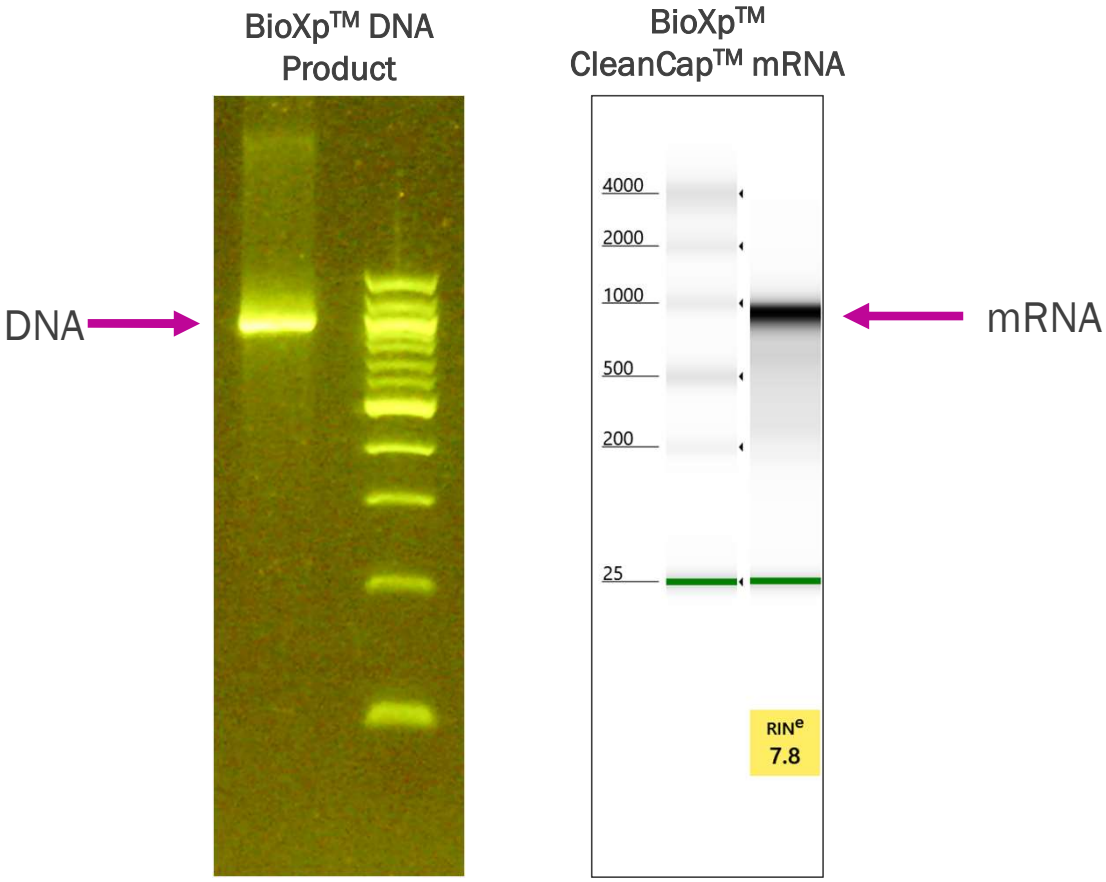
mRNA

Protein

CODEX DNA

KRAS CLEAN-CAP™ mRNA DERIVED FROM SOLA EDS ON THE BIOXP

- SOLA EDS KRAS was manufactured using 16 overlapping 100-mers
- SOLA EDS KRAS 100-mers were pooled and loaded onto BioXp™ 3250
- Using 100-mer pool BioXp synthesized full-length dsDNA template which was transcribed, capped, and tailed using CleanCap technology in a single BioXp run of 20 hours



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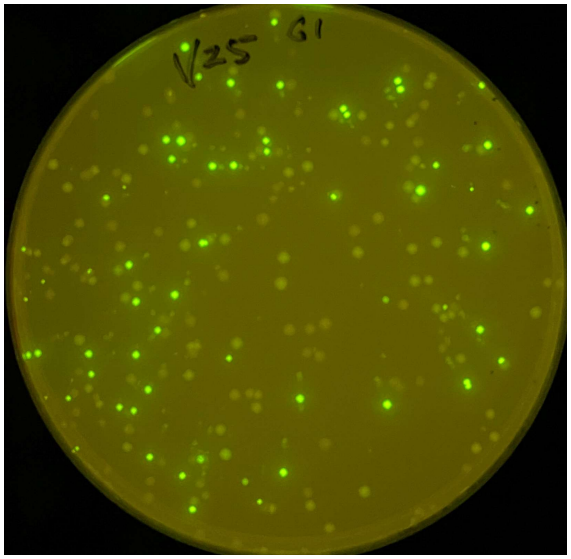
GFP PROTEIN DERIVED FROM SOLA EDS ON THE BIOXP

- SOLA EDS superfolder Green Fluorescent Protein (sfGFP) was manufactured using 24 overlapping 100mers. Full length DNA template = 1268 bps.
- 100mer sfGFP pool was loaded onto the BioXp and in 24 hours >6 ug sfGFP was manufactured from the SOLA derived linear expression templates (LETs).

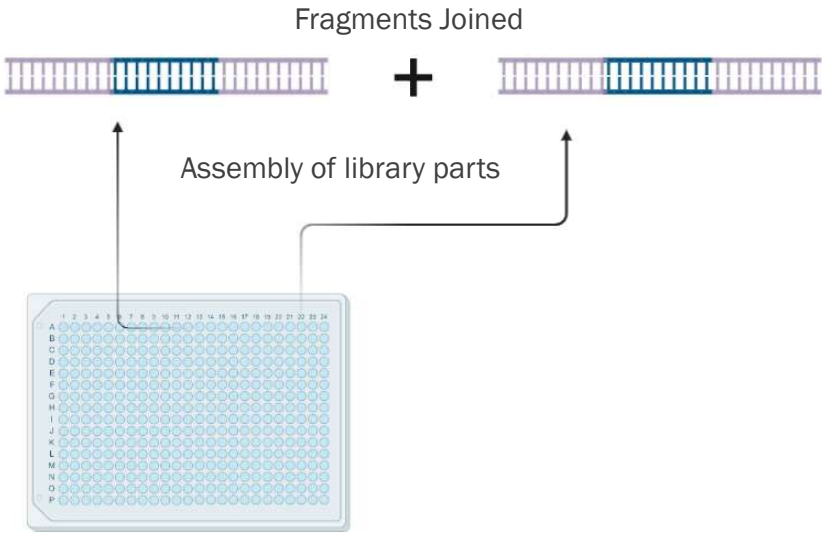


BioXp Fragments were cloned and transformed into *E. coli*

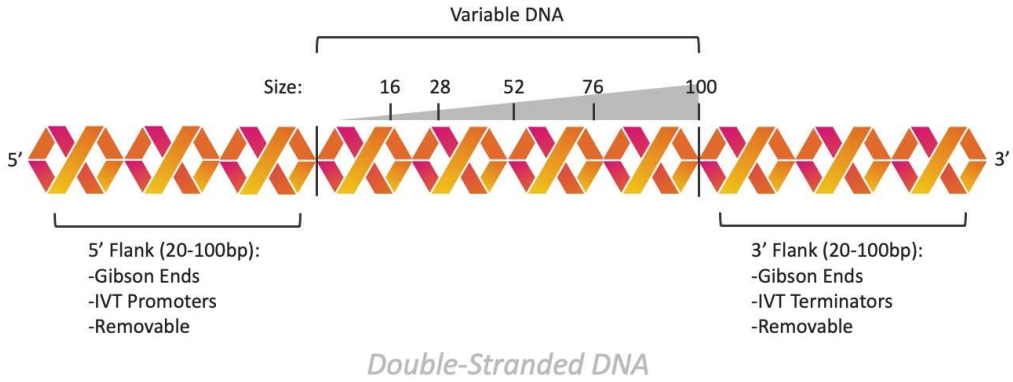
sfGFP Replicate	OSOS2 DNA conc (ng/ul)	[sfGFP], ug/mL	sfGFP Yield, ug
1 (A01)	28.1	196.37	6.87
2 (B01)	22.7	153.20	6.13
3 (C01)	28.1	168.19	6.73

SOLA ENZYMATIC DNA SYNTHESIS OFFERS FLEXIBILITY

Designed to assemble large numbers of very short oligos for multiple applications including assembly into high-fidelity longer genes



SOLA reagent cartridges contain all the reagents necessary to build DNA



- Oligos for Gene Synthesis
- CRISPR Guides
- PCR primers
- NGS Probes

ENABLES RAPID, LOW-COST SYNTHESIS OF VIRTUALLY ANY GENE USING A UNIVERSAL LIBRARY OF OLIGOS

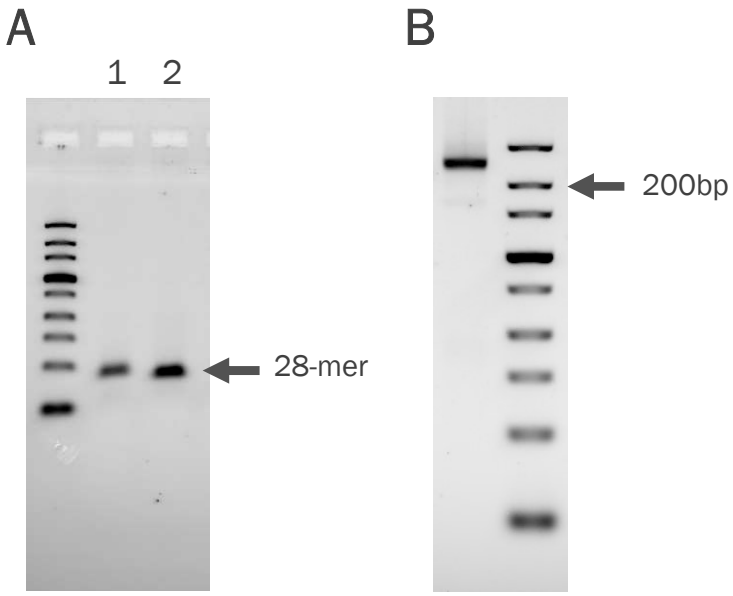
CODEX DNA

FLEXIBILITY: COMBINATION OF HIGH COUPLING EFFICIENCIES AND FIDELITY ENABLE A BROAD ARRAY OF HIGH GROWTH OPPORTUNITIES

Oligo Length	CRISPR Guides	PCR Primers	NGS Probes	Gene Synthesis	mRNA Synthesis	Protein Synthesis
10-mer	•					
16-mer	•					
28-mer	•	•				
52-mer		•				
100-mer		•	•	•	•	•

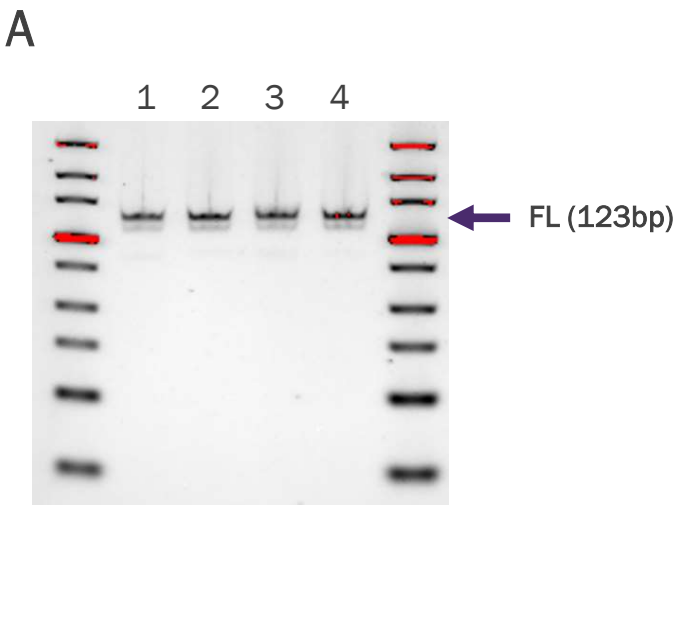
SOLA'S HIGH COUPLING EFFICIENCIES AND HIGH FIDELITY MAKE IT THE *IDEAL SOLUTION* FOR SYNTHETIC BIOLOGY APPLICATIONS

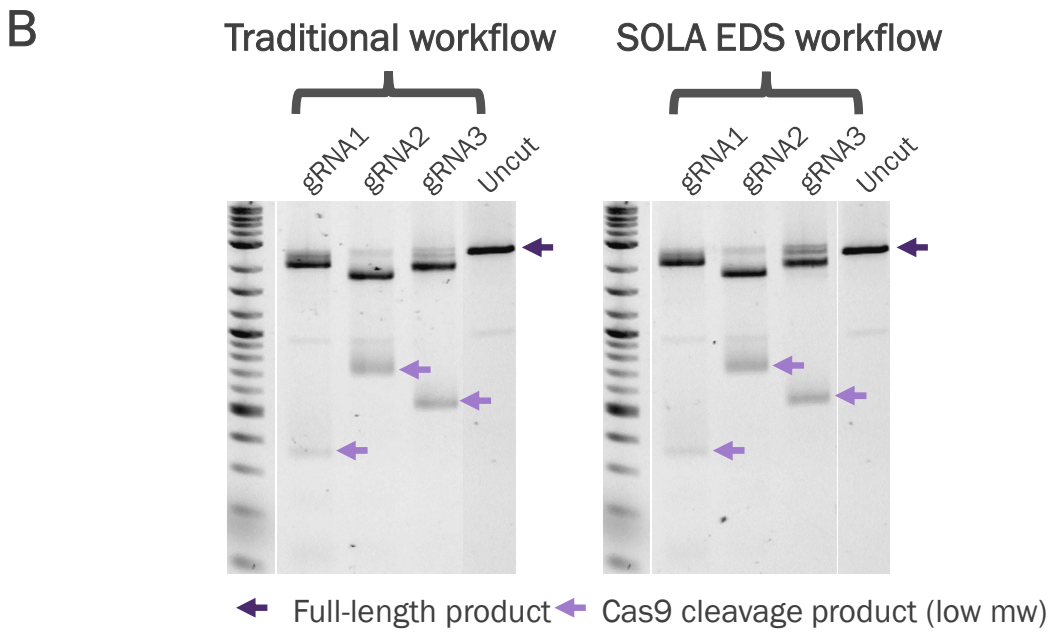
GENERATION OF PCR PRIMERS



Gel images demonstrate the successful production of two 28-mer ssDNA PCR primers (A) and amplification of a 250 bp region of an *E. coli* gene (B) using the PCR primers shown in (A). Following two rounds of SOLA EDS to produce dsDNA 28-mers, the products were enzymatically converted to ssDNA and flanking regions were removed. The 250bp PCR product was confirmed by DNA sequencing with 100% of the colonies demonstrated to be error-free.

CONSTRUCTION OF GUIDE RNA FOR CRISPR/CAS9 GENOME EDITING



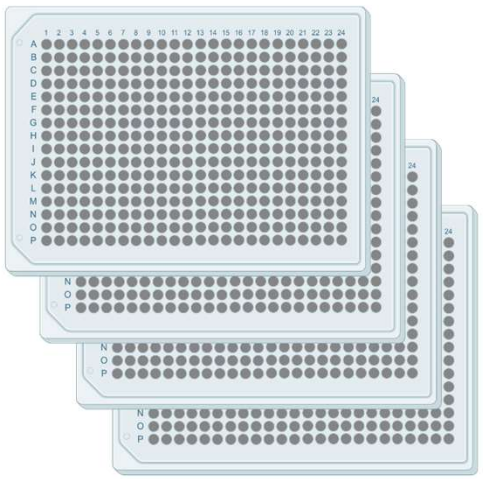


Gel images demonstrate the production of DNA templates for four 20-mer guide RNAs (**A**), and the successful demonstration of biological activity of three guide RNAs generated from (**A**) as tested by *in vitro* digestion of a pUC19 plasmid DNA template when combined with Cas9 enzyme (**B**). Expected low mw products from Cas9 cleavage are indicated along with the uncut control, which shows the expected full-length (FL) product. Very little qualitative differences were observed in gRNAs from templates generated by traditional workflows or by SOLA EDS.

EFFICIENCY BENEFITS OF SOLA EDS

SOLA Library

Provides enough material for
millions of genes to be synthesized



Dilution is the solution

- Leverage full yield of oligonucleotide material
- Oligo costs are driven down exponentially

CODEX DNA

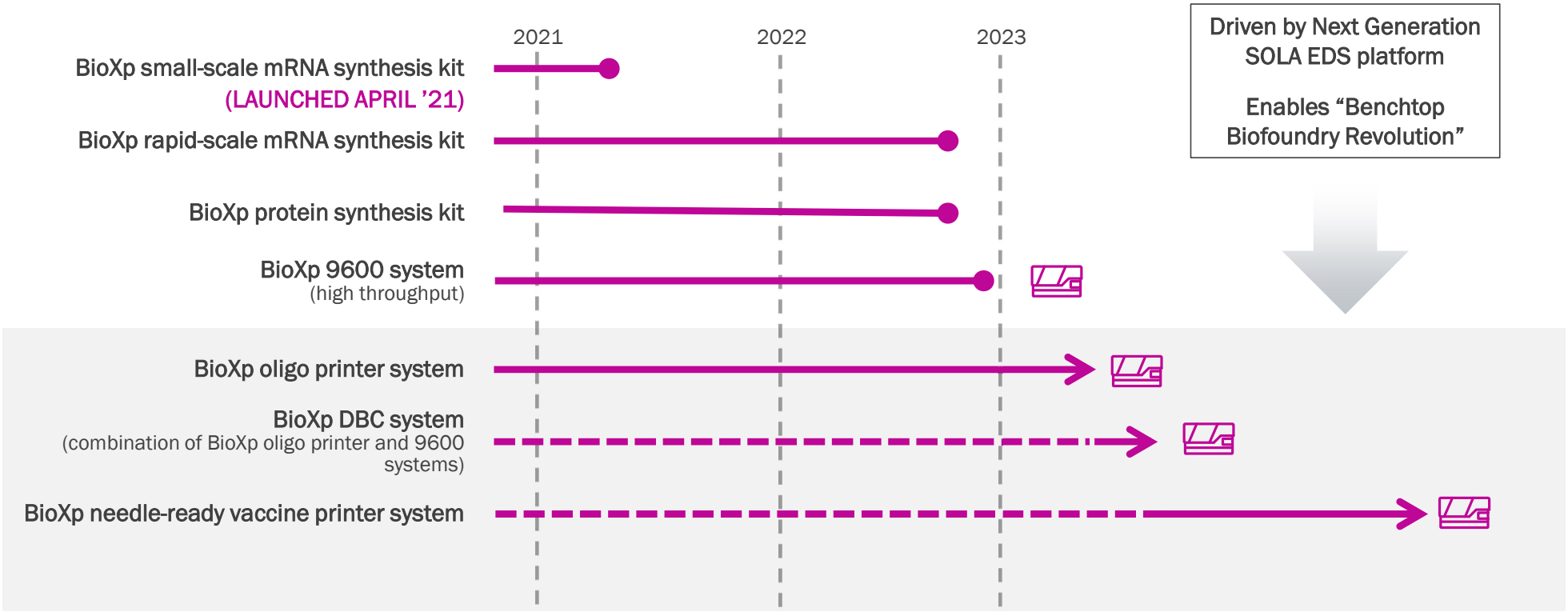
THE SOLA OPPORTUNITY & CODEX DNA'S STRATEGY

Designed to Shape the Future of Healthcare and Technology

ADVANTAGES OF CODEX DNA'S SOLA EDS TECHNOLOGY

	DNA Length	Fidelity	Applications	COST
Codex DNA	≥ 2,000 bp	Coupling efficiencies approach 100% resulting in >50x better fidelity	CRISPR Guides, NGS Probes, PCR primers Gene Synthesis, mRNA and Protein applications	Efficient low-cost bulk manufacturing of SOLA building blocks and enzymes
Others	≤ 100 bp	Risk of failure for new base additions	Limited to applications for short oligos, such as PCR primers, or where errors can be tolerated	Inefficient use of expensive dNTPs
Why Codex DNA Wins	Allows *unique* access to synthetic biology market	Better fidelity means scientists build longer DNA, mRNA and Protein accurately	Uniquely positioned across life science and synthetic biology applications	Lower cost per bp for DNA accelerates scientific discovery

FUTURE GROWTH ENABLED BY A STRONG TECHNOLOGY PIPELINE



SOLA REAGENTS WILL ENABLE CUSTOMERS WITH BIOFOUNDRY ON THEIR BENCHTOP

SOLA enables our vision of Digital to Biological Conversion

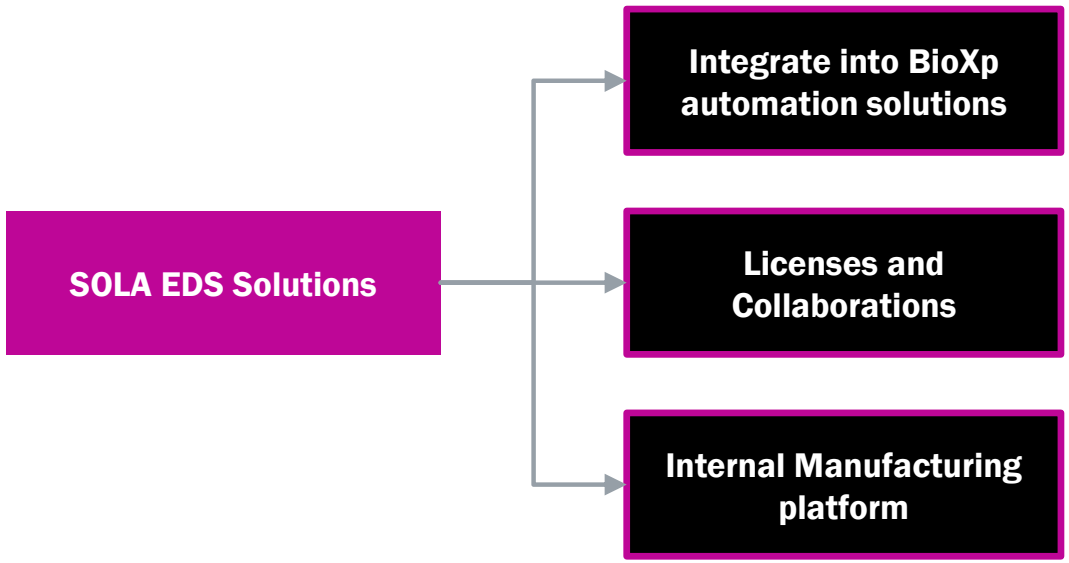
BioXp DBC: Builds oligos, primers, genes, mRNA and proteins at the benchtop

BUILD ON-DEMAND

CODEX DNA

MULTIPLE STRATEGIES TO LEVERAGE SOLA TECHNOLOGY

- Novel patent patented method for DNA Synthesis
- Multiple strategies to commercialization
- Potential to drive near-term revenue growth via partnerships
- Sustainable technology
- Potential to improve gross margins



CODEX DNA

MRNA VACCINE DISCOVERY

- Demonstrates value proposition for the BioXp franchise
- Validates Codex DNA as a leading EDS platform
- Provides significant near-term revenues including royalties on sales of mRNA-based vaccines and therapeutics

DEAL SNAPSHOT: WORTH UP TO $500M TO CODEX DNA

- Licensing and collaboration agreement to accelerate R&D of mRNA-based vaccines and biotherapies
- Collaboration gives Pfizer early access to out novel SOLA enzymatic DNA synthesis technology
- Option for exclusivity in two therapeutic areas
- Exclusive application: development milestones up to $55M + commercial milestones up to $180M, plus royalties for each application
- Non-exclusive applications: development milestones up to $35M + commercial milestones up to $60M, plus royalties for each application

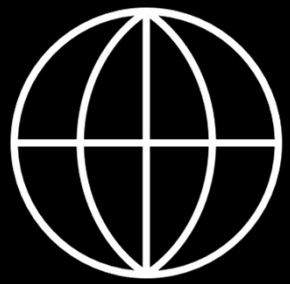
"We have signed a strategic collaboration and licensing agreement with Codex DNA… [for the] enzymatic assembly of DNA at the front-end of the mRNA production process."

This could possibly reduce the time to produce a new vaccine from 3 months down to 2 months. If successful, this would be an important differentiator when developing a vaccine for the flu, for example, as it would allow us to select a strain much closer to the start of any flu season."

- Dr. Albert Bourla, Pfizer Chairman and CEO

CODEX DNA

DIGITAL TO BIOLOGIC CONVERSION WILL ENABLE THE FUTURE



CODEX DNA

ENABLING PRODUCT CYCLE

- Allows access to additional large TAMs
- Accelerates product cycles
- Consolidates critical supply chains
- Enables global scientific collaboration

SOLA ENABLED BIOXP'S USING DBC REPRESENTS AN ESG+ TECHNOLOGY THAT HAS THE POTENTIAL TO SOLVE GLOBAL PROBLEMS AT A REGIONAL LEVEL

FUTURE APPLICATIONS FOR SOLA

Designed to Shape the Future of Healthcare and Technology

CELL & GENE THERAPIES: $2.7B END USER MARKET

Improvement in lead identification for T-Cell therapies

NEED

La Jolla Institute of Immunology sought rapid synthesis capabilities for KRAS G12V TCRs as a potential mRNA vaccine

SOLUTION

Used BioXp system to rapidly and accurately synthesize and clone TCRs for KRAS G12V and associated mRNA

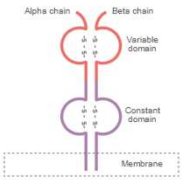
RESULT

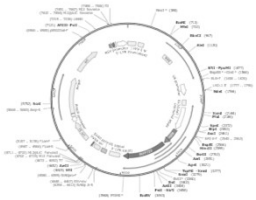
mRNA from synthetic TCRs elicited desired immune response

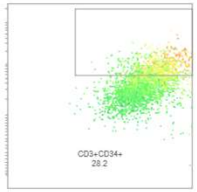
OPPORTUNITY

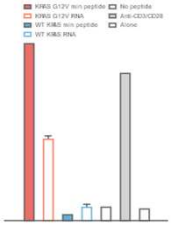
400+ opportunities within cell and gene therapy workflows

> *"The BioXp™ system has dramatically improved the speed, efficiency and scale of our discovery platform."*
>
> — Stephen Schoenberger, PhD | La Jolla Institute of Immunology |







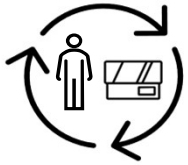


CODEX DNA

BIOLOGICS: $129B END USER MARKET

CUSTOMER NEED DEFINED*

Multiple biotechnology and pharmaceutical customers seeking to dramatically accelerate the number of leads for antibody-based therapeutics



A streamlined and highly automated antibody discovery workflow designed to advance an increasing number of validated targets into preclinical studies

SOLUTION

Integrated BioXp™ 3250 automation platforms into antibody-engineering workflows; heavy utilization of synthetic DNA library automation modules (CDR and IgG libraries)

RESULT

Improved productivity as much as 20x based on the number of validated leads generated

OPPORTUNITY

2,000 – 3,000 BioXp systems

AMGEN Pfizer janssen Genentech TWIST BIOSCIENCE

* Representative customers

CODEX DNA

DIGITAL TO BIOLOGICAL CONVERSION WILL ENABLE THE FUTURE

GATACCATACCATACAGGAT

GATACCATACCATACAGGAT

GATACCATACCATACAGGAT

Once the sequence to be built is submitted to the BioXp cloud, the BioXp printer begins to print the desired DNA, mRNA or protein

SUMMARY INVESTMENT HIGHLIGHTS

- End-to-end automation systems and services for synthetic biology
- Opportunity to unlock large, multi-billion-dollar TAMs
- Large IP portfolio, with over 300 patents
- Robust commercial pipeline and technology stack for partnering
- Strong commercial growth trajectory
- Diversified revenue stream (on market products, biofoundry services & partnerships
- Potential for significant gross margin expansion

THANK YOU!