



INVEST IN INVVAX

We use a new genetics platform to develop better vaccines for flu, COVID-19, etc

inv-vax.com Pasadena CA

Technology

Minority Founder

Biotech

Science & R&D

Featured Investors



Priya Balachandran ✓

Syndicate Lead

Invested in [InvVax](#)

Follow

InvVax is fundamentally changing the way in which antiviral vaccines are developed. Leveraging years of technical and commercial experience in the space, the InvVax team has developed a breakthrough platform that significantly increases the vaccine hit rate against current, emerging and future variants of viruses such as Influenza, Hepatitis and SARS-COV-2. InvVax is collaborating with leading global researchers in the space to apply their best knowledge and move the

[Read More](#) ▾

Invested \$2,500 this round

Highlights

1 Huge global market for these vaccines: Universal flu - \$22B; COVID-19 - \$5B

2 Chance to make an enormous societal impact

- 3 Patented durable and universal flu vaccine
 - 4 Major smashes: Moderna, BioNTech, Novavax: Invest in the next one!
 - 5 Backed by Life Science Angels - #1 US angel group (CB Insights), Sand Hill Angels, Tech Coast Angels
 - 6 Funded by the DoD and the NSF
-

Our Team



Arthur Young CEO

PhD from a top 5-medical school; Postdocs at Harvard and UCLA; Pioneered a powerful new viral genetics platform applicable to vaccines and therapies



Nima Shiva Head of Business Development

Managing Director, Convergent Ventures; Founder, Encode Bio; Co-founder, Neurion Pharmaceuticals



Olga Petrauskene Director

COO, Diagnosticcs Biosystems; Produced an HIV and flu diagnostic with Applied Biosystems that is sold in 60 countries

Wefunder Founder video

Arthur Young

01:00

vimeo



InvVax
Next Generation Vaccines

InvVax – Next Generation Vaccines

The Problem

- 01.**
Pandemics:
COVID-19, Ebola, Zika
- 02.**
Possible Emergence Of:
- 03.**
Every year: Flu --
- 04.**
The Challenge:

- COVID-19 – 6.9M deaths
- 1918 Flu – 50M deaths
- 1957 Flu – 2M deaths
- 1968 Flu – 2M deaths
- 2009 Flu – “Swine” flu

- Bird H5N1 – 60% fatality
- Bird H7N9 – 30% fatality

- 36M cases in U.S. alone
- 300,000 – 650,000 deaths worldwide

- Susceptible to variants that escape vaccine

InvVax's solution

1

Find regions of the virus that cannot mutate – i.e., Any mutations in these regions result in the death of the virus

2

Find these regions by a novel, sophisticated scientific platform pioneered by Dr. Arthur Young (InvVax founder) while at UCLA

3

Target these regions in a next-generation vaccine

4

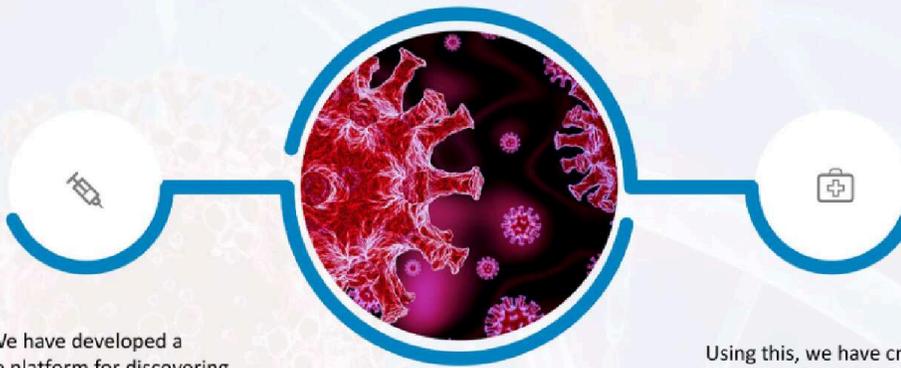
Virus cannot escape the vaccine by mutation

5

Approach enables vaccines and therapies against all hypervariable viruses, flu and COVID-19 included

How We're Better Than What's Out There

	Current Flu Shot	InvVax Universal Vaccine
Typical efficacy	40%	>90%
Works against	Limited number of strains	All strains
Flu pandemic protection?	No	Yes
Can virus escape vaccine?	Yes	No
Current stage	Commercial	Preclinical



We have developed a unique platform for discovering the best vaccine and therapeutic targets for highly challenging viruses.

Using this, we have created the only universal flu vaccine targeting invariant* sequences of Influenza.

Invariant* · adj: Any part of a virus that cannot be mutated without the virus self-destructing



**To our knowledge, this is the only universal flu vaccine targeting invariant sequence of influenza, but there could be, in theory, others that we do not know about.*

InvVax's First Product Is A Universal Influenza Vaccine

Influenza A virus Subtypes

H1N1
H2N2
H3N2
H5N1
H7N9
H7N7
H1N2
H9N2
H7N2
H7N3
H5N2
H10N7



Dr. Young's (Founder of InvVax) work uncovered **11 invariant sequences** in the Influenza A genome which are superior vaccine targets in that:

- The virus cannot mutate away from them
- They induce a strong immune response
- They account for all strains of flu

We should be able to give the **vaccine only once every 5-10 years.**

Patent for influenza vaccine targets **granted April 2021**: 11 invariant stretches comprised by 48 peptide variants.
Arthur Young co-inventor; exclusive license from UCLA.



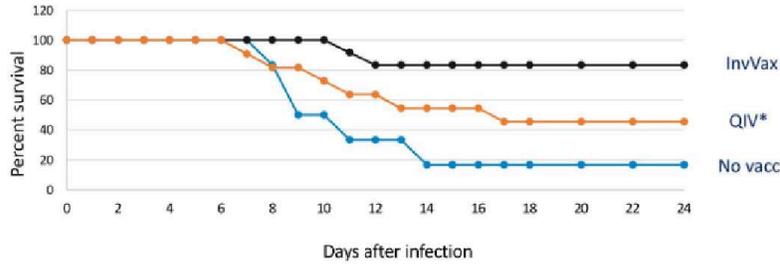
Proof-of-concept: Our vaccine works against a lethal challenge of flu virus Mouse studies





H5N1 (Highly Pathogenic Bird Flu; Pandemic Strain)

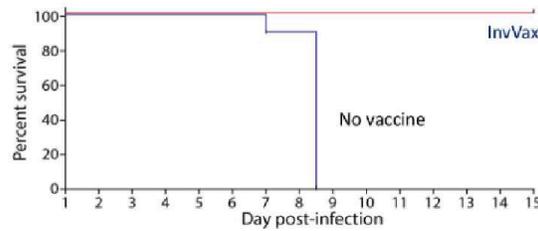
The InvVax Vaccine Beats The Seasonal Flu Shot



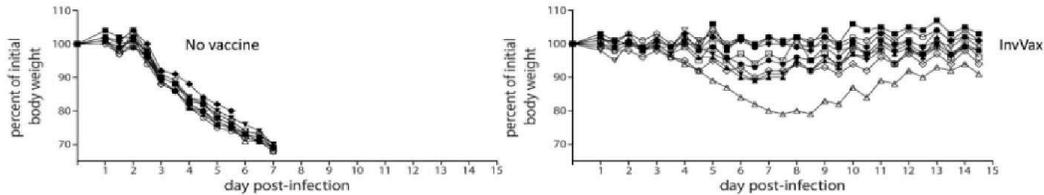
* standard-of-care



Reduces Key Symptoms Of Morbidity



Body Weight Loss Is The Most Objective Symptom Indicator



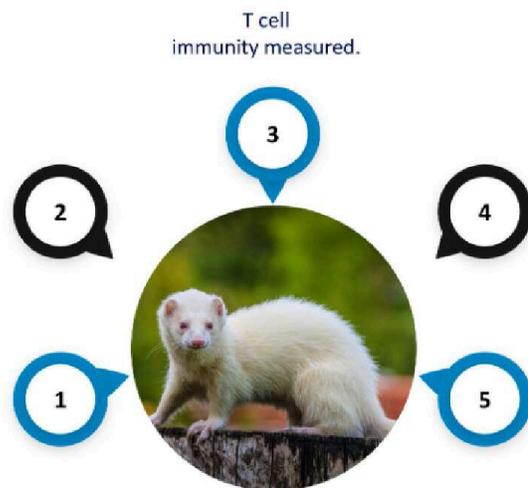
(Each line is an individual mouse [n=10])



Ferret study: "Gold standard" flu model

20 ferrets were vaccinated with the InvVax vaccine and 4 ferrets were unvaccinated, and then 6 weeks later animals were all infected with flu virus.

Ferrets are better than mice because they have the same symptom profile from flu as humans.



T cell immunity measured.

Body weight loss monitored as response to flu virus.

Statistically significant correlation (95% confidence) between T cell immunity and less body weight loss.



Our Scientific Platform Can Be Applied To Other Hypervariable Viruses – Generating Additional Intellectual Property And Multiple Revenue Streams

Virus	Current Solutions	# of Deaths/Year	# Infected	Time to Invariance Map
COVID-19	Four vaccines in market with varying efficacy against variants	tbd	tbd	1.25 years
Hepatitis B	No therapy available	900k	260M	1 year
Hepatitis C	No vaccine available	350k	175M	1 year

(Have received federal funding to work on Hepatitis B virus (\$1.9M) in collaboration with Princeton University)



COVID-19 opportunity

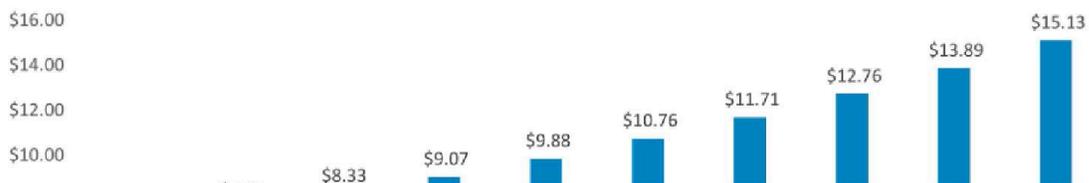
The constant emergence of new variants has wreaked havoc on our COVID-19 vaccine efforts.

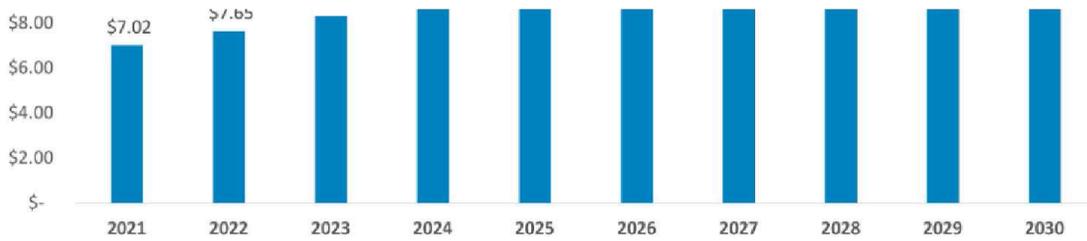
Omicron has upended the dogma that COVID-19 will not vary as widely or mutate as quickly as Influenza.

We are a proactive solution to all the future variants that COVID can and will evolve, rather than a reactive one (scrambling to make new boosters after the next serious variant arises).



Influenza Vaccine Market Size, \$USD (billions)





Source: Vision Research Reports.

We Are The Only Company Focused On Invariance

Company	Features	Progress	Outcome
InvVax <small>Next Generation Vaccines</small>	T cell, conserved, INVARIANT	Preclinical	Validation in animal models
FluGen <small>Flu Vaccine</small>	Live attenuated, nonconserved & conserved	Phase 2a (challenge)	Only 1/2 of subjects showed Ab response, of these only 1/3 reduction in viral load
BiondVax <small>Next Generation Vaccines</small>	Ab and T cell, conserved	Phase 3	Failed Phase 3
altimmune	Ab and T cell, nonconserved	Phase 1	Safe & immunogenic, but HA very mutable
vaccitech	T cell, conserved	Phase 2a & 2b (natural world infec.)	Failed both
IMUTEX	Ab and T cell, nonconserved & conserved	Phase 2b	Reduced severe disease, but even these epitopes are mutable
NOVAVAX <small>Creating Tomorrow's Vaccines Today</small>	Ab, nonconserved, novel Adjuvant	Phase 3	Improved immunogenicity over seasonal vaccine, nothing said about efficacy



To our knowledge, we are the only company focused on invariance. There could be others we do not know about.

Funding Raised To-date

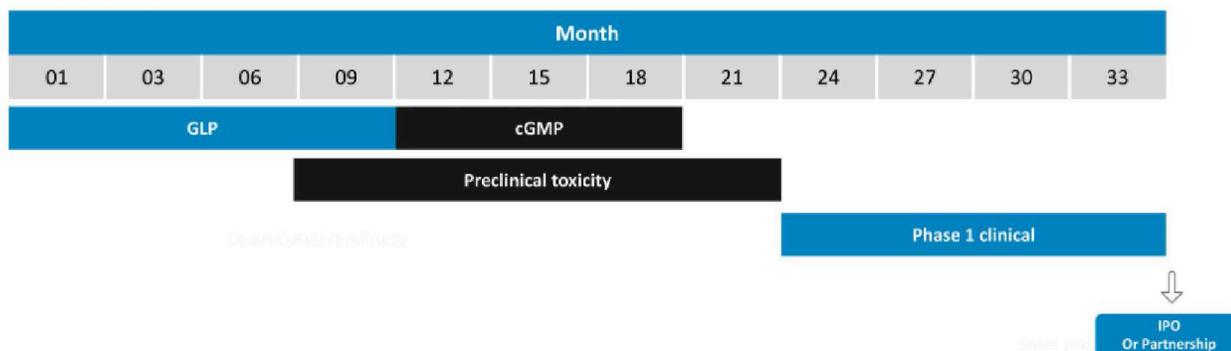
Dilutive: ~1.5M

- Life Science Angels: \$305K
- Sand Hill Angels: \$222K
- Tech Coast Angels
- Individual angels
- Friends & Family

Non-dilutive

- DoD CDMRP (Congressionally Directed Medical Research Program): Invariance mapping of complete HBV genome and testing of Mre11 repair nuclease toward the improvement of CRISPR/Cas therapy for Hepatitis B: 4 years, \$1.9M
- NSF (National Science Foundation) Phase 1 SBIR: Stable prophylactic antibodies: 1 year, \$256K

ROAD MAP: Influenza: Next 2.5 years



Forward-looking projections are not guaranteed.

Our Team

Significant vaccine, genomic, and flu expertise; successful bringing products to market.



Arthur Young
PhD, Founder & CEO

- PhD from Washington Univ.
- Harvard & UCLA Postdocs
- 13 yrs. Flu research experience (credited with mapping the entire flu genome)



Nima Shiva
MBA, Head of Business Development

- Entrepreneur in Residence, University of Southern California - AMI
- Managing Director, Convergent Ventures, life science VC firm
- Founder, CEO & Chairman, Encode Bio, Inc.
- Co-founder, VP Strategic & Business Development, Neurion Pharmaceuticals
- Research Scientist, UCSD Scripps Oceanographic Institute & Sequana Therapeutics
- MBA, Marshall School, USC/B.S. Neuroscience & Physiology, UCSD



Olga Petrauskene
PhD, MBA, Business Advisor & Director

- Directed R&D, Applied Biosys: developed Viroseq™, HIV detection test, and flu & anthrax diagnostic
- COO of Business Development, Diagnostic BioSystems
- Former CEO of Molecular Decisions
- Faculty Moscow State Univ

Advisory Board

Academic leaders in the field; life science commercialization track record; regulatory expertise



Ian Wilson
PhD

- Professor & Chair, Integrative Struc & Comput Bio, Scripps Research Institute
- Premier researcher in flu, HIV, & COVID struc bio
- World leader in immune recognition of pathogens



Han van den Bosch
PhD

- Founder, Nobilon, development of human vacces for influenza, RSV, and bacterial diarrhea
- Founder, Vaxilon, consultancy for vaccine R&D
- CEO, Litevax, development of novel adjuvants for vaccines



Jon Lasch
PhD

- Former Director, Alfred Mann Institute, Univ of Southern California
- 35 yrs. in science and technology development
- Former Vice President, Technology Development, Scripps Research Inst
- Former Faculty, UCLA Anderson School of Management



Lou Fries, MD
Consultant

- Johns Hopkins faculty
- Vaccines for flu, RSV, malaria, rabies, and bacterial pathogens
- Senior management at Intellivax, ID Biomed, GSK; CMO at Novavax



Use Of Funds

Preclinical studies on influenza virus (e.g., comparison of mRNA with viral vector)

Regulated manufacturing of influenza vaccine for clinical trials

Development of a first-ever Hepatitis C vaccine

Development of a next-generation, mutation-proof COVID-19 vaccine

Supplementation of grant income: Hepatitis B virus therapy, Prophylactic antibody work

Ongoing company expenses: e.g. staff salaries, facility rent, IP and other legal fees



We Have A Unique Opportunity

InvVax has pioneered a new viral genetics platform which can be used to discover new vaccine targets that hypervariable viruses cannot escape by mutation.

This platform is readily adaptable to other hypervariable viruses, such as COVID-19. This will generate new IP and additional revenue streams.



COVID-19 has thrust vaccines in general

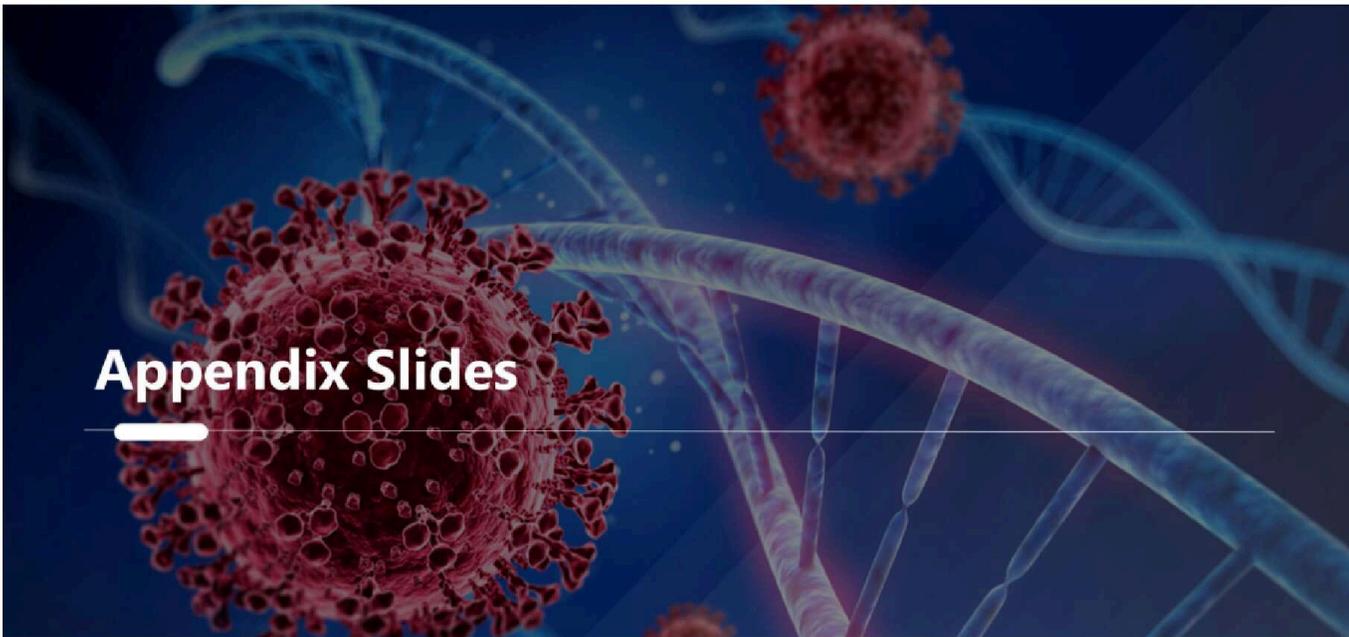
COVID-19 has thrust vaccines in general into center stage. It has also laid the groundwork for rapid development and approval of new, globally-important vaccines.

We have applied it first to flu virus.

We expect to undergo a strategic acquisition or public listing after we have demonstrated the safety and efficacy of our flu product in about 3-5 years.



Forward-looking projections are not guaranteed.



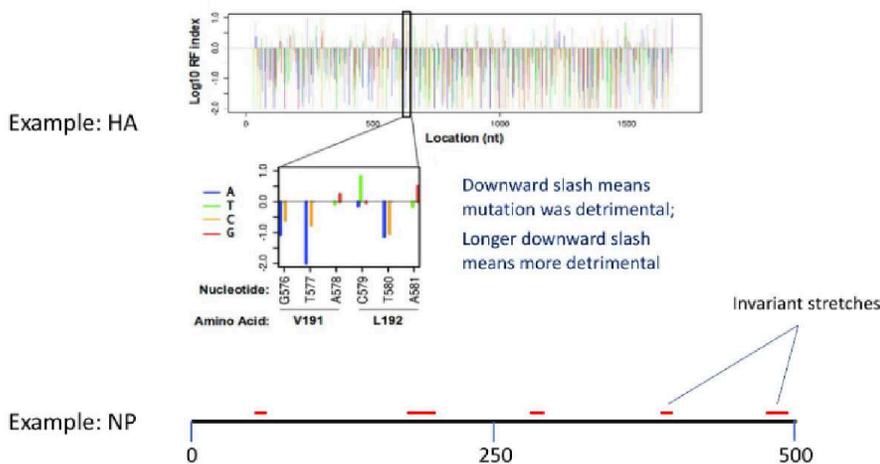
Appendix Slides



Mutational Profiling – Influenza A Virus

First-ever next-generation sequencing and bioinformatics-driven functional mapping of a viral genome.

Determined the effect of mutation at every position in the genome



Wu NC and Young AP et al. Sci Rep 2014

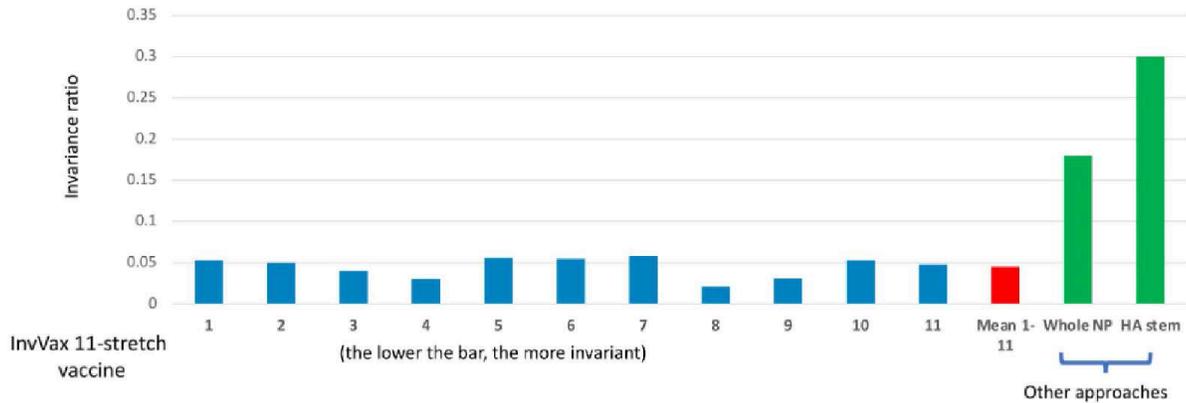


Competitive Landscape: InvVax's Superior Approach

InvVax is the only universal flu vaccine in development that targets both conserved and invariant.

Vaccine epitopes	InvVax	HA Stem	Internal Proteins
Conserved*	✓	✓	✓
Invariant	✓		

*A sequence shared among most strains of flu.



Ferrets - Statistically Significant Correlation Was Observed

Some vaccinated animals responded and some did not; those that did tolerated virus better.

N = 20 vaccinated with InvVax vaccine

	Vaccine responders	Vaccine nonresponders
Least body weight loss at endpoint (7)	6	1
Most body weight loss at endpoint (13)	5	8

One-sided Fisher's Exact Test $p = 0.058$

N = 24 (20 InvVax + 4 mock vaccinated)

	Vaccine responders	Vaccine nonresponders
Least maximum body weight loss (6)	5	1
Most maximum body weight loss (18)	6	12

One-sided Fisher's Exact Test $p = 0.048$

