



Unisex, on-demand, and non-hormonal contraceptives

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Nearly half of all pregnancies worldwide are unintended



>120 million
unintended pregnancies
occur globally each year

>60% of unintended pregnancies
end in abortion

~45% of all abortions are unsafe

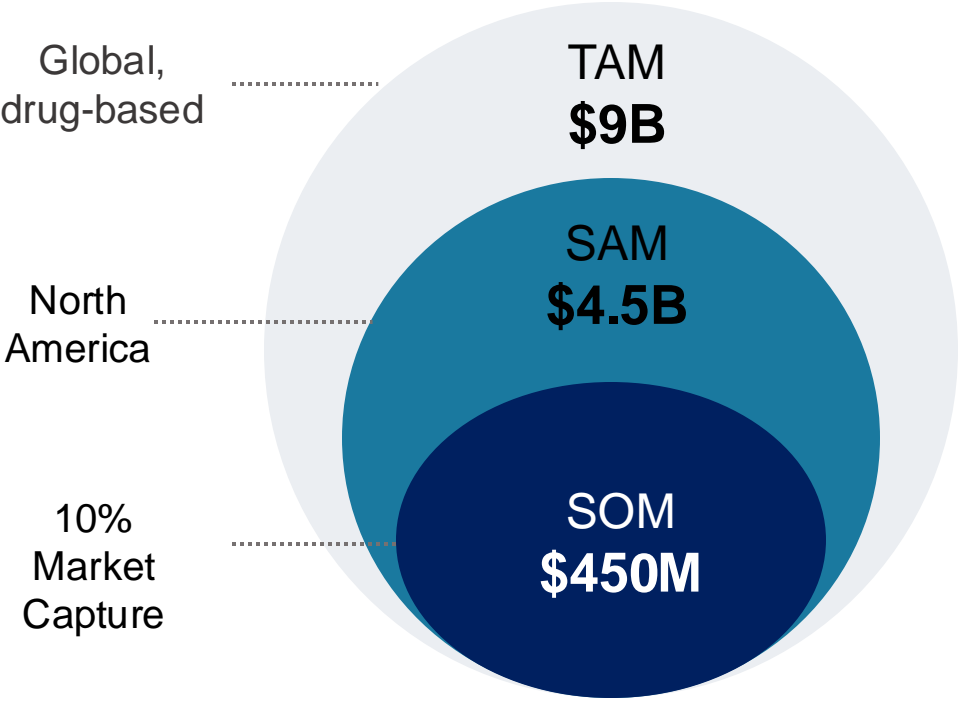
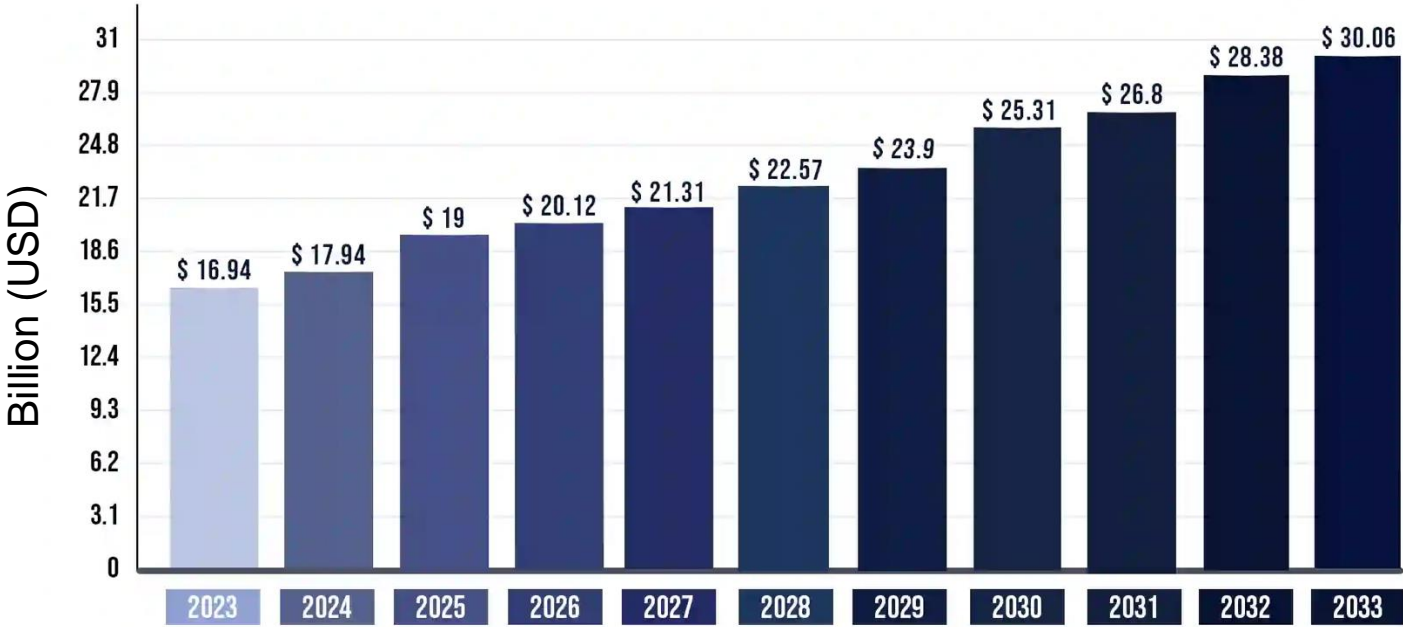
~10% of all maternal deaths

State of World Population 2022 report
by the United Nations sexual and
reproductive health agency

Global contraceptive market size worth \$18 billion

Compound Annual Growth Rate (CAGR) 6%

Contraceptive drugs market size 2023 to 2033



Current methods for effective male and female birth control



My goal for developing new contraceptives

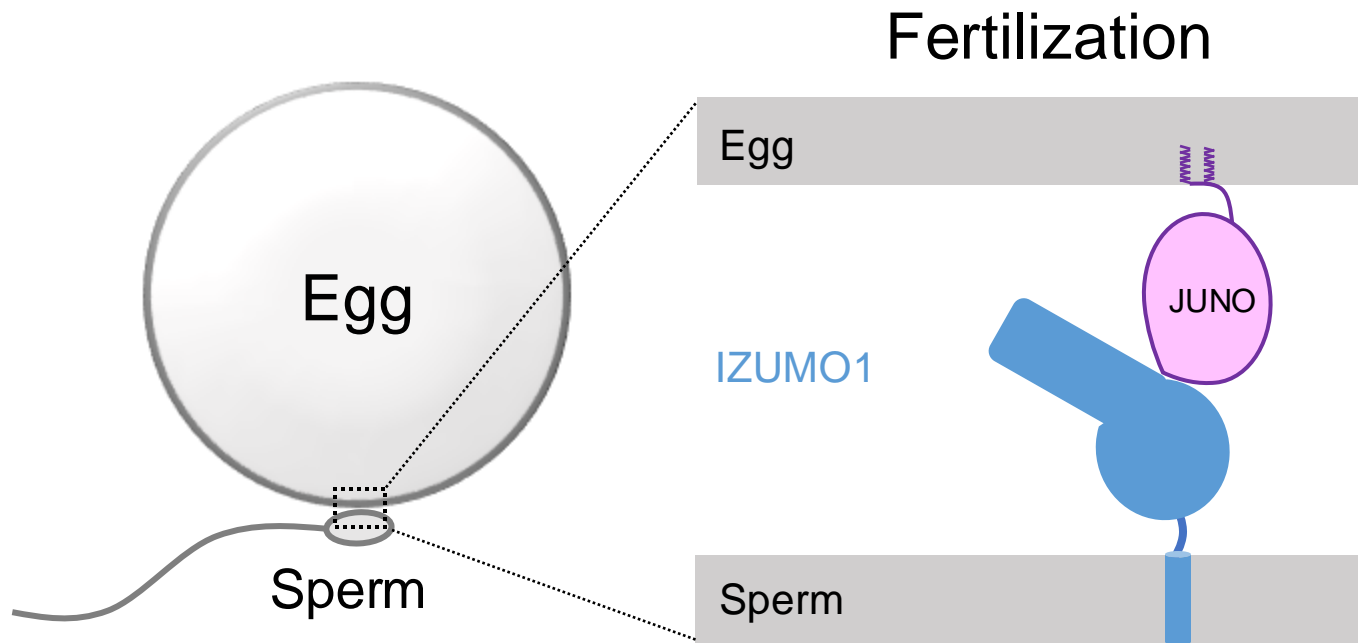
unisex
 non-hormonal
 orally available
 on-demand
 reversible
 minimal off-target



ACOG

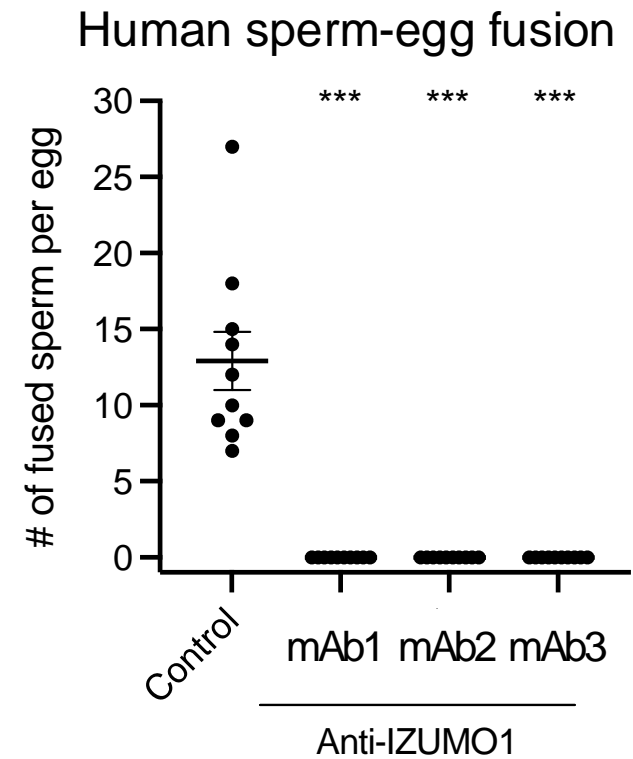
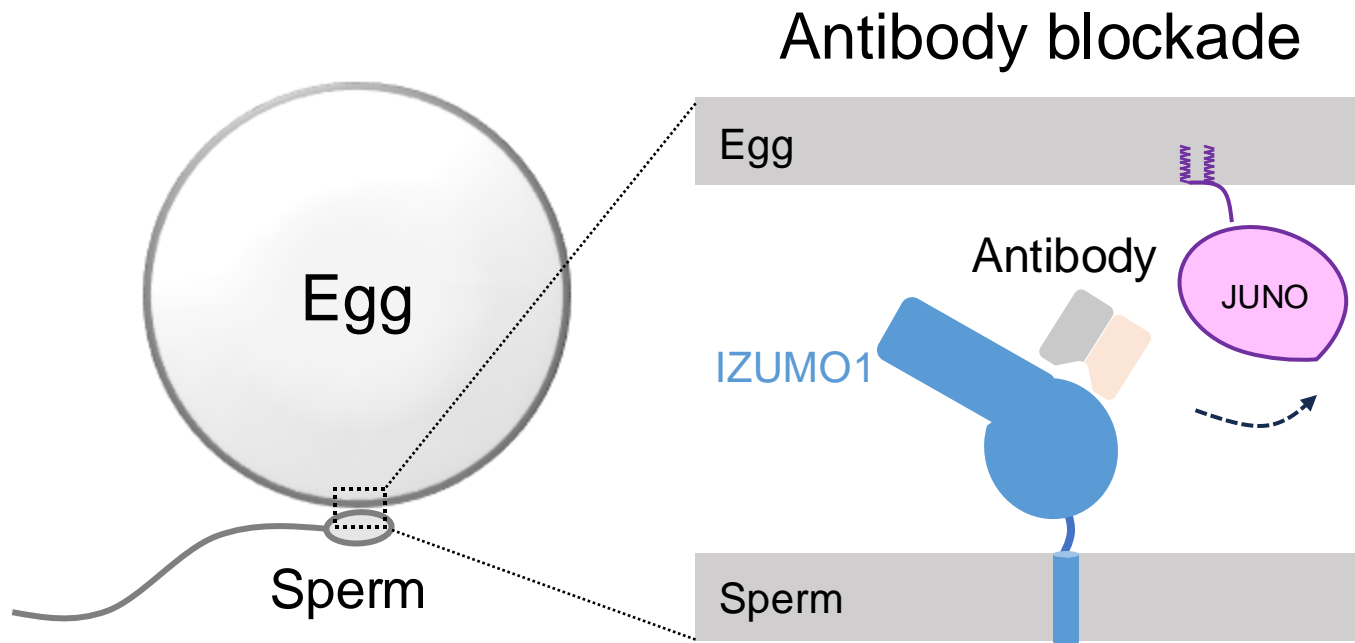
The American College of
Obstetricians and Gynecologists

Fertilization requires IZUMO1-mediated sperm-egg interactions



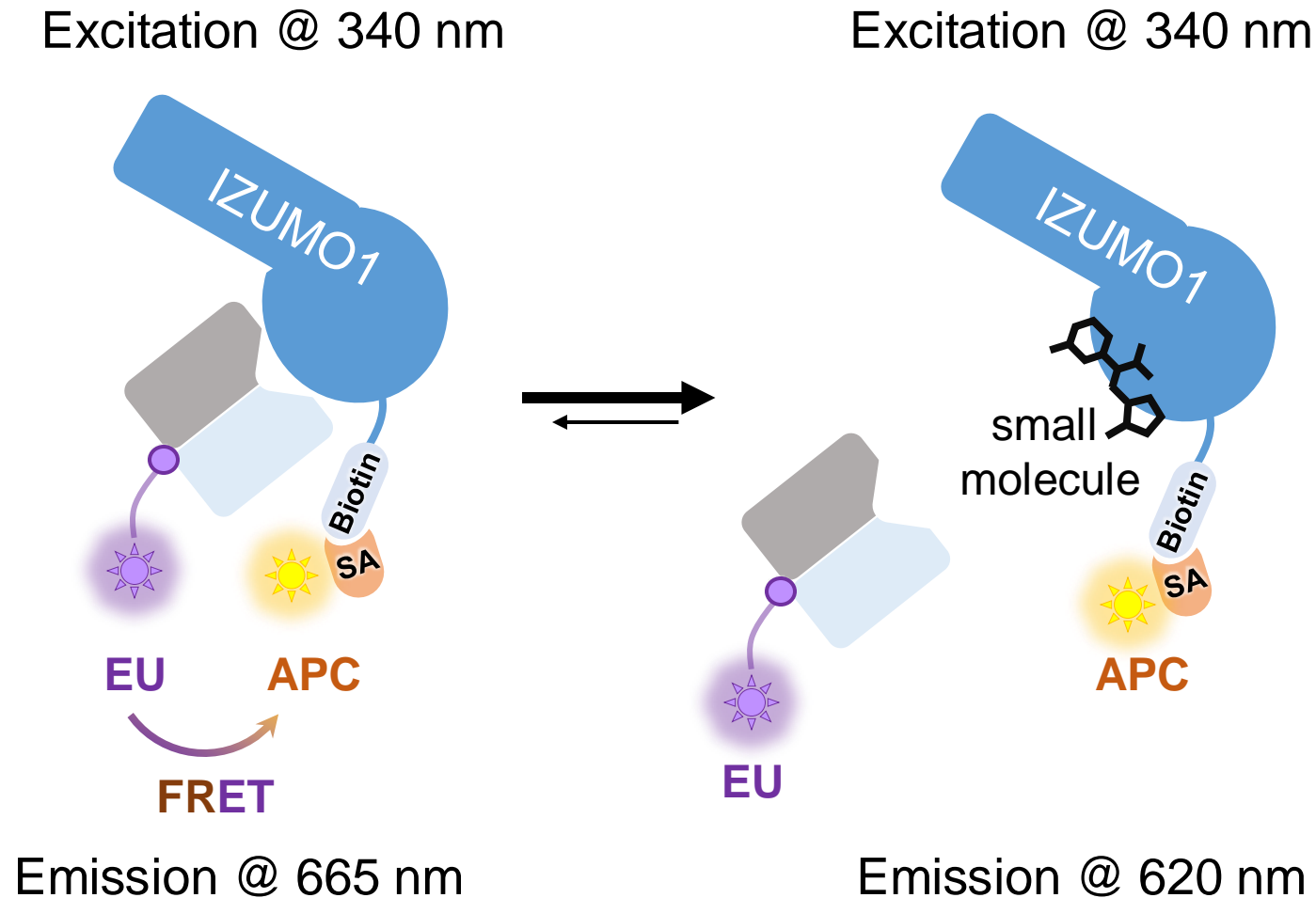
IZUMO1 is only expressed in the testis and sperm
Izumo1 knockout show male-specific sterility in mice

My lab showed that anti-human sperm IZUMO1 monoclonal antibodies (mAb) can block fertilization



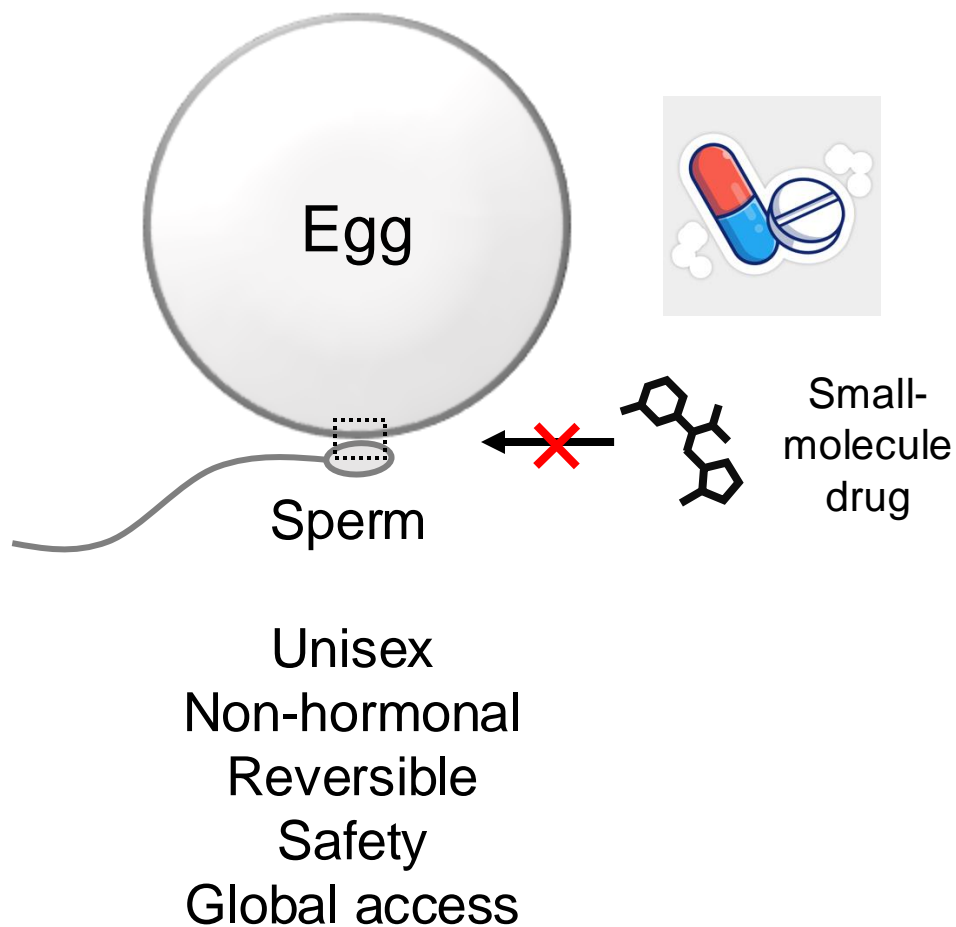
Anti-human IZUMO1 antibodies block fertilization

My lab developed Förster resonance energy transfer (FRET)-based assay for IZUMO1 small-molecule drug screen



My discovery process and my goals

- lead compounds against sperm **IZUMO1**
- evaluating the contraceptive effects in human sperm and mouse model



High-throughput assay validation - \$20,000 <ul style="list-style-type: none"> • Recombinant protein production • FRET-based assay development 	Year 1 Q1
High-throughput screening - \$30,000 <ul style="list-style-type: none"> • Pilot screening • Primary screening & hit confirmation 	Year 1 Q2-Q3
Hit validation and optimization - \$40,000 <ul style="list-style-type: none"> • Validation using <i>in vitro</i> fertilization • Generation of humanized <i>IZUMO1</i> mouse • Activity determination in mouse model • Structure-activity (SAR) analysis 	Year 1 Q4 Year 2 Q1-Q3
Personnel - \$183,600 <ul style="list-style-type: none"> • One postdoctoral associate for two years 	Year 2 Q2-Q4 Years 1-2

My Team



Steven Tang, Ph.D
Assistant Professor
Yale



Taylor Gierke
Graduate Student
Yale

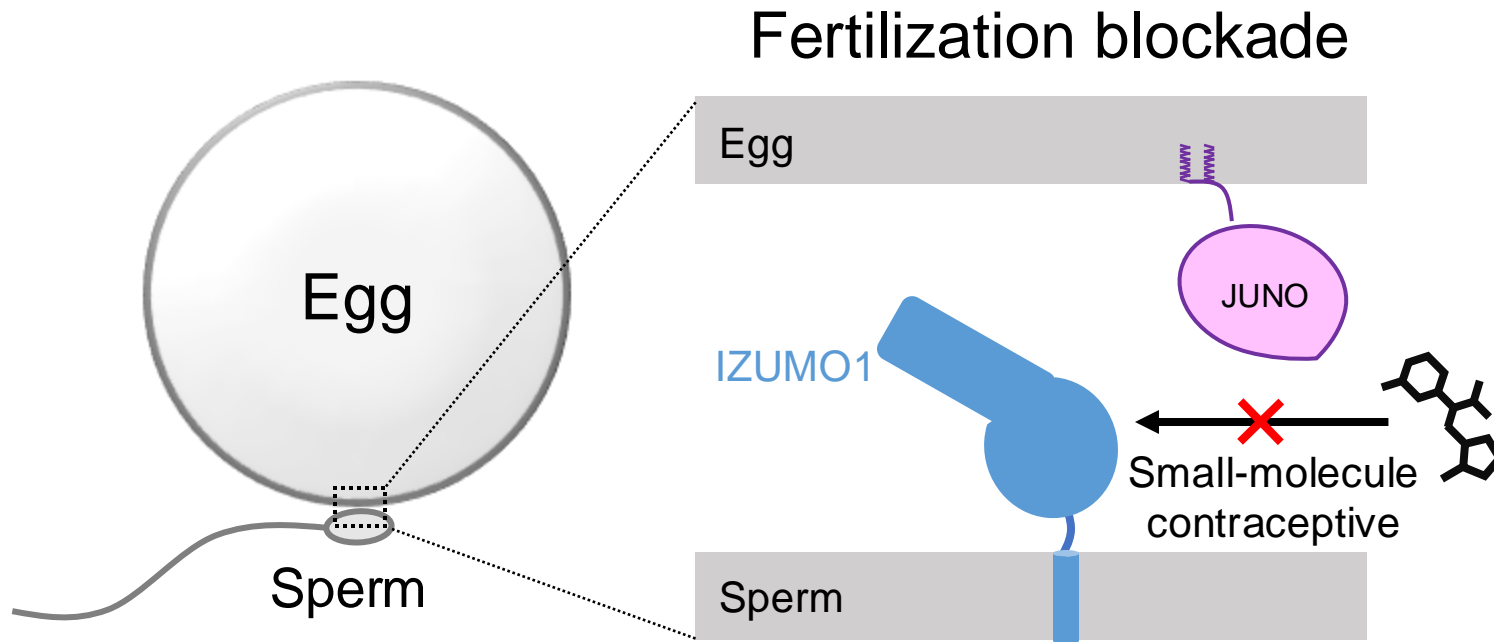


Pulan Liu, Ph.D
Postdoc
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Patrick Wahlig
Undergraduate
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Towards small-molecule on-demand, non-hormonal contraceptives against human sperm IZUMO1



**My goal for developing
new contraceptives**

unisex
non-hormonal
orally available
on-demand
reversible
minimal off-target

Anti-IZUMO1 small molecules block fertilization