UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): June 14, 2023

SAB BIOTHERAPEUTICS, INC.

(Exact name of Registrant as Specified in Its Charter)

Delaware	**001-39871**	**85-3899721**
(State or Other Jurisdiction of Incorporation)	**(Commission File Number)**	**(IRS Employer Identification No.)**
2100 East 54th Street North Sioux Falls, South Dakota		**57104**
(Address of Principal Executive Offices)		**(Zip Code)**

Registrant's Telephone Number, Including Area Code: 605 679-6980

(Former Name or Former Address, if Changed Since Last Report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	**Trading Symbol(s)**	**Name of each exchange on which registered**
Common stock, $0.0001 par value per share	SABS	The NASDAQ Stock Market LLC
Warrants, each exercisable for one share of Common Stock at an exercise price of $11.50 per share	SABSW	The NASDAQ Stock Market LLC

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§ 230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§ 240.12b-2 of this chapter).

Emerging growth company ☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Item 7.01 Regulation FD Disclosure.

On June 14, 2023 SAB Biotherapeutics, Inc., a Delaware corporation (the “Company”) will present an overview of the Company's platform and a portfolio progress update including recent Breakthrough Therapy and Fast Track Designations (the "Presentation") during the Company's Virtual 2023 Annual Research and Development Day. A copy of the Presentation is furnished herewith as Exhibit 99.1 and is incorporated herein by reference.

The information furnished under this Item 7.01, including Exhibit 99.1, will not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), or otherwise subject to the liabilities of that section, and will not be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended, except as expressly set forth by specific reference in such a filing.

Cautionary Note Regarding Forward-Looking Statements

Certain statements made herein that are not historical facts are forward-looking statements for purposes of the safe harbor provisions under The Private Securities Litigation Reform Act of 1995. Forward-looking statements generally are accompanied by words such as “believe,” “may,” “will,” “estimate,” “continue,” “anticipate,” “intend,” “expect,” “should,” “would,” “plan,” “predict,” “potential,” “seem,” “seek,” “future,” “outlook” and similar expressions that predict or indicate future events or trends or that are not statements of historical matters. These forward-looking statements include, but are not limited to, statements regarding future events, the development and efficacy of our influenza program, C. diff. program, type 1 diabetes program, and other discovery programs, the results, including timing, of the development of SAB-176, SAB-185, SAB-142 and SAB-195, including SAB-176 Fast Track designation and the outcome of and potential future government and other third-party collaborations or funded programs.

These statements are based on the current expectations of SAB and are not predictions of actual performance, and are not intended to serve as, and must not be relied on, by any investor as a guarantee, prediction, definitive statement, or an assurance, of fact or probability. These statements are only current predictions or expectations, and are subject to known and unknown risks, uncertainties and other factors which may be beyond our control. Actual events and circumstances are difficult or impossible to predict, and these risks and uncertainties may cause our or our industry’s results, performance, or achievements to be materially different from those anticipated by these forward-looking statements. A further description of risks and uncertainties can be found in the sections captioned “Risk Factors” in our most recent annual report on Form 10-K, subsequent quarterly reports on Form 10-Q, and other filings with or submissions to, the U.S. Securities and Exchange Commission, which are available at https://www.sec.gov/. Except as otherwise required by law, SAB disclaims any intention or obligation to update or revise any forward-looking statements, which speak only as of the date they were made, whether as a result of new information, future events, or circumstances or otherwise.

Item 9.01 Financial Statements and Exhibits.

Exhibit Number	Description
99.1	Presentation
104	Cover Page Interactive Data File-the cover page XBRL tags are embedded within the Inline XBRL document.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

SAB Biotherapeutics, Inc.

Date: June 14, 2023

By: */s/ Eddie J. Sullivan*
Eddie J. Sullivan
Chief Executive Officer

SAb BIOTHERAPEUTICS

DISEASE SPECIFIC HUMAN IMMUNOGLOBULIN (hIgG) DERIVED FROM TC BOVINES

SAB BIOTHERAPEUTICS R&D DAY | June 14, 2023

Eddie J. Sullivan, PhD
President and CEO

NASDAQ: SABS

Forward-Looking Statements

The material in this presentation has been prepared by SAB Biotherapeutics, Inc. ("SAB") and is general background information about SAB's activities current as of the date of this presentation. This information is given in summary form and is not intended to be complete. Information in this presentation, including financial forecasts, should not be considered advice or a recommendation to investors or potential investors in relation to holding, purchasing, or selling securities or other financial products or instruments and does not take into account any particular investment objectives, financial situation or needs.

This presentation may contain forward-looking statements including statements regarding our intent, belief, or current expectations with respect to SAB's businesses and operations, market conditions, results of operations and financial condition, capital adequacy, specific provisions, and risk management practices. Readers are cautioned not to place undue reliance on these forward-looking statements. SAB does not undertake any obligation to update any information herein for any reason or to publicly release the result of any revisions to these forward-looking statements to reflect events or circumstances after the date hereof to reflect the occurrence of unanticipated events unless required by law. While due care has been used in the preparation of forecast information, actual results may vary in a materially positive or negative manner and the presentation may contain errors or omissions. Forecasts and hypothetical examples are subject to uncertainty and contingencies outside SAB's control. Past performance is not a reliable indication of future performance. The forward-looking statements contained or implied in this presentation are subject to other risks and uncertainties, including those discussed under the heading "Risk Factors" in SAB's most recent Annual Report on Form 10-K with the Securities and Exchange Commission (the "SEC") and in other filings that SAB makes with the SEC.

Unless otherwise specified, information is current at the date hereof.

Investment Thesis

- SAB Biotherapeutics is a next generation antibody platform company with human data in > 700 patients across three indications, currently focused on prevention of Type 1 diabetes.
- MoA of SAB-142 in T1D is a proven therapeutic approach with support and enthusiasm from clinicians, opinion leaders and Juvenile Diabetes Research Foundation (JDRF)
- Expecting to file IND/ CTA for SAB-142 within 12 months; development plan is designed in partnership with JDRF
- Phase 1 data expected by YE 2024 with goal of demonstrating safety advantage over rATG (zero serum sickness and ADA) due to being fully human antibody to enable re-dosing for prevention and disease modification
- Strategic validation for new drugs for prevention of Type 1 diabetes is demonstrated by Sanofi's acquisition of Provention for $2.9B, another company sponsored by JDRF
- Other assets include: SAB-176 for influenza (Breakthrough Therapy & Fast Track Designations), SAB-185 for COVID-19, SAB-195 for C. diff, and other preclinical assets to be developed with partnership funding.

Human Immunoglobulin G Produced in Transchromosomic Bovine

Tc Bovine™ contain all the human immunoglobulin genes

Human Artificial Chromosome (HAC) ~17Mb contains the entire unarranged VDJ human immunoglobulin loci (IgH + Igκ)

Tc Bovine™

- Only transgenic animal that carries the entire human immunoglobulin (Ig) heavy and light (κ) chain loci.
- HAC is subject to mitosis along with the other 60 Tc Bovine™ chromosomes.
- HAC present in the Tc Bovine™ allows for the highest production of human immunoglobulin repertoire most similar to humans.

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Human Anti-Thymocyte Globulin (hATG) – Focused Program Development in Type 1 Diabetes

What is Type 1 Diabetes?

- **Type 1 Diabetes is an autoimmune disorder** caused by destruction of insulin producing beta-cells in the pancreas from the patient's own immune system.
- Anyone can get it, but it is most often diagnosed in young children with an **average age at diagnosis of 13 years old** with increased risk if a parent has been diagnosed with the disease.
- It is a **lifelong disease** with no current cures and many **life altering** implications.

Type 1 Diabetes: For Millions, a Daily Disease for a Lifetime

There is no cure, only continuous management

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The Promise of SAB-142: Durable Disease Modification

Modifying vs Managing T1D would be life changing

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SAB-142 could be uniquely positioned to support patients across the T1D landscape

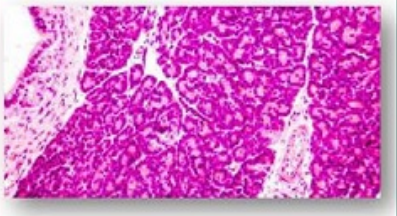
Delay Onset

A Heathier Childhood

Halt Progression

Less Severe Consequences

Prevent Disease



Preserve Insulin Production

Disease Modification is Just Beginning

SAB-142: Fully-human profile has the potential to advance Standard of Care

Stage 2 Prevention Market

Tzield (teplizumab-mzwv)

Projected to reach >$1B in WW sales[1] by 2028

In the US, only family relatives are screened for T1D (<10% of patients), but screening programs are expanding

SANOFI

$2.9B Sanofi acquisition of Provention Bio illustrates **value of prevention market**

Stage 3 Recent Onset Market

64k

64k patients are diagnosed with T1D in the US every year[2]

With insulin as the only treatment option, patients lose residual beta-cell function over time

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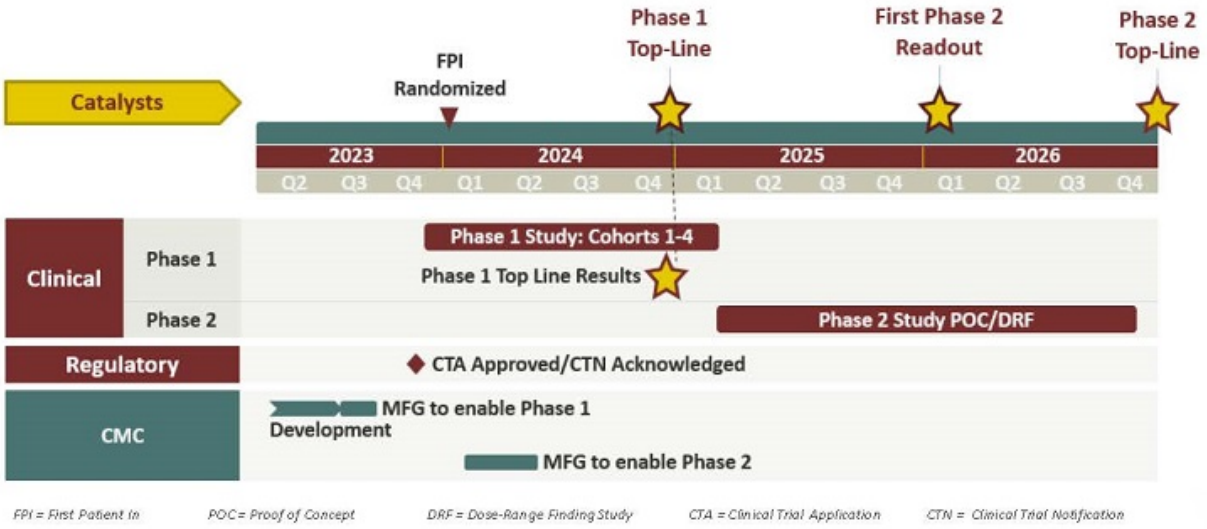
SAB-142 is positioned to **quickly advance to the clinic** to address unmet need in recent onset patients

1. Source: Analyst consensus forecast (Evaluate Pharma)
2. Source: BMC Med . 2017 Nov 8;15(1):199. doi: 10.1186/s12916-017-0958-6

SAB-142 Development Plan and Catalysts



FPI = First Patient In *POC = Proof of Concept* *DRF = Dose-Range Finding Study* *CTA = Clinical Trial Application* *CTN = Clinical Trial Notification*

Phase 1 / Phase 2 Major Outcomes:

- ✓ *0% serum sickness*
- ✓ *0% ADA/nADA (Anti-Drug Antibodies)*
- ✓ *Superior efficacy vs TZIELD on C-peptide*
- ✓ *Superior efficacy vs TZIELD on HbA1C*

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Tc Bovine Derived INFECTIOUS Disease Targeted hIgG Out-Licensing Opportunities

SAB Platform has Broad Potential Therapeutic Applications

The Company is currently focusing its resources on the Type 1 Diabetes SAB-142 program; SAB is actively engaging in partnership for further development of other pipeline programs

PIPELINE

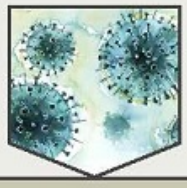
	PRODUCT	INDICATION	DISCOVERY	PRECLINICAL	PHASE 1	PHASE 2	PHASE 3
RESPIRATORY	SAB-185	COVID-19 TREATMENT	Phase 3 Trial (NIH ACTIV-2) Study Top line results available				
RESPIRATORY	SAB-176	INFLUENZA TREATMENT	Phase 1 Trial & Phase 2a Challenge Study Top line results available				
RESPIRATORY	SAB-176	INFLUENZA PROPHYLAXIS					
IMMUNOLOGY	**SAB-142**	**TYPE 1 DIABETES - STAGE 3**					
IMMUNOLOGY	SAB-142	ORGAN TRANSPLANT REJECTION OR APLASTIC ANEMIA					
GASTROINTESTINAL	SAB-195	CLOSTRIDIOIDES DIFFICILE					
IMMUNOLOGY	ANTI-IDIOTYPE SERIES	SYSTEMIC LUPUS ERYTHEMATOSUS, TYPE 1 DIABETES, RHEUMATOID ARTHRITIS					

Value Proposition: SAB-176

First-in-class fully-human immunoglobulin treatment aimed to provide superior long-lasting efficacy for prophylaxis and management of influenza in high-risk patients

Key Differentiators

First and only broadly neutralizing immunoglobulin for prophylaxis and treatment of influenza in high-risk patients



Adaptive and cross-reactive to multiple influenza strains

Multiprong Mechanism of Action

- Neutralizing activity targeting multiple epitopes of Influenza A and B virus
- Antibody-Dependent Cellular Cytotoxicity (ADCC)

Established Proof-of-Concept in the well-established validated influenza challenge model

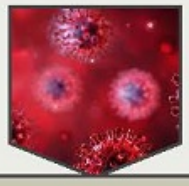
SAB-185 Potential Value to Patients

Only biologic with sustained efficacy across non-Omicron and Omicron variants in high-risk and low-risk patients
Only antibody treatment designed to reduce risk of losing efficacy to escape mutants for high-risk COVID-19 patients

Key Differentiators

First-in-class fully human broadly-neutralizing IgG1 antibody treatment for COVID-19

Only biologic treatment showing neutralizing activity against mAb escape mutants



Clinical and preclinical *in-vivo* and *in-vitro* data demonstrate efficacy against all tested SARS-CoV-2 variants to date

Preclinical and clinical data support potential for competitive efficacy in high-risk COVID-19 patients

Value Proposition: SAB-195

First-in-class fully-human immunoglobulin treatment with dual mechanism of action designed to treat severe CDI and reduce CDI recurrence in high-risk patients

Key Differentiators

First-in-class fully human immunoglobulin treatment targeting C. diff spores, bacteria, and toxins

Only treatment with dual mode of action:

- Unlike bezlotoxumab, SAB-195 targets surface antigens on C. diff bacteria and spores
- Unlike antibiotics, SAB-195 targets several C. diff toxins responsible for severity of the disease

SAB-195 is a target-specific treatment targeting only C. diff bacteria/spores/toxins while fully preserving good microbiome

Preclinical data supports potential for competitive efficacy as first-line immunoglobulin therapy for severe CDI in patients who are at high risk for CDI recurrences

SAB-176 & SAB-185 Designations

FDA has reviewed our platform on multiple occasions

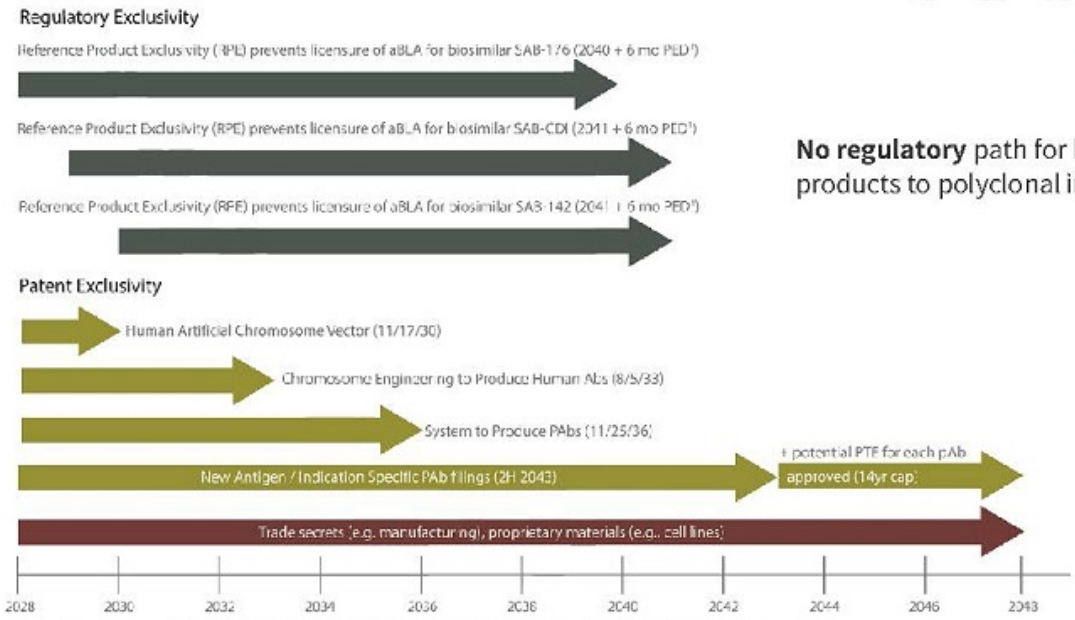
- **Breakthrough Therapy Designation (BTD) and Fast Track designation granted to SAB-176**, an investigational therapeutic, for post-exposure prophylaxis for Type A and Type B influenza illness in high-risk patients, including those who have anti-viral resistant strains
  - Only 8 Breakthrough Therapy designations were granted by CBER in 2022[1]

- **FDA guidance received on advancing SAB-176** through initiation of a Phase 2b dose-range finding efficacy and safety trial in patient populations at high-risk for developing severe disease.

- **Positive Data in COVID Phase III: SAB-185** demonstrated significant benefit in sustained symptom resolution over 2 and 4 consecutive days (p= 0.021 and 0.01 respectively) in study participants with COVID-19 caused by Omicron as compared to participants who received a monoclonal antibody combination, REGEN-COV®

1. CBER Breakthrough Therapy Designation Requests | FDA

Intellectual Property



No regulatory path for biosimilar products to polyclonal immunoglobulins

Assumptions: licensure of BLA for (i) SAB-176 for flu in 2028; (ii) SAB-CDI for C. diff in 2029; and (iii) SAB-142 for type 1 diabetes in 2030

¹Potential Pediatric Exclusivity + 6 months

Today's Presenters

Eddie J. Sullivan, PhD
PRESIDENT & CEO / CO-FOUNDER
- 20 years new technology development
- 25+ years biotech
- Former Japanese pharma
- BIO Executive Committee
- Reproductive physiologist

Christoph Bausch, PhD, MBA
EVP & CHIEF OPERATING OFFICER
- 20+ years research and discovery, biomanufacturing, business development, and platform technology commercialization
- MilliporeSigma (Merck KGaA)
- Stowers Institute for Medical Research Postdoc

Alexandra Kropotova, MD
EVP & CHIEF MEDICAL OFFICER
- 20+ years global clinical development
- Biopharmaceutical R&D leader, Pfizer, Wyeth, Sanofi, Teva Specialty R&D
- Board member, iBio
- Contributed to numerous patents & compounds leading portfolios from Phase I to BLA and NDA approvals

Michael Haller, MD
PEDIATRIC ENDOCRINOLOGIST
KOL GUEST SPEAKER
- Graduate and Professor at University of Florida Gainesville
- Focused on the prediction, prevention, and reversal of type 1 diabetes
- Active investigator in the NIH funded Type 1 Diabetes TrialNet, the NIH TEDDY study, and the T1D Exchange

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VALIDATED TC BOVINE™ PLATFORM TO ADDRESS COMPLEX IMMUNE AND AUTOIMMUNE DISEASES

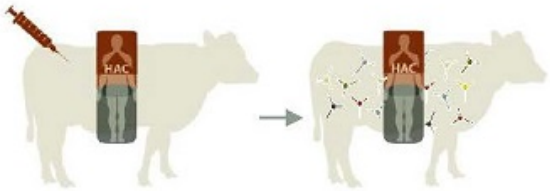
SAB BIOTHERAPEUTICS R&D DAY | June 14, 2023

Christoph Bausch, PhD
EVP & Chief Operating Officer

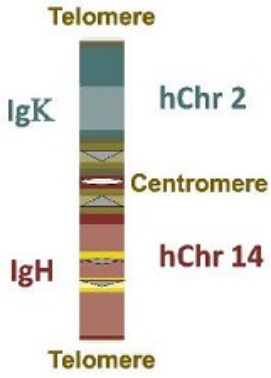
NASDAQ: SABS

A Powerful Technology to Produce Fully Human IgG Polyclonal Antibodies

Tc Bovine™ contain all the human immunoglobulin genes



Human artificial chromosome (HAC)
~17Mb contains the entire unarranged VDJ human immunoglobulin loci (IgH + Igκ)



Tc Bovine

- Only transgenic animal that carries the entire human immunoglobulin (Ig) heavy and light (κ) chain loci.
- HAC is mini-chromosome that reliably replicates during mitosis along with the other 60 Tc Bovine chromsomes.
- HAC present in the Tc Bovine allows for the highest production of the diverse IgG repertoire most similar to humans.

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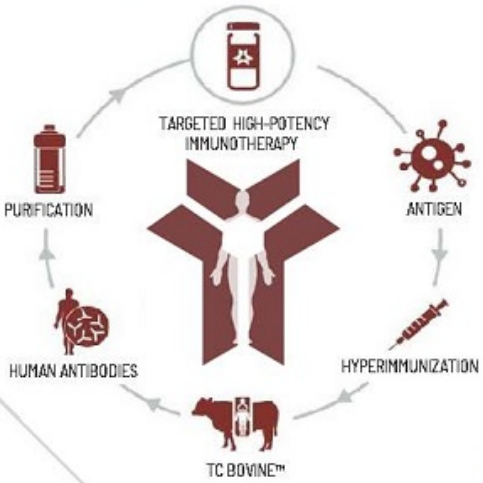
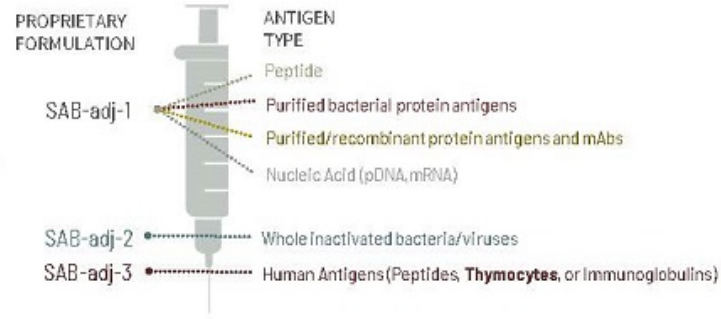
Validated Platform For Producing Fully Human IgG Therapeutics

First of its kind Tc Bovine™ platform clinically validated with several programs advancing through clinical development





FDA: CENTER FOR **BIOLOGICS** EVALUATION & RESEARCH (CBER)

3 INDs & 1 CTA — Filed in US and ex-US

7 Clinical Trials — Span from Phase 1 to Phase 3 across 3 indications

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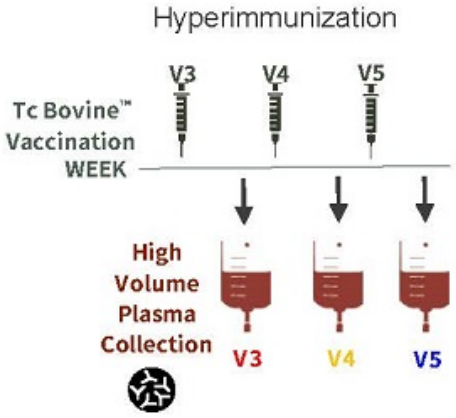
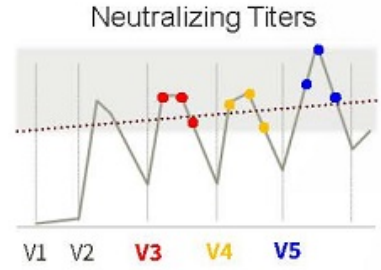
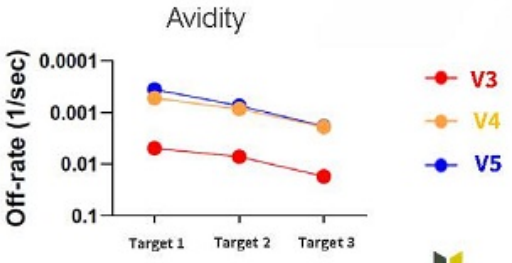
High Titers and Avidity (Potency): Driven By Hyperimmunization

Titers and avidity increases with each immunization







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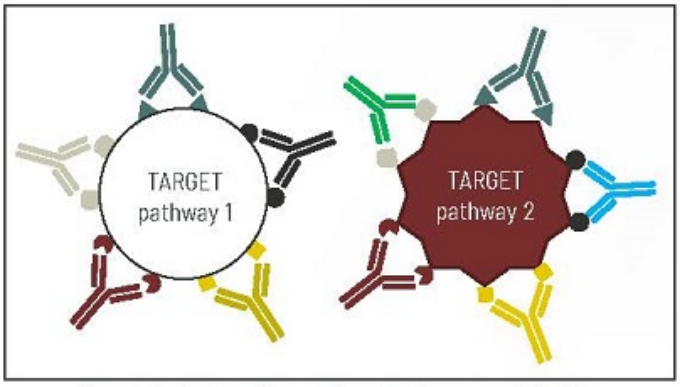
SAB Human Immunoglobulin: Next Generation of Biologics

Key Product Differentiators vs Monoclonal Antibodies:

- Multi-target capability in a single therapeutic
  - ✓ Natural multi-epitope targeted hIgG selected and produced *in vivo*
  - ✓ Ability to target multiple disease pathways at once increase potential for superior efficacy
- Proven ability to target multiple human autoantibodies to treat autoimmune diseases
- Specifically driven high-potency titers and avidity
- Effective against escape mutants with reduced possibility for resistance
- More cost and time effective R&D development
- No current risk of biosimilar competition



Natural mixture of many **human** immunoglobulins
that bind to multiple epitopes is regulated as a single product

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Anti-Idiotype (ID): Proof of Principle to Treat Autoimmune Disease

Multi-target capability in a single therapeutic

Ability to target multiple autoantibodies at once increase potential for superior efficacy

Known mAb autoantibodies were selected and used as antigens for hyperimmunization

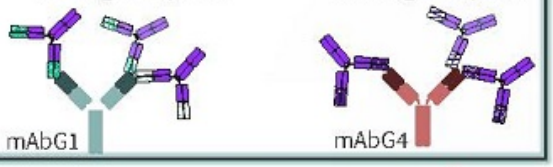
IgG1 isotype (mAbG1)

IgG4 isotype (mAbG4)

Fully-human IgGs generated with selected mAbs showed binding to the variable region and blocked in vitro functional effects

Anti-IgG1 hpAbs

Anti-IgG4 hpAbs



Both antigens injected into the same Tc Bovine

IgGs generated against each antigen

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Tc Bovine™ Anti-Variable/Anti-ID IgG are Specific to the Variable Region

Data indicates distinct polyclonal antibody responses to 2 different anti-idiotype targets (antigens) in the same Tc Bovine.

100X Excess Competitive Ab/Fragments

Tc bovine sample	mAbG1 (TcBovine Antigen)	mAbG4-like Fab Fragment	mAbG1-like Fc Fragment	mAbG1-like framework
Pre-Immunization	-2.3	-4.7	3.9	-8.6
V3 hIgG	**99.9**	13.6	19.3	15.5
V4 hIgG	**100.0**	10.2	10.7	4.8
V5 hIgG	**100.0**	16.0	22.2	11.2

100X Excess Competitive Ab/Fragments

Tc bovine sample	mAbG4 (TcBovine Antigen)	mAbG4-like Fab Fragment	mAbG4-like Fc Fragment	mAbG4-like framework
Pre-Immunization	3.1	-3.8	6.9	6.1
V3 hIgG	**99.8**	**99.7**	-12.7	-8.9
V4 hIgG	**99.9**	**99.0**	14.6	10.0
V5 hIgG	**99.9**	**99.5**	10.0	7.8

Competitive Binding Assay:

- Pretreatment with various antibodies or variable region fragments
- Analyzed using bridging immunoassays
- Data shown is percent inhibition, indicating specificity of binding to variable regions

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SAB-142 (Human Anti-Thymocyte Globulin) Product Characterization and Scaled Production

SAB-142 Has Potential for a Best-in-Class Safety Profile with Higher Potency Compared to FDA Approved Rabbit ATG (Thymoglobulin)

Better Safety Profile

Red Blood Cell Binding

Sample	Activity (µg/mL)
Thymoglobulin Anti-thymocyte Globulin (Rabbit)	20
SAB-142	**280**

Hemagglutinin (HA) Titer:
(Protein conc/endpoint titer/dilution) *1000 = relative active concentration of antibody to cause complete agglutination of the red blood cells.
Higher (ug/mL) number = decreased RBC binding (desired)

Higher Potency

Complement-dependent cytotoxicity (CDC)

Sample	Mean EC_{50} ±SD (µg/mL)
Thymoglobulin Anti-thymocyte Globulin (Rabbit)	162 ± 8
SAB-142	**22 ± 2**

CDC Assay:
Concentration (µg/mL) of antibody required to cause targeted cell death in the presence of human complement.
Data generated by a third party, N=4 replicates
Lower number = higher activity/potency

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SAB-142 Targets Lymphocytes (CD2) Similar to rATG

Multi-Target Binding of Thymoglobulin (rATG) IgG Polyclonal Antibodies

Lymphocytes | T-Lymphocytes | Helper T-Cells | Cytotoxic T-Cells

Thymoglobulin includes antibodies against multiple T-cell markers likely involved in T1D like CD2, CD3, CD4, CD8, and others

https://www.thymoglobulin.com

Targets CD2

Anti-CD2 Activity

Sample	Mean EC_{50} ±SD (µg/mL)
Thymoglobulin Anti-thymocyte Globulin (Rabbit)	0.19 ± 0.009
SAB-142	**0.24** ± 0.008

Anti-CD2 Inhibition Assay:
Concentration (µg/mL) of antibody required to inhibit CD2 binding to 50%.
Data generated by a third party, N=5 rATG, N=6 SAB-142
Lower number = higher activity

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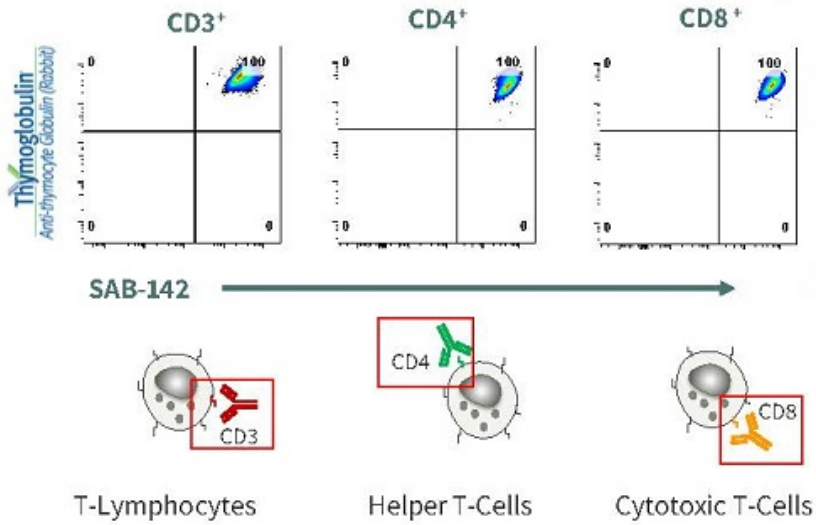
SAB-142 Demonstrates Similar T-Cell Subset Binding Profile as rATG

Targets T-cells (CD3+), T-Helper Cells (CD4+), and T-Killer Cells (CD8+) similar to rATG suggesting similar muti-target binding



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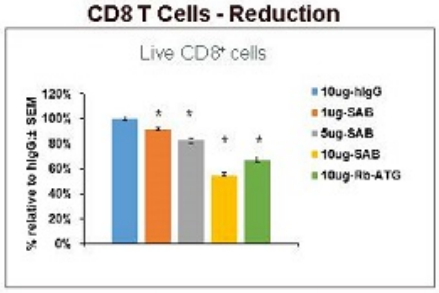
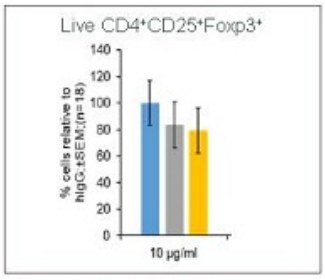
SAB-142 Demonstrates Similar T-Cell Subset Mechanism of Action as rATG

Similar to rATG, exposure to SAB-142 results in the reduction of cytotoxic CD8⁺ T-cells, protection of Tregs, and conversion of naive CD4⁺ to an activated state suggesting similar MoA as rATG as a treatment for T1D

CD8 T Cells - Reduction

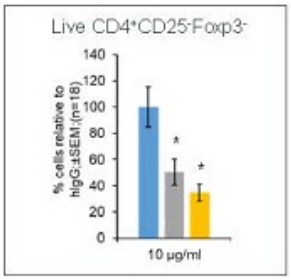


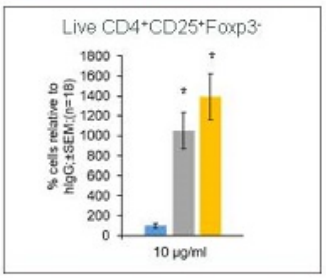
Treg Cells – No Change



hIgG
Rb-ATG
SAB-ATG

Naïve CD4 T Cells ⟶ **Activated CD4 T Cells**

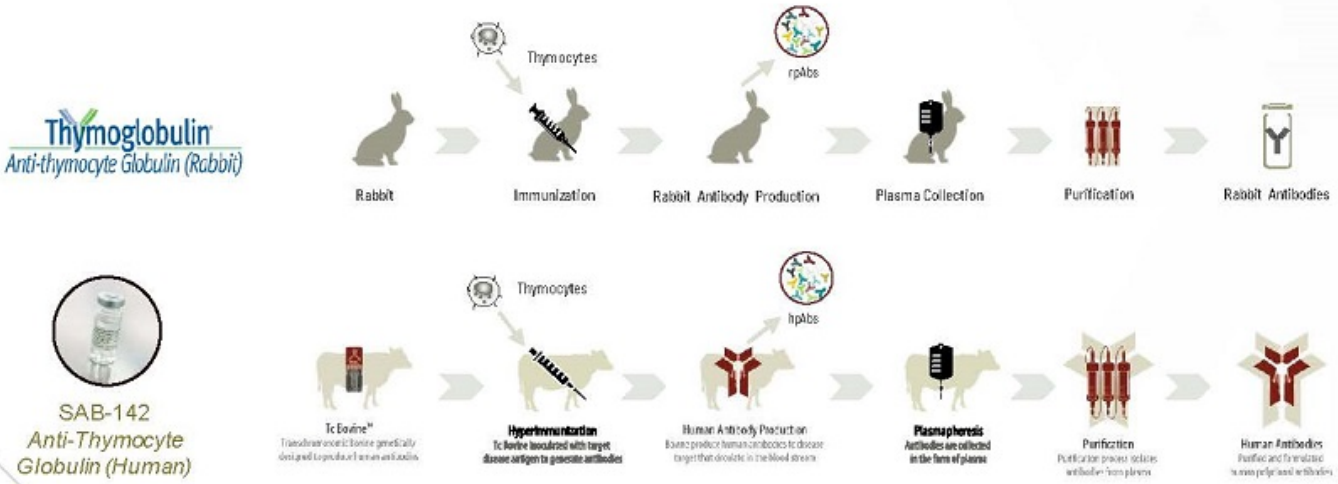




* Indicates p<0.05 compared to negative control hIgG

SAb BIOTHERAPEUTICS

SAB-142 Production Similar to FDA Approved rATG



SAB-142
Anti-Thymocyte Globulin (Human)

SAb BIOTHERAPEUTICS

Demonstrated Process Scalability & Manufacturing Capabilities

Process Development Laboratory

MAX. CAPACITY:
10L

USE:
Antigen development, research material, and manufacturing optimization

Early Clinical MFG Facility

MAX. CAPACITY:
50L & 200L

SQUARE FOOTAGE:
800 & 2300

USE:
Scale up research, antigen manufacturing, pre-clinical, Phase 1/2 clinical

EMERGENT BIO SERVICES

Commercial MFG Partnership

MAX. CAPACITY:
1000L

USE:
Phase 3 clinical and commercial

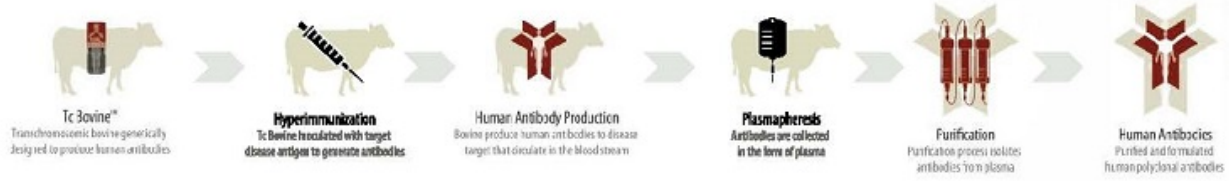
Quality Control and Quality Assurance

Fully Compliant Supportive BioAnalytical Testing Laboratory & QA

USE:
In-process testing and final drug product release testing and quality compliance

SAb BIOTHERAPEUTICS

SAB-142 is Manufacturing Clinical Material and Positioned to Scale to Commercial Production



- Current SAB-142 Plasma inventory sufficient to produce clinical material to support global phase 1-2 clinical trials
- Tc Bovine™ Platform is immediately scalable to support commercial production of SAB-142
- A small herd of ≤ 15 Tc bovine could produce enough commercial product to address the global T1D market

≤ 15 Tc Bovine™ Herd

=

SAB-142

Product to Address Global T1D Market

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ADVANCING A POWERFUL NEW CLASS OF THERAPEUTIC IMMUNOGLOBULINS (hIgG)

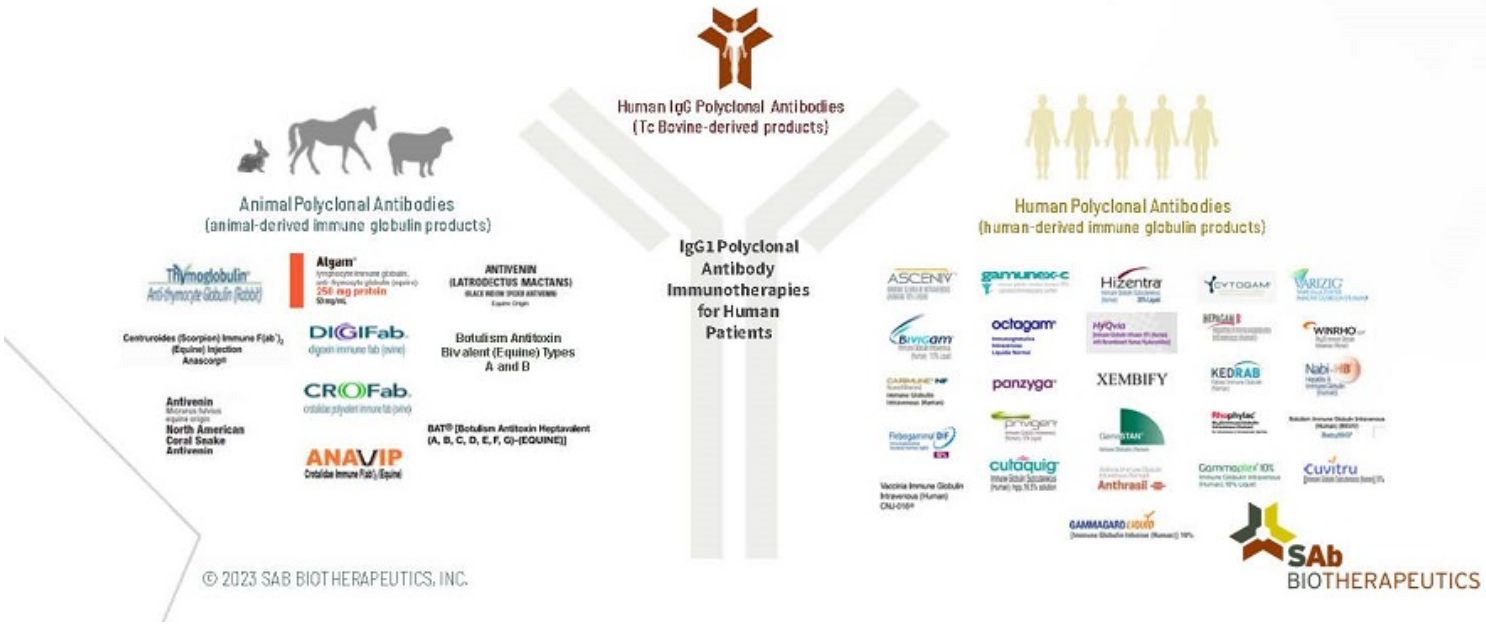
SAB BIOTHERAPEUTICS R&D DAY | June 14, 2023

Alexandra Kropotova, MD
EVP & Chief Medical Officer

NASDAQ: SABS

Proven Clinical Regulatory Path for IgG Polyclonal Antibody Products

40+ FDA Approved through the Center for Biologics Evaluation and Research (CBER)



The Global Diabetes Crisis Few are Talking About

- Since 2000, T1D prevalence has **increased at four times** the rate of global population growth[1]
- An estimated **8.4 million** people were living with Type 1 Diabetes across the globe in 2021[2]
- This number is predicted to increase to **13.5-17.4** million people living with T1D by 2040[2]
- Based on birth cohorts from 1950 to 2040, **6.85 million lives will be lost** by 2040 if people universally do not have access to interventions to diagnose and treat type 1 diabetes, and it stands to become one of the world's largest deadly chronic health conditions, of similar scale and impact to HIV[1]

1. https://www.jdrf.org/press-releases/jdrf-announces-launch-of-global-type-1-diabetes-index/
2. *Lancet Diabetes & Endocrinology*

SAb BIOTHERAPEUTICS

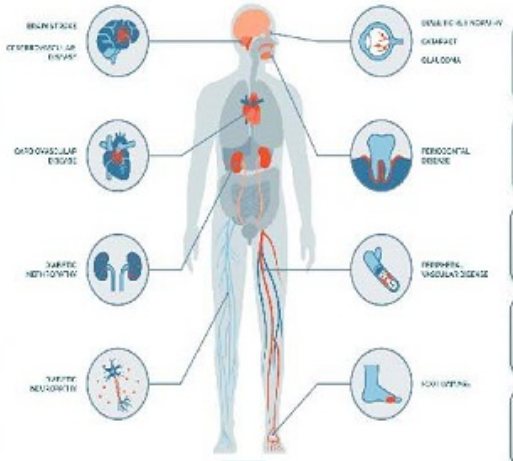
Living with Type 1 Diabetes: for Millions, a Daily Disease for a Lifetime

There is no cure, only management

Signs and Symptoms

- Increases thirst & urination
- Unintended weight loss
- Extreme hunger
- Fatigue & weakness
- High glucose levels

Complications



Diabetes Management

- Glucose monitoring
- Insulin therapy
- Hyperglycemia management
- Hypoglycemia management
- Diabetes complications management

5-13x Increase in mortality[1]

1. Diabetes in America, 3rd Edition Cowie CC, Casagrande SS, Menke A, et al., editors. Bethesda (MD): National Institute of Diabetes and Digestive and Kidney Diseases (US); 2018 Aug.

SAb BIOTHERAPEUTICS

Anti-Thymocyte Globulin (rATG) Demonstrates Strong Disease-Modifying Efficacy In T1D

Anti-Thymocyte Globulin

Polyclonal Ab that restrains the immune system by targeting T-lymphocytes

Rabbit ATG is a marketed products indicated for organ transplant and aplastic anemia

Includes antibodies against T cell markers such as CD2, CD3, CD4, CD8, CD11a, CD18, CD 44, CD45, HLA-DR, HLA Class I heavy chains, and ß2 microglobulin

Thymoglobulin
Anti-thymocyte Globulin (Rabbit)

2009

Established rATG efficacy in non-obese diabetic mouse

2015

Established T1D pilot study
After 12 months C-peptide was ~75% higher in ATG-treated patients vs. placebo

Low-Dose rabbit ATG Clinical Trials

Recent onset T1D phase 2
After 24 months C-peptide was 2-fold higher in ATG-treated patients vs. placebo

2019

Phase 2 prevention study
Ongoing study to test efficacy of ATG in preventing T1D onset

2029

Clinicians and KOLs in the T1D community are deeply invested in advancing ATG as an immunotherapy for T1D

Note: Dates represent top-line results, or publication of study outcomes
Source: J Clin Invest . 2015 Jan;125(1):448-55. doi: 10.1172/JCI78492. Epub 2014 Dec 15.; Diabetes . 2019 Jun;68(6):1267-1276. doi: 10.2337/db19-0057. Epub 2019 Apr 9.; MELD-ATG trial (NCT04509791); STOP-T1D trial (NCT04291703)

Low-Dose Anti-Thymocyte Globulin (ATG) in Type 1 Diabetes: The Potential of SAB 142

June 2023

Michael J. Haller, MD
Professor and Chief
Pediatric Endocrinology
University of Florida

UFHealth
Shands children's Hospital

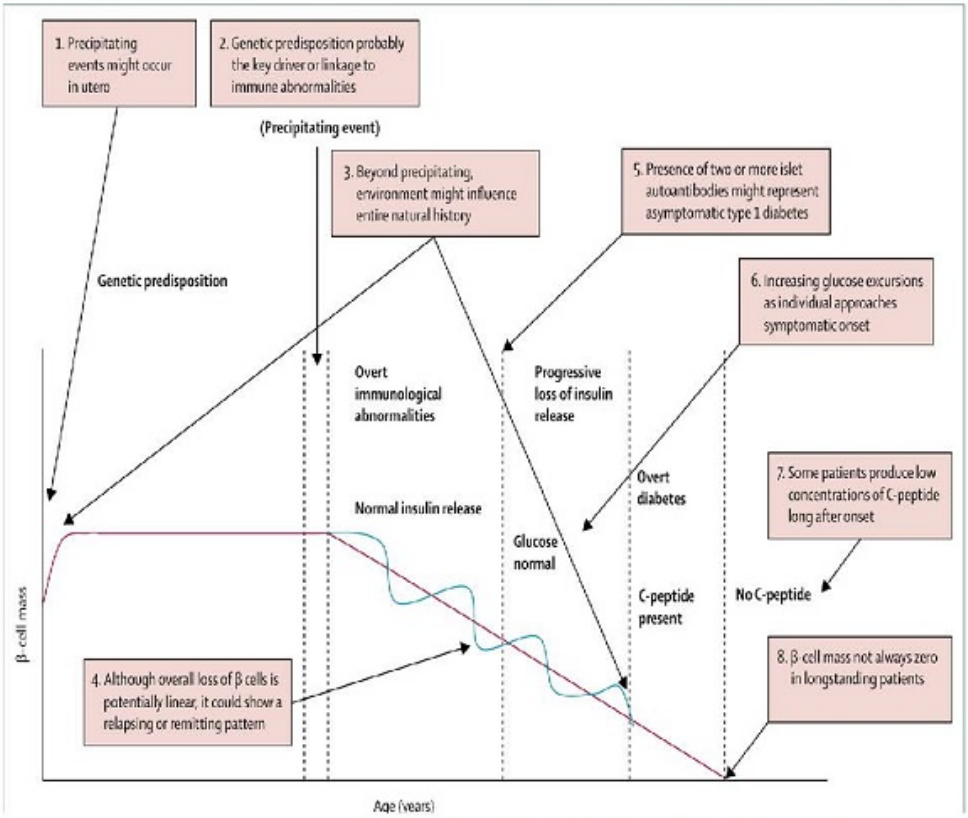
UFHealth
shands children's hospital

Disclosure

I serve on the Scientific Advisory Board for SAb Biotherapeutics

I have received company stock options for that role

Type 1 Diabetes Pathogenesis



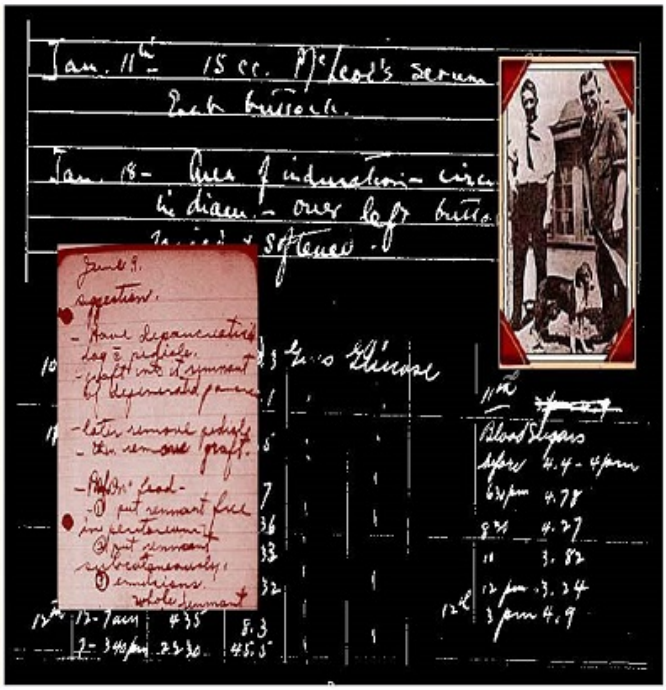
Atkinson, M; Eisenbarth, G.S.; Michels, A. *Lancet*, 2014

What is the scope of the problem?

- Type 1 diabetes – 1 in 300 children
- 1 in 7 health care dollars
- T cell mediated…. but highly heterogeneous
- Likely ideal for polyclonal Ab / multiple targets
- Need induction and maintenance therapies

The Major Therapeutic Breakthrough for Type 1 Diabetes - 1921

LEONARD THOMPSON
First patient to receive insulin in Toronto.



"Thick brown muck" lowered glucose from 520 to 120 mg/dl

7.5ml into each buttock

100+ years Later…Still Insulin

Tzeild / Teplizumab - Approved
1992 to November 17, 2022 .... 30+ year effort

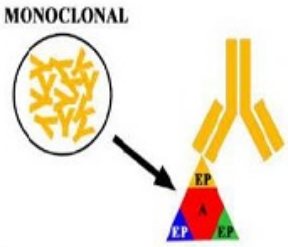
Proc. Natl. Acad. Sci. USA
Vol. 91, pp. 123–127, January 1994
Immunology

Anti-CD3 antibody induces long-term remission of overt autoimmunity in nonobese diabetic mice

(autoimmunity/diabetes)

LUCIENNE CHATENOUD, ERIC THERVET, JACQUELINE PRIMO, AND JEAN-FRANÇOIS BACH

Institut National de la Santé et de la Recherche Médicale U 25, Hôpital Necker, 161 Rue de Sèvres, 75015 Paris, France



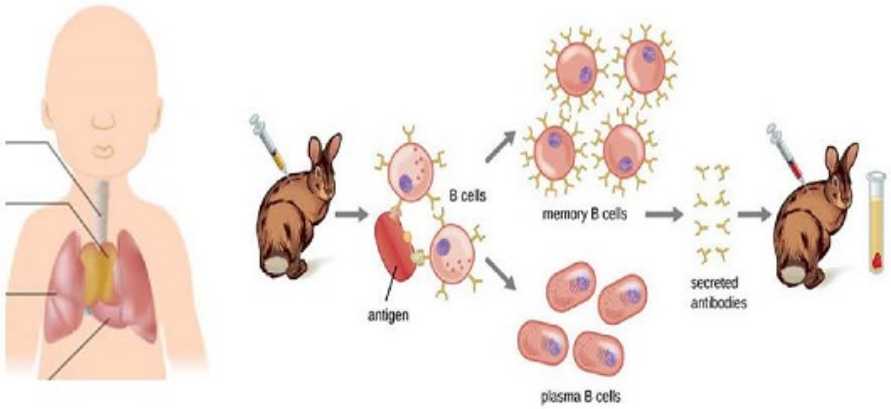
Prevention of Autoimmune Diabetes With Nonactivating Anti-CD3 Monoclonal Antibody

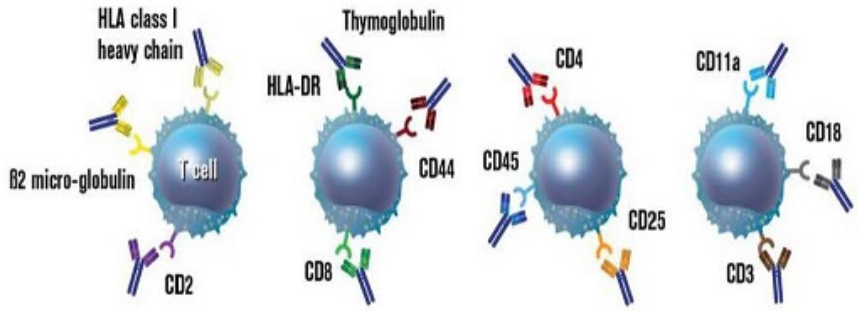
KEVAN C. HEROLD, JEFFERY A. BLUESTONE, ANTHONY G. MONTAG, ASHU PARIHAR, AMY WIEGNER, RONALD E. GRESS, AND RAPHAEL HIRSCH

FDA NEWS RELEASE

FDA Approves First Drug That Can Delay Onset of Type 1 Diabetes

Monoclonals are great but what about Polyclonals?

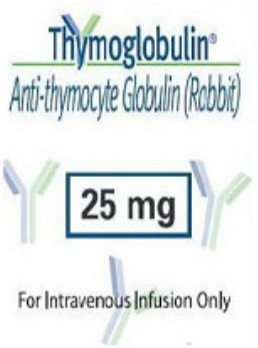




Thymoglobulin

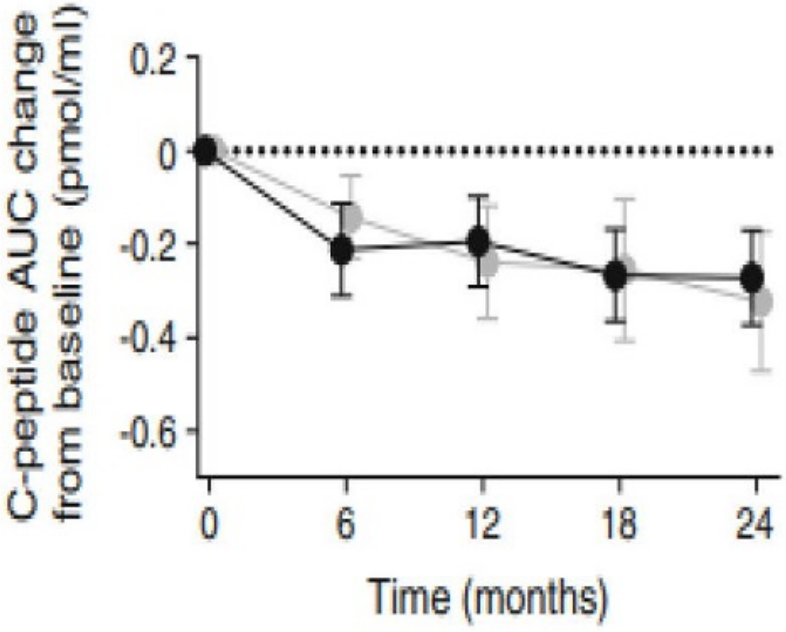
- Human Thymus / T-cells > Immunized Rabbit
- Polyclonal Mix of Rabbit Anti-Human Antibodies
- FDA approved ~30 years
- Standard in Renal Transplant – up to **10mg/kg**

- Near complete depletion of Treg and Teff with slow recovery at Transplant dose



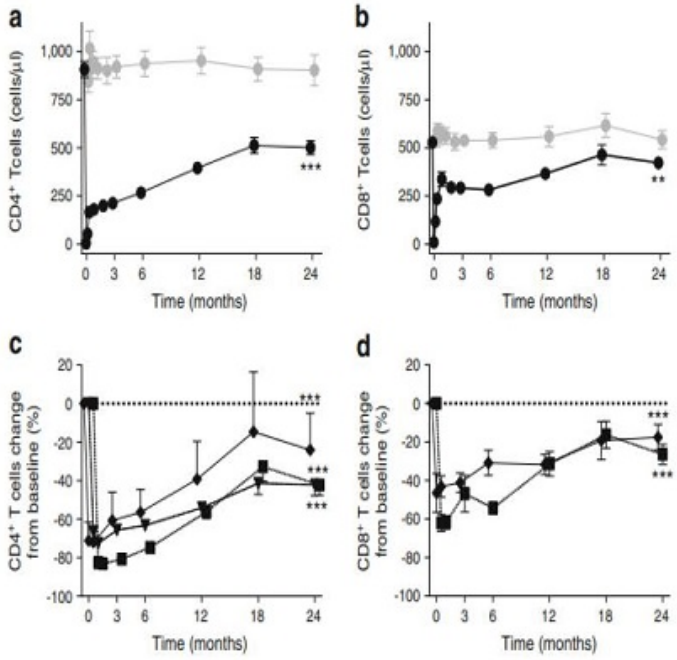
- What about Lower dose?

“High” Dose ATG in T1D (6.5mg/kg)



Gitelman et al. *Diabetologia* 2016; 59(6)

High Dose ATG (6.5mg/kg)
Too much Treg Depletion?

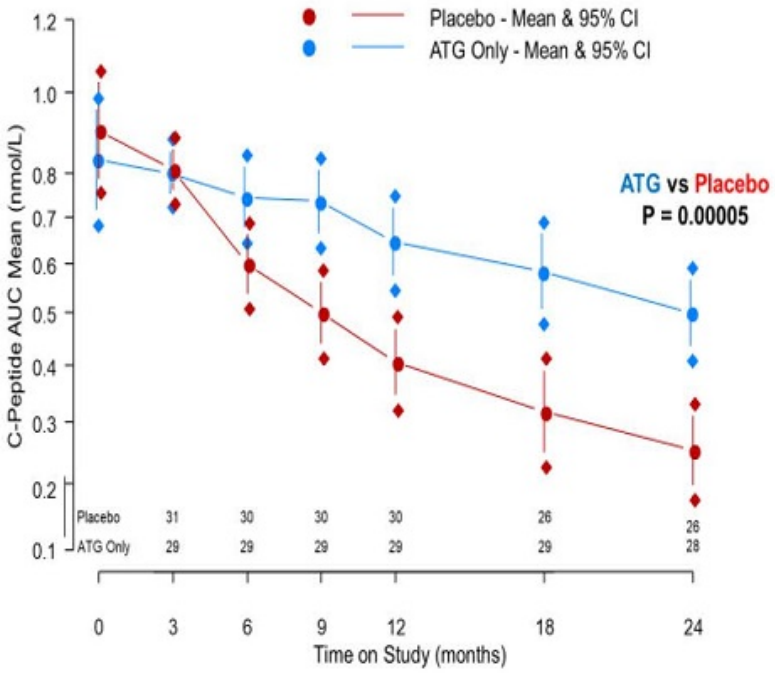


100% Cytokine Release
100% Serum Sickness

Gitelman et al. *Diabetologia* 2016; 59(6)

Low-Dose ATG in New Onset T1D
NIH TrialNet

C-Peptide AUC Mean Over Time By Treatment Group



Haller et al. Diabetes. 2019. Jun;68(6):1267-1276

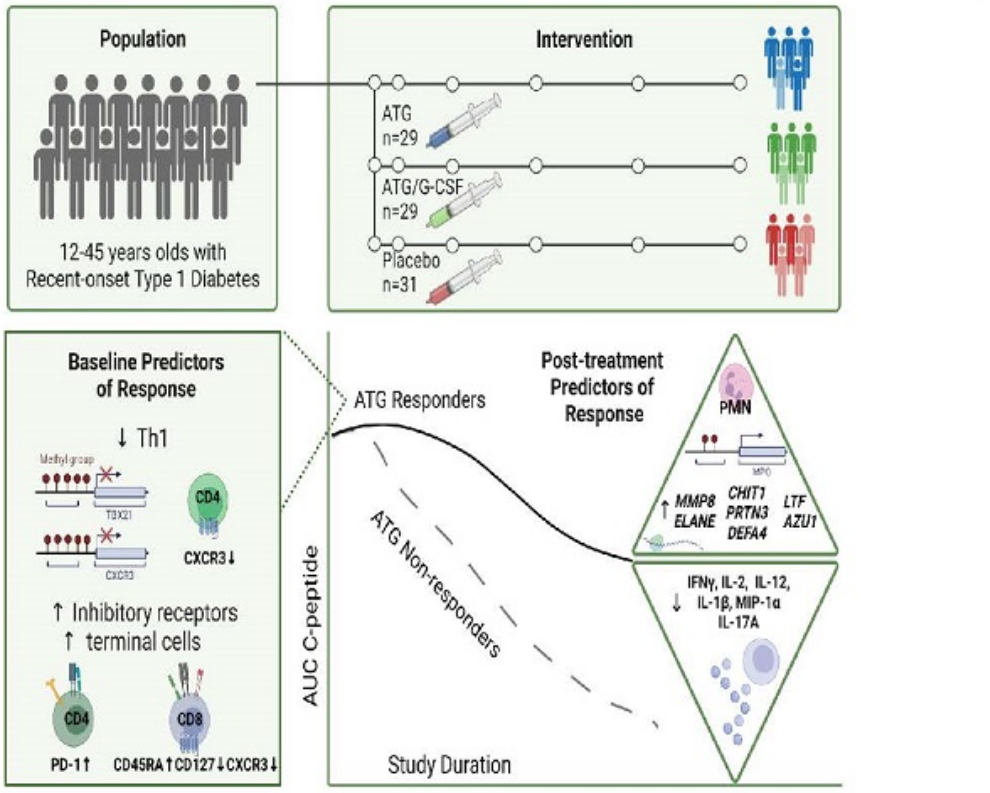
Outcomes of ATG in New Onset T1D

	N	Age (yrs)	Regimen	Primary Outcome (AUC C-peptide)	p
ATG- Low Dose	89	12–45	**2.5mg/kg** IV over 2 days	2hr MMTT at 2 years	**0.00005**
ATG – High Dose (START)	52	12–35	**6.5mg/kg** IV over 4 days	2hr MMTT at 1 year	0.591

Low dose – 35% CRS / 71% Serum Sickness

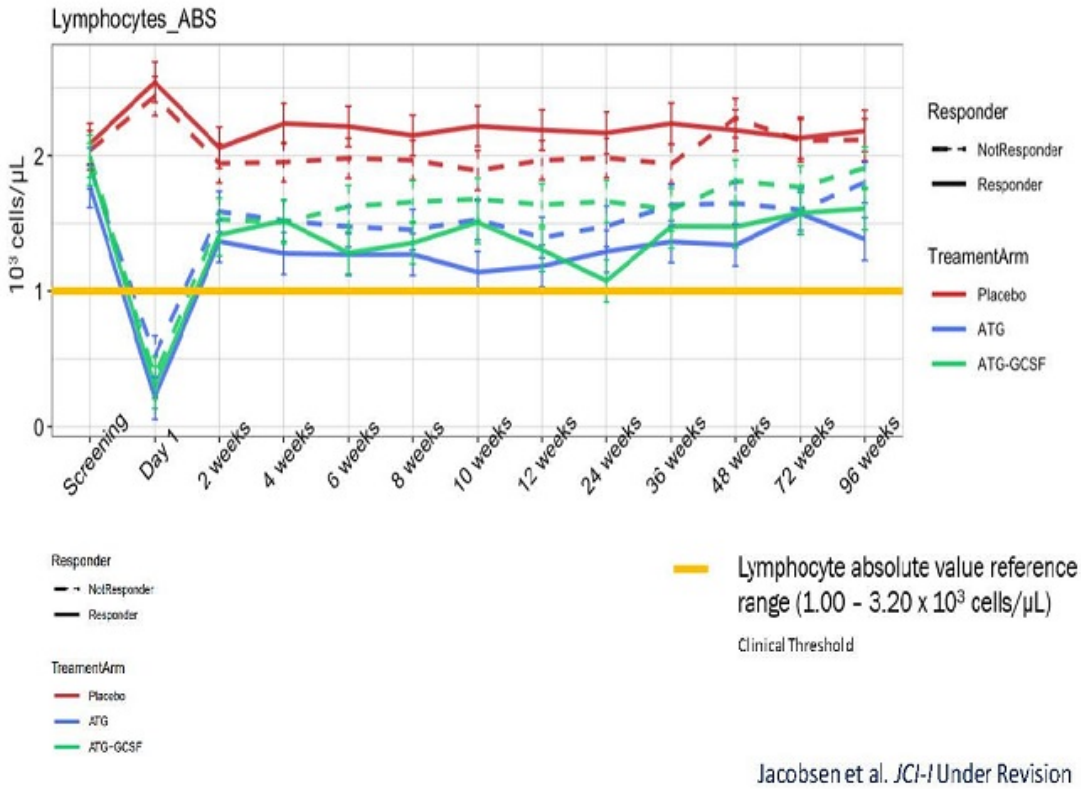
High dose -100% CRS / 100% Serum Sickness

Low-Dose ATG – Predicting Responders



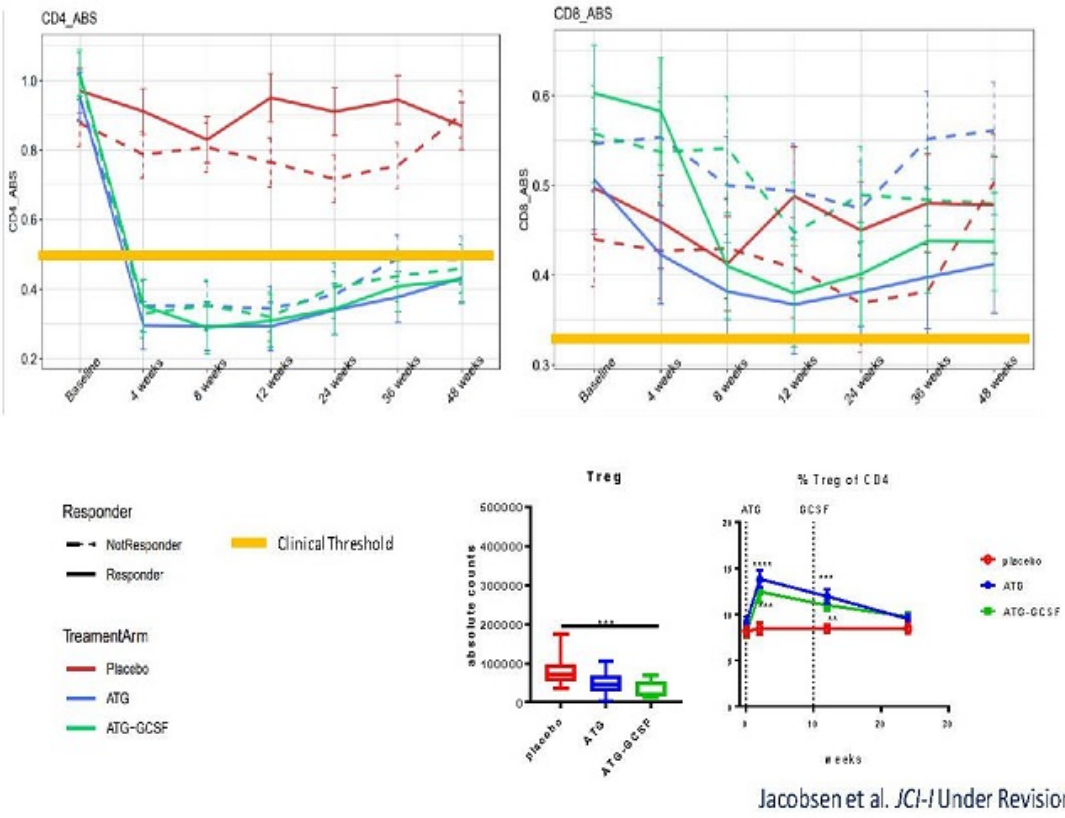
Jacobsen et al. *JCI-I* Under Revision

Low-Dose ATG - Lymphocyte Recovery Above Clinical Threshold



Jacobsen et al. *JCI-I* Under Revision

Low-Dose ATG – Absolute CD4 and CD8

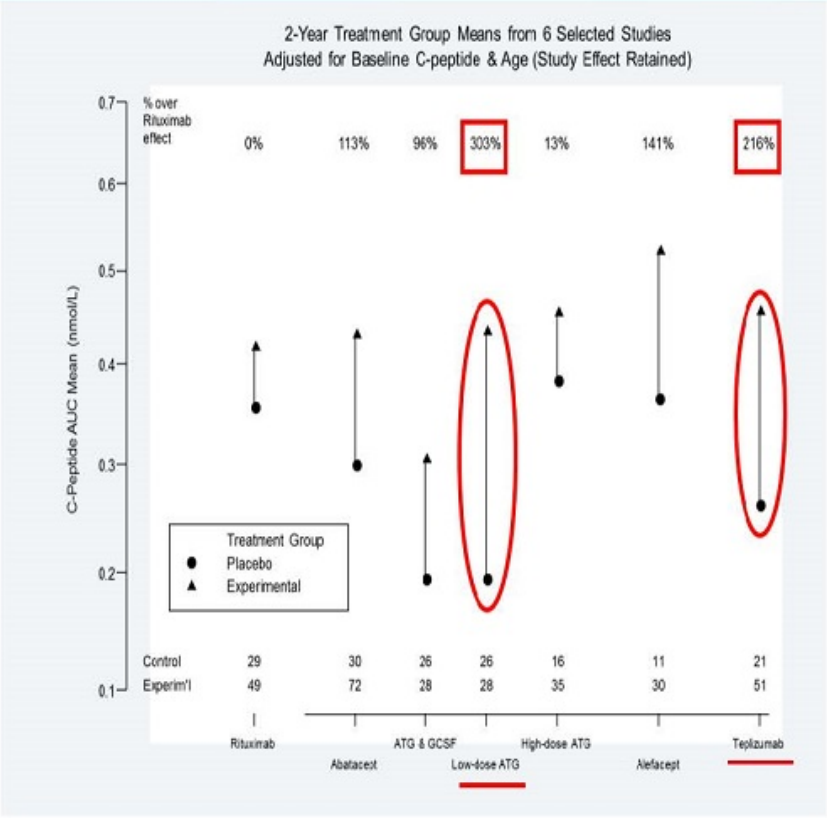


Jacobsen et al. *JCI-I* Under Revision

Low-Dose ATG – Treg / CD4 Preservation Relative to High Dose

- High Dose ATG Trial: CD4, CD8, and Tregs ↓
  - Slow to recover, some lymphocytes counts still
  - < 1000 cells/µL at 12 months
- Low-dose ATG trial: CD4 ↓
  - CD4 Tconv depletion and increased effector memory
  - CD8 T cells increased with higher naïve cells and lower effector memory
  - Decreased CD4:CD8 ratio
  - Tregs relatively stable

Cross Trial Comparison – 2 Years



Effect of Low-dose ATG superior at 2 years to even Teplizumab

Diabetes Technol Ther. 2020 Dec;22(12):948-953

Low Dose ATG Prevention Study

- Stage 2 T1D = Multiple Ab+ / Dysglycemic
- Age 12 and up
- Single course low-dose ATG (2.5mg/kg)
- 2 IV infusions on back-to-back days
- 1:1 Randomization
- 144 Subjects

Type 1 Diabetes TrialNet

Why SAB Polyclonal ATG (SAB-142) ?

- Eliminate Serum Sickness
- Re-treatment without risk
- Could entirely replace current polyclonal immunosuppressive (Thymoglobulin) if similarly effective
- Kidney Transplant / Autoimmune Disease / Cancer Therapy
- Large untapped market

UFHealth
Shands Children's Hospital

What SAB-142 could offer…

UFHealth
Shands Children's Hospital

Acknowledgements

SAb BIOTHERAPEUTICS

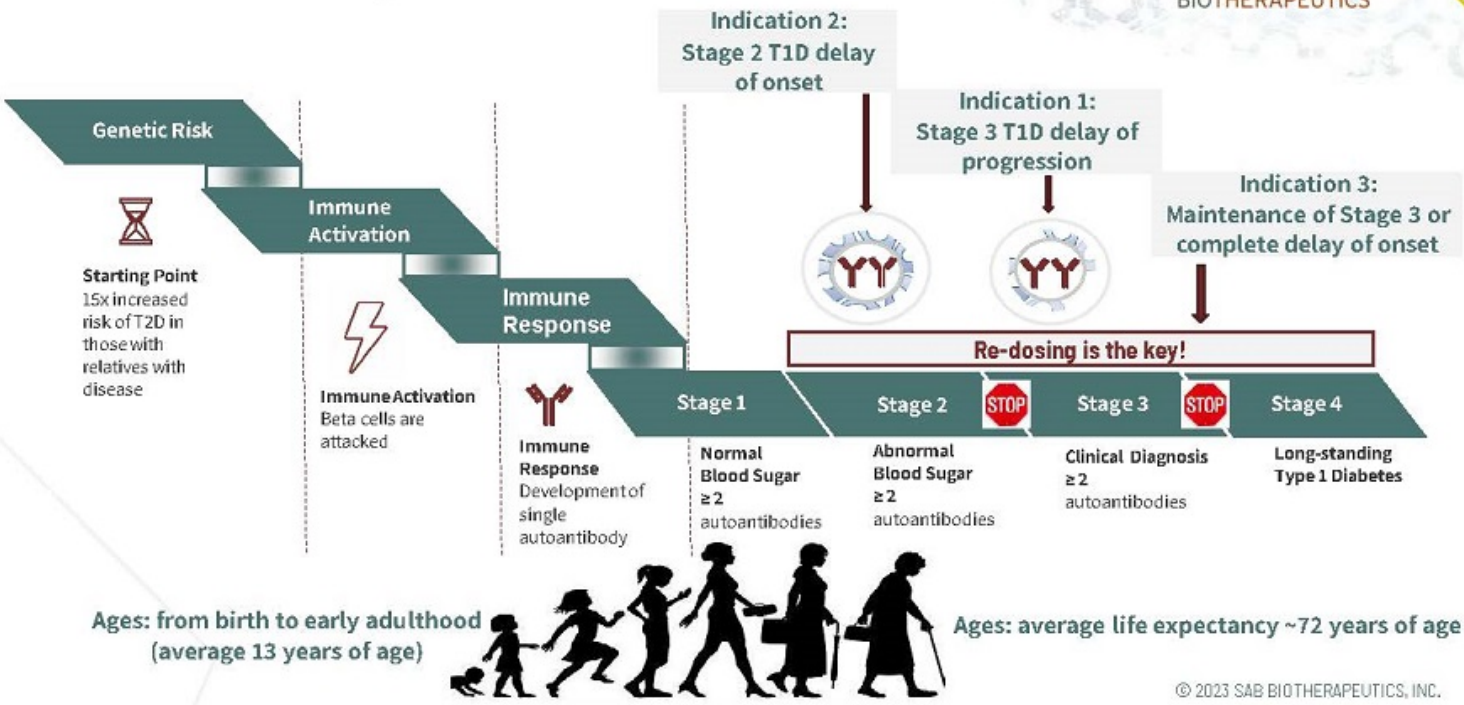
SAB-142: FULLY HUMAN ANTI-THYMOCYTE GLOBULIN FOR DELAYING THE ONSET AND/OR PROGRESSION OF TYPE 1 DIABETES (T1D)

SAB BIOTHERAPEUTICS R&D DAY | June 14, 2023

Alexandra Kropotova, MD
EVP & Chief Medical Officer

NASDAQ: SABS

SAB-142 has Strong Potential to Control or Prevent T1D Over the Entire Life Span

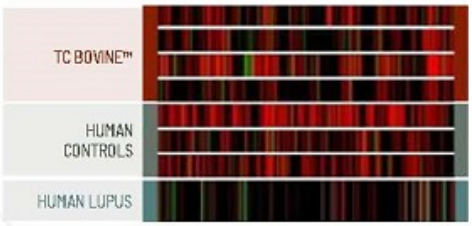


SAB-142 has Similar MoA to rATG with Distinct Advantages

SAb BIOTHERAPEUTICS

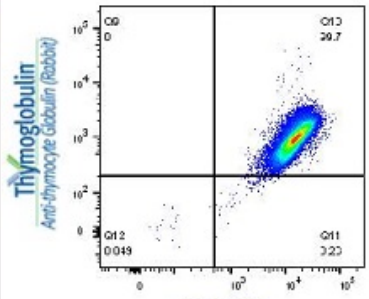
1 Rich & Fully Human Antibody Diversity

VDJ repertoire usage mimics human-derived diversity in variable region



2 Identical In Vitro Binding

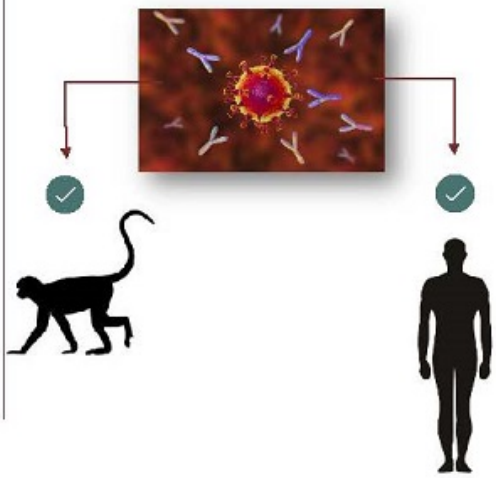
SAB-142 vs. Rabbit THYMO-AF488



SAB-142
Anti-Thymocyte Globulin (Human)

3 Positive Proof of Principle

GLP study confirmed effect of SAB-142 on same & relevant to T1D T-cell subsets



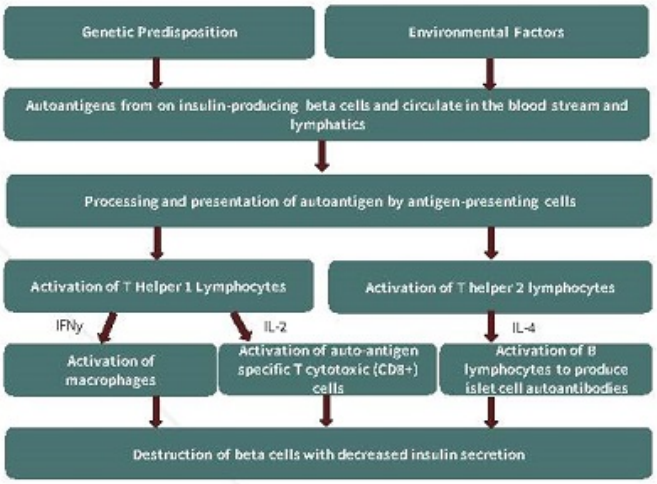
Data on file

SAB-142 *In Vivo* Proof of Principle

Demonstrated impact on major relevant T-cell subsets

SAb BIOTHERAPEUTICS

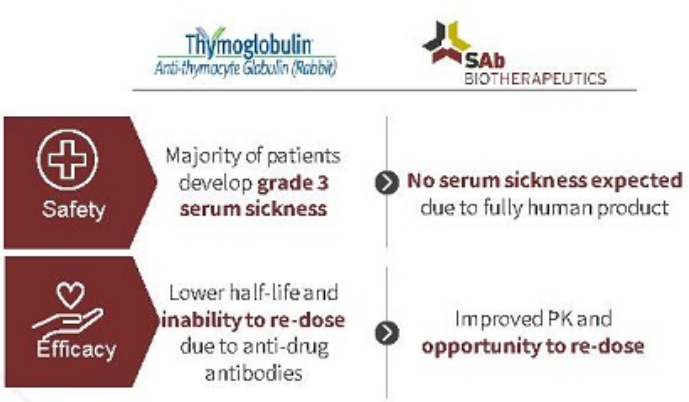
T1D Pathophysiology[1]

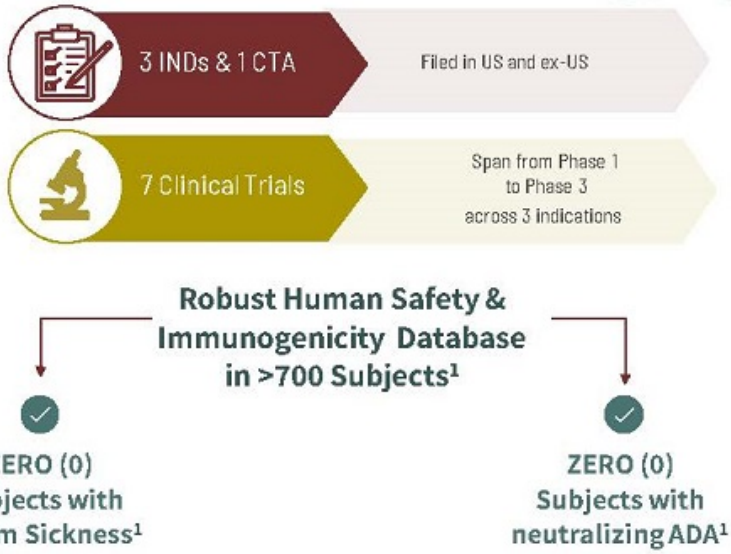


SAB-142 impacts major relevant T-cell subsets *in vivo*[2]

1. Pathophysiology: The Biologic Basis for Disease in Adults and Children. Kathryn L. McCance, RN, PhD, Sue E. Huether, RN, PhD 2014
2. Data on file

SAB-142 Has a Similar MoA to rATG with Several Distinct Safety Advantages





1. Data on file

Long-Term Safety of Low-Dose rATG in T1D Patients

Single course of low dose rATG has shown adequate safety in the up to 5+ years of follow up

SAb BIOTHERAPEUTICS

Randomized, PBO-controlled trials in T1D patients		Infections	Humoral Response	Cancers	Serum Sickness & CRS
Thymoglobulin NCT00515099	6.5mg/kg Ages: 12-45yo T1D Dx<100 days	✓ • No increase vs PBO *No opportunistic infections* *No difficulty in clearing infections*	✓ • Fully preserved	✓ • No increase vs PBO	• SS: 38 out of 38 ptns • CRS: 37 out of 38 ptns
Thymoglobulin NCT02215200	2.5mg/kg Ages: 12-45yo T1D Dx<100 days	✓ • No increase vs PBO	• N/A	✓ • No increase vs PBO	• SS: 21 out of 29 ptns *Grade 3 & 4: 15 (51.7%)* • CRS: 14 out of 29 ptns *Grade 3 & 4: 0*
Thymoglobulin + GCSF NCT01106157	2.5mg/kg Ages: 12-45yo T1D Dx: 4 months to < 2 years	✓ • No increase vs PBO	• N/A	✓ • No increase vs PBO	• SS: 13 out of 17 ptns *Grade 3 : 11 (64.7%)* • CRS: 11 out of 17 ptns *Grade 3: 0*

SAB-142 vs Teplizumab

Projected favorable risk/benefit profile compared to other treatments

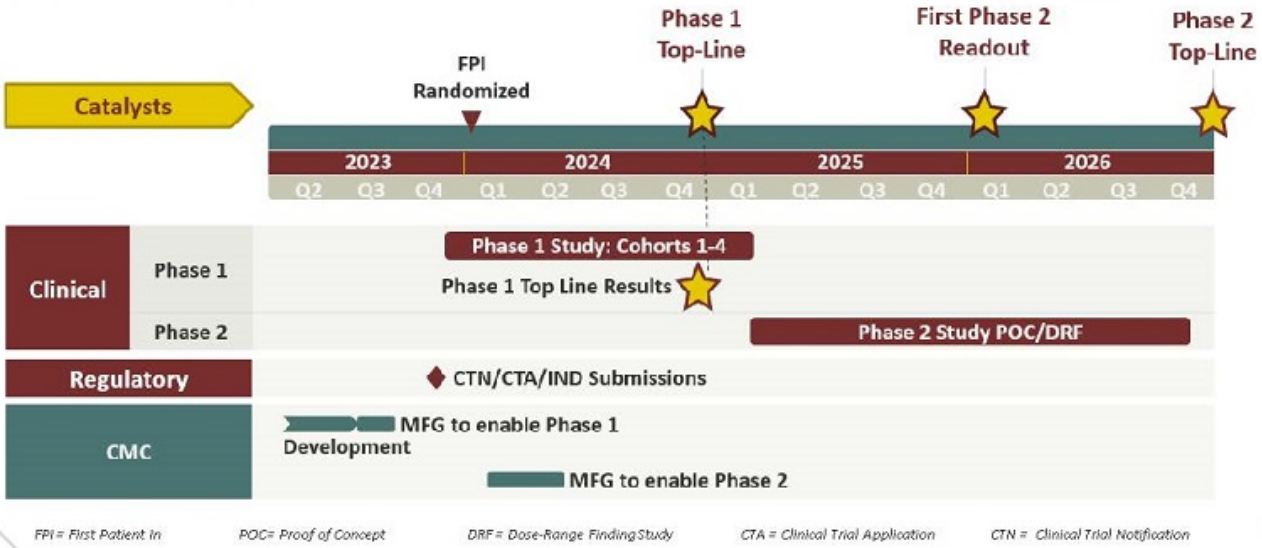
	Teplizumab (Tzield)	SAB-142
Nature of the antibody	Humanized mAB	Human pAbs
Mode of Action	Binds to CD3[2]	Multifactorial: Shown to bind to similar cell lineages as rATG
Indications	Stage 2[2] (Q1 2023)	Targeting Stage 2 & Stage 3
Efficacy	**63% effect o**n C-peptide AUC after year 2[1]	• For 1st dosing course, anticipated to be comparable to rATG • rATG showed 103% effect on C-peptide AUS at year 2[1] • Unlike rATG/teplizumab, maintenance of C-peptide preservation may be achieved by safe re-dosing
Immunogenicity: ▪ **ADA** ▪ **Neutralizing ADA**	• 57% of treated patients have ADA[2] • 46% of whom having neutralizing ADAs[2]	• ADA and nAbs are projected low/none • 0% of subjects dosed at or below 25mg/kg had ADA, across multiple clinical-stage compounds
T1/2	4.5 days	21-28 days
Safety		Lower/no probability of serum sickness
Dosing	IV daily for 14 days[2]	IV over 1-2 days
Repeated dosing	Challenging due to high % of nAbs	High probability of safe redosing due to fully human nature of pAbs

1. Cost-Effectiveness of Low-Dose Antithymocyte Globulin Versus Other Immunotherapies for Treatment of New-Onset Type 1 Diabetes Hai V Nguyen 1, Desmond A Schatz 2, Shweta Mittal 1, Laura M Jacobsen 2, Michael J Haller 2. 2022 Apr;24(4):258-267
2. Tzield Full Prescribing Information https://static1.squarespace.com/static/584574ed9f3456c7683a95d6/t/6644a88ba4f03d04b9ef8602/1682608091493/tzield-full-prescribing-information.pdf#-prescribing-information

SAB-142: Clinical Development Plan in T1D

STUDY DESIGN	**"Fully HUman anti-thymocyte biologic in first-in-MAN clinical study (HUMAN trial)"** **Phase 1: First in Human, Randomized, Single Ascending Dose trial** **SAB-142 dose range: 0.01mg/kg up to 2.5mg/kg**
ENDPOINTS	**Primary end point:** Acute (serum sickness, CRS) and long-term (rate of infections) safety **Secondary end points:** pharmacokinetics, pharmacodynamics, immunogenicity/ADA **Major outcomes:** ○ **Validate safety superiority based on the anticipated 0% of serum sickness and nAbs** ○ **Validate MoA of SAB-142 in humans** ○ **Proof of Biological Activity (POBA): change vs baseline in CD3, CD8, CD4, CD8/CD4 ratio, Tregs compared to rATG (cross study)**

SAB-142 Key Milestones



FPI = First Patient In *POC= Proof of Concept* *DRF = Dose-Range Finding Study* *CTA = Clinical Trial Application* *CTN = Clinical Trial Notification*

Phase 1 / Phase 2 Major Outcomes:

- ✓ *0% serum sickness*
- ✓ *0% ADA/nADA (Anti-Drug Antibodies)*
- ✓ *Superior efficacy vs TZIELD on C-peptide*
- ✓ *Superior efficacy vs TZIELD on HbA1C*

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Summary

- **SAB-142:** First-in-class fully-human multi-target antibody treatment aimed to provide superior safety and efficacy for delaying onset or progression of Type 1 Diabetes.
- **MoA** of SAB-142 in T1D is clinically-validated in numerous clinical trials with rabbit ATG
- **Safety database** with human data in > 700 patients SAB antibodies produced by DIVERSITAB™ platform supports anticipated zero (0) serum sickness and zero (0) neutralizing antibodies with SAB-142 in upcoming T1D studies
- **Established Regulatory path** for T1D indications and SAB-142 asset as fully human multi-epitope multi-target modality
- **Next steps:** CTN/CTA/IND filings with First in Men Phase 1 trial anticipated by the end of 2023

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