Targeting Signature Receptors to Enable Unprecedented Safety and Efficacy in Cancer and Other Devastating Diseases

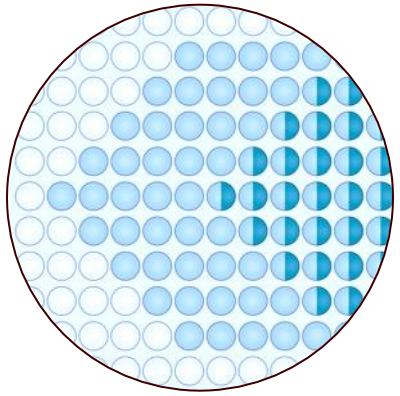
Overview and Status

Late 2019

Situation: Many Currently Incurable Diseases are Characterized by Clonal Proliferations of Aberrant Cells That Can Be Identified by a Single (*Signature*) Cell Surface Receptor – Targeting These Receptors Can Yield Unprecedented Outcomes

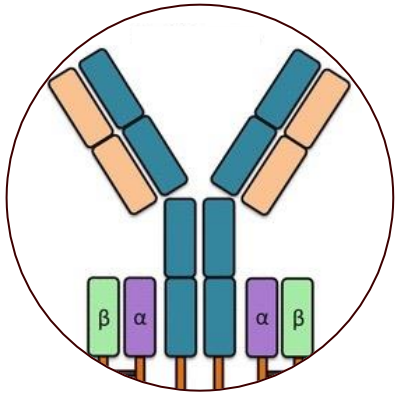
Clonal Disease

Aberrant Clone(s)

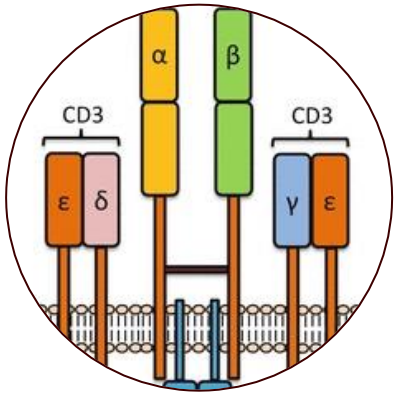


***sIg*Nature Cell Surface Receptor Classes**

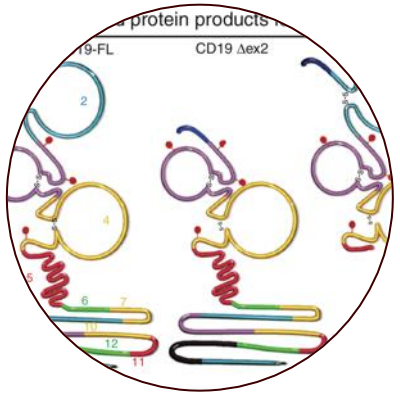
BCR Idiotype



TCR Idiotype



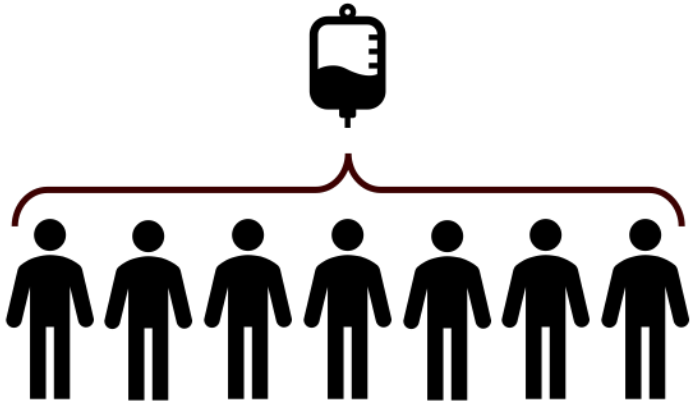
Tumor Neoepitopes



Many incurable immune mediated diseases, including B and T cell cancers and autoimmune disorders, are characterized by clonal cellular populations that can be identified uniquely by a ***Signature Receptor*** *– **a single highly–expressed cell surface receptor that distinguishes the aberrant clone from all other tissues in the body**. These signature receptors are ideal therapeutic targets, as they are completely unique to the diseased cellular clone(s) and are not found on healthy tissue, are both highly and widely expressed on diseased cells, and are often essential to both cell survival and proliferation. The ability to craft therapies against these targets promises unprecedented degrees of efficacy and safety across a range of devastating diseases.*

Problem: The Signature Receptor is Often Unique from Patient-to-Patient, and Necessitates a New Drug for Each Patient in a Clinically Relevant Timeframe

Current Targeted Therapy

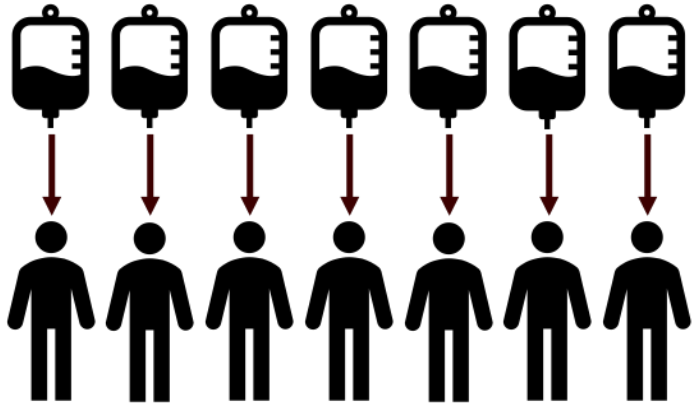


Associated or Overexpressed Targets

Poor Ability to Distinguish Between Healthy and Diseased Tissue

Incapable of Accounting for Escape Variants

Affigen Clone-Identifying Therapy



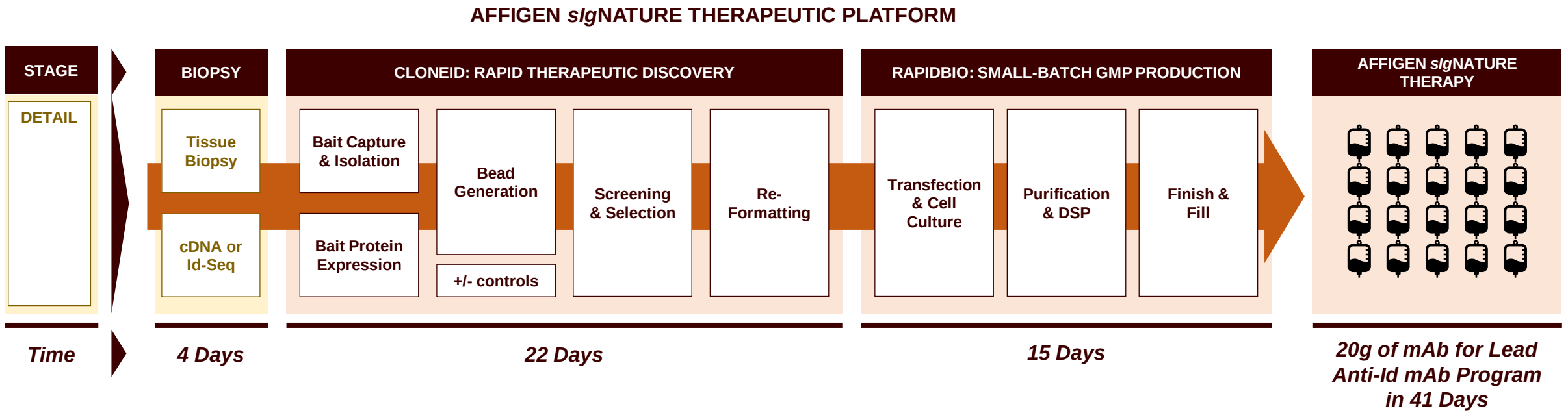
Disease-Specific / Identifying Targets

Absolute Ability to Distinguish Between Healthy and Diseased Tissue

Capable of Accounting for Escape Variants

In the great majority of cases, the target class of the Signature Receptor (e.g. the Idiotype of the B cell receptor in B cell diseases, the Idiotype of the T cell receptor in T cell diseases, etc.) will be common to the disease, but the underlying sequence and protein structure will be different, and essentially random, from patient to patient. This necessitates the development of a unique drug for each patient within a clinically-relevant time window – often weeks.

Solution: Affigen's *sIg*Nature Platform Enables the Production of Patient-Specific Therapies Against Signature Receptors With Unprecedented Speed and Precision

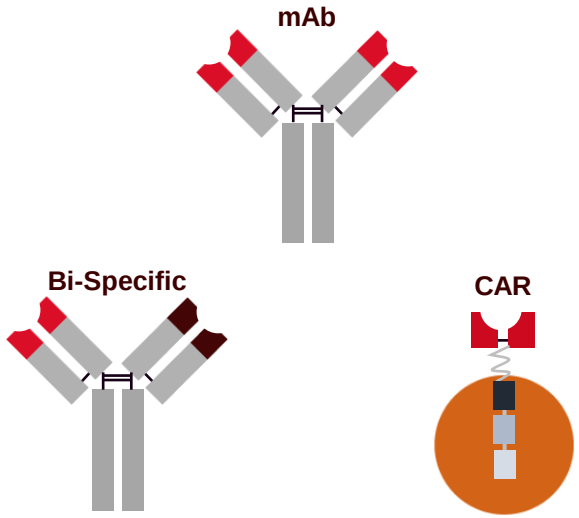


*Affigen was building **sIgNature**, a platform that can identify immunoglobulin (Ig) binding domains to Signature Receptors with **single amino acid resolution** and with **single digit nanomolar or better affinities**, and that can produce **sIgNature** therapies, including monoclonal antibodies (mAbs), chimeric antigen receptor cell therapies (CAR-T/NK) and bi-specific antibodies (bsAbs), **within weeks of diagnosis**. By leveraging the power **sIgNature** and its constituent CloneID and RapidBio platforms, we seek to usher in a new era of efficacy and safety in the treatment of many of our most devastating diseases.*

Affigen's *sIg*Nature Therapies Have the Potential to Bring a New Class of Safe and Effective Options to Patients With Devastating Cancers, Autoimmune Diseases, and Lymphoproliferative Disorders

Affigen *sIg*Nature Therapies

Multi-Modal Platform



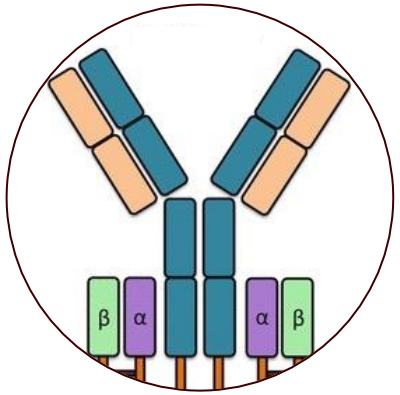
Optimized & Standardized Scaffold

*sIg*Nature CDR

Immune-Effector Domain

Applicable Disease Areas by Target Class

BCR Idiotype

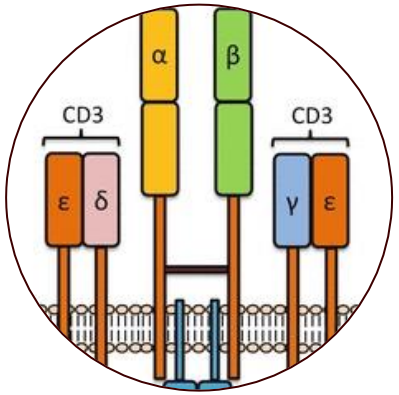


B-Cell Malignancies

B-Cell Autoimmunity

B-Cell Lymphoproliferative Disorders

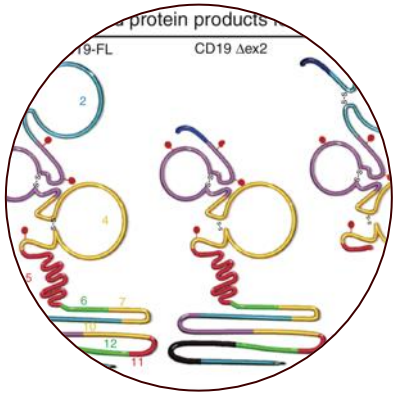
TCR Idiotype



T-Cell Malignancies

T-Cell Autoimmunity

Tumor Neoepitopes



Solid Tumors

sIg-Negative Hematological Malignancies

sIg-Negative Lymphoproliferative Disorders

Introduction to Affigen

First-In-Class Platform for Rapid and Selective Clonal Ablation

- **Affigen was building *sIg*Nature, a first-in-class platform for the rapid production of patient-specific therapies that have the potential to bring a new class of safe and effective options to patients with devastating cancers and autoimmune diseases**

- **Our *sIg*Nature therapies target highly-expressed cell surface receptors that serve to uniquely-identify distinct aberrant clonal population of cells – in essence, clonal signatures – and that distinguish aberrant clones from all other tissues in the body**

- **Examples of these Signature Receptors include: the idiotype of the BCR, the idiotype of the TCR, and tumor neoepitopes**

- **Proof-of-Concept manufacturing platform (CloneID and RapidBio) development is complete**

- **Novel in vitro and in vivo efficacy data generated, tying back to Levy et al studies from the 1980's-1990's**

Program Status

Demonstrated Proof-of-Concept of *sIg*Nature Therapeutic Manufacturing Platform
Generation of MOA and Efficacy Data With *sIg*Nature mAbs That Bridge Program to Historical Levy et al Pre-Clinical and Clinical Data

- **Proof-of-Concept manufacturing pipeline (*sIg*Nature) was demonstrated**
- ***In vitro* and *in vivo* efficacy data was generated with Affigen *sIg*Nature mAbs in the workhorse Levy et al SUPB8 model**
- **Affigen had secured an exclusive license to a key library technology, the engine behind CloneID, for our lead BCR-Id program and for our follow-on TCR-Id program. However, as of December 2019 this has been terminated due to Affigen's liquidation. A replacement license will be required for further development.**
- **Patent US10221249B2, Method of making patient specific anti-idiotype antibodies, was issued in March 2019**
- **Initial evaluation of GMP manufacturing feasibility and cost was completed**