

RubrYc Therapeutics, Inc.

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RubrYc™
THERAPEUTICS

Nature-inspired, antibody discovery driven by AI

RubrYc Therapeutics has established an antibody discovery engine for the development of epitope-targeted biotherapeutics. Through machine learning, the platform helps reveal natural subdominant and alternative epitopes to target for optimized bio-superior design and as access points to traditionally 'undruggable' proteins.

Biotechnology company RubrYc Therapeutics, Inc., founded in 2017, has developed a proprietary machine learning-driven solution for the discovery of best-in-class and first-in-class epitope-selective immunomodulatory therapies for cancer and autoimmune disease. Compared with small molecules and conventionally selected antibodies, epitope-selective antibodies exhibit precise target selectivity that confers enhanced safety and pharmacodynamic properties.

RubrYc's discovery engine takes advantage of recent improvements in machine learning, protein simulation, deep sequencing and screening. The company has deployed its platform to advance proprietary discovery programs, and to initiate partnerships with top-tier pharmaceutical companies that share its mission of expanding therapeutic options and improving outcomes for patients through the application of novel, epitope-targeted biotherapeutics (Fig. 1).

RubrYc's lead programs include RTX-002, an anti-PD-1 agonist for serious autoimmune diseases such as systemic lupus erythematosus and multiple sclerosis, and RTX-003, an anti-CD25 antibody that drives the antibody-dependent cellular cytotoxicity response towards immune-suppressive regulatory T cells (T_{reg} cells) in cancer.

The company has a two-pronged approach to partnering that includes the establishment of co-discovery collaborations, or of asset out-licensing or partnering collaborations.

"As a company using epitope-specific targeting to advance immunomodulatory therapies, RubrYc is ideally positioned to rapidly create drug candidates for patients afflicted with a range of conditions," said Isaac Bright, CEO of RubrYc. "During our first 2 years, we have taken an engineering approach to the discovery of biotherapeutics that has allowed us to establish a track record of successful interventions in T cell biology, attacking challenging epitopes on multiple target families."

The RubrYc discovery engine

RubrYc has developed a unique molecular engineering approach to the discovery of epitope-selective antibodies. By combining greatly parallel in silico simulations, proprietary machine learning algorithms and empirical analysis of protein structures, RubrYc develops so-called meso-scale engineered molecules, or MEMs. A MEM consists of an engineered scaffold designed to present a specific epitope while retaining its natural conformation and motion present in the native target protein. This engineered fidelity ensures the MEM will help select antibodies that reliably recognize the epitope of interest in its natural in vivo context.

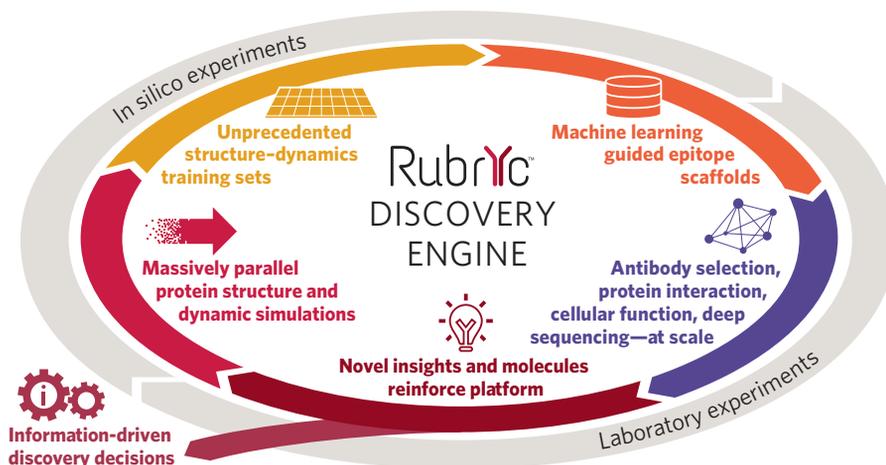


Fig. 1 | RubrYc's machine-learning solution. The platform drives the discovery of epitope-selective immunomodulatory therapies for cancer and autoimmune disease.

The MEM platform enables RubrYc to discover antibodies with exquisite control of epitope targeting through in vitro selection. This platform gives access to an expanded complementary determining region (CDR) diversity that allows for rapid discovery of antibodies against (i) therapeutically relevant epitopes, (ii) challenging epitopes on targets classically considered 'undruggable', and (iii) discontinuous or junctional epitopes.

Importantly, the epitope selectivity conferred by the RubrYc discovery engine provides a distinct IP advantage for the commercial development of therapeutic antibodies. By steering to distinct epitopes with MEMs, resulting antibodies can have novel composition of matter IP associated with them.

RubrYc's two lead programs exemplify the power and versatility of the platform. In RTX-003, a CD25 T_{reg} cell-targeting program, RubrYc used MEMs to identify epitopes and antibodies that enhance antibody directed cellular cytotoxicity (ADCC). This results in T_{reg} cell depletion and a restored antitumor immune response. RTX-003 could be used in combination with checkpoint inhibitors to boost the response or as a monotherapy given the optimized activity and toxicity profiles of the target epitope. RTX-003 is undergoing final in vivo proof of concept studies before proceeding to the pre-investigational new drug (IND) stage later this year.

In RTX-002, an anti-PD-1 campaign, RubrYc used MEMs to discover epitopes that confer optimal allosteric agonist activity to selected antibodies. The company anticipates RTX-002 leads will be advanced to in vivo proof of concept studies in the second half of 2020.

Partnering with RubrYc

The RubrYc platform lends itself to multi-modal partnerships to drive the development of biologics ranging from conventional monoclonal antibodies (mAbs) for specific novel epitopes, and epitope-optimized antibody-drug conjugates, to bispecific antibodies and chimeric antigen receptors for cell-based therapies. RubrYc's collaboration model includes options for co-discovery and co-development programs, for out-licensing or co-developing pipeline assets, and for single or multi-target exclusive collaborations.

"RubrYc delivers unprecedented epitope-selectivity through designed MEMs that recapitulate sequence, structure, and motion of selected epitopes," said Bright. "Our unique platform enables accelerated and diversified discovery and optimization of highly efficacious therapeutic antibodies, making us the partner of choice for the rapid discovery of novel immunomodulatory therapeutics in areas such as cancer and autoimmune disease."

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