

I. Client's Objective

- Discovery strategy team at a top 15 global healthcare company wished to identify attractive pre-clinical therapeutic targets in autoimmunity, focusing on dysregulation of signaling pathways

II. Lumleian's Perspective

- Data mining algorithms can efficiently and exhaustively identify known therapeutic targets associated with specific immune cells, pathways, and diseases
 - Data: Patent applications, NIH and private grants, academic publications, technology transfer offices
- Targets can be objectively prioritized based on their known correlation with: (1) autoimmune disease, (2) immune cell activation, and (3) effector mechanisms and pathways
- Lumleian's decision scientists can validate prioritized therapeutic targets to qualitatively corroborate data mining algorithms

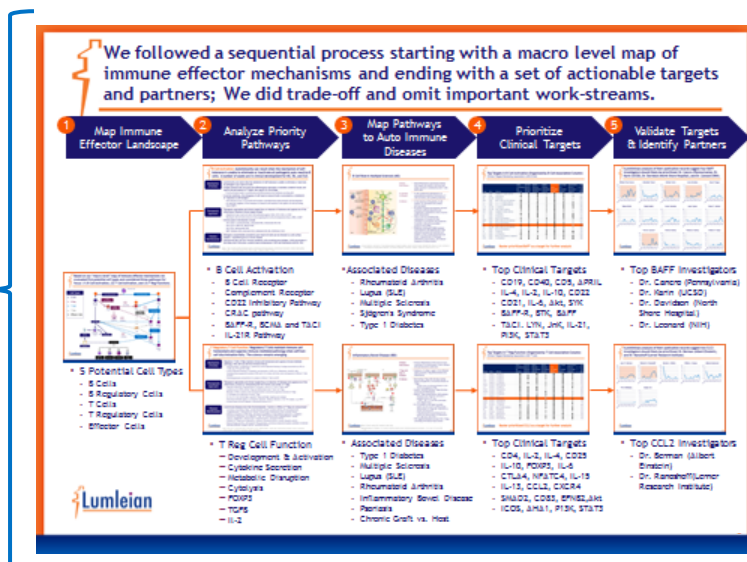
III. Client Result

- Process Improvement:** Client implemented an objective, efficient and exhaustive approach to identify and prioritize potential therapeutic targets to inform internal discovery strategy and external research collaborations
- Pipeline Roadmap:** Discovery management coalesced on a pipeline roadmap to inform strategic R&D programs and investments, based on objective data analysis
 - 200 clinically meaningful targets were identified and objectively ranked
 - Prioritized targets were profiled to qualitatively inform pipeline roadmap

IV. Engagement Summary

Sequential Approach

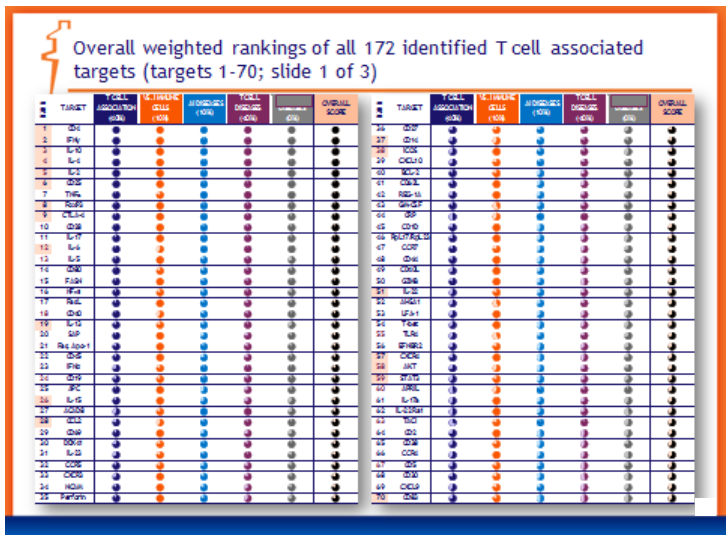
- Map immune system pathways
- Classify MoAs associated with autoimmune diseases
- Identify and prioritize potential clinical targets
- Profile current scientific thinking and clinical experience for priority targets



IV. Engagement Summary

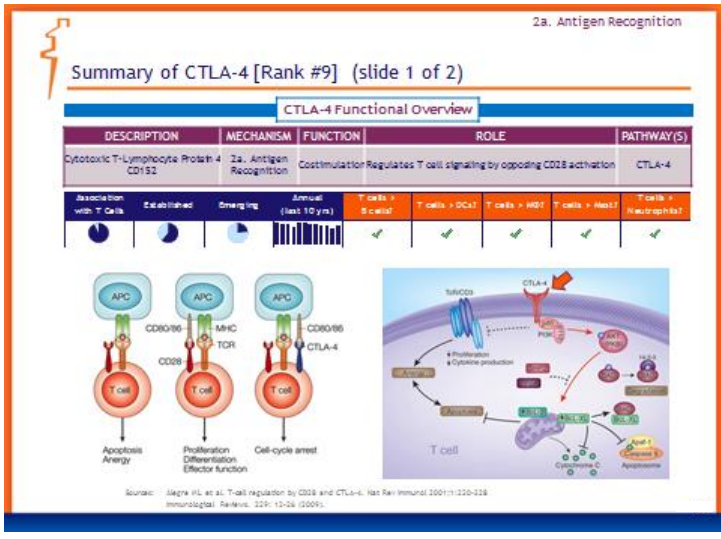
Data Mining Algorithms

- Identification: Identified therapeutic targets in autoimmunity, focusing on dysregulation of signaling pathways
- Ranking: Targets were objectively ranked based on client specified criteria, including:
 - Function in specific immune cell subsets
 - Specificity to cell type or dysregulation of signaling pathway
 - Role in autoimmune diseases
 - Synergy with client's portfolio



Target Validation

- Priority targets were validated to qualitatively corroborate data mining algorithms
 - Quantified data representing current scientific merit of target
 - Up-to-date mechanistic and contextual understanding of target's role in autoimmunity



Disease State Correlations

- Priority targets were correlated with key autoimmune diseases
 - Association of target with specific diseases of client interest
 - Clinical experience with target across disease states

