

# 23andMe Therapeutics

January 2024



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## 23andMe Therapeutics: Genetics Reimagining R&D Our Value Proposition

	Our credo: Every Day Matters	<ul> <li>Current focus: Oncology Development, Immunology Discovery</li> <li>Fast timelines and early kill decisions from discovery through clinical development to approval</li> </ul>
	Higher probability of success in the clinic	<ul> <li>Indication selection informed by lifetime genetic risk based on world's largest human genotypic &amp; phenotypic data platform</li> <li>Genetics (e.g. GWAS, PRS) and biomarkers to optimize target-indication-patient clusters</li> </ul>
	Forward-thinking expert team	<ul> <li>Experienced, innovative genetics researchers and clinical development team with track record for innovative approvals</li> <li>Genetics and clinical development scientists to identify higher success programs to bring into the clinic</li> </ul>

GENETICS





Using Human Genetics to Create Meaningful Therapeutics for Diseases with High Unmet Need in Oncology and Immunology





# The Power of Our Approach

## Leaders in Data

23andMe Has the Largest Recontactable Genetic Database for Target Discovery in the World

Largest, most diverse recontactable database of <u>genotyped + phenotyped</u> individuals

23andMe <sup>,</sup>		)	14M <sup>1</sup>
REGENERON	~2M+		
MILLION VETERAN PROGRAM	900,000+		
UK BIOBANK	500,000		
DECODE GENETICS	500,000		
FINNGEN	473,000+		
ALL OF US	413,000+	~80%	
GENOMICS ENGLAND	100,000	consent to research	

<sup>1</sup> As of September 30, 2023.

\*Publications supporting human genetic evidence for approved drug indications Nelson et al., 2015 (Nature Genetics); King et al., 2019 (PLOS Genetics)

# Pharma partnerships leverage the database for research and recruitment



#### POWER: Combining Our "I" and "O" Phenotypes Gives Us Broad Statistical Power to Drive Unique Immunological Insights <u>for Oncology Development</u>

#### IO phenotypes of interest (examples)

"O" Oncology phenotypes	Cases
BCC	410,104
Bladder	15,663
Brain	4,586
Breast	118,632
Colorectal	25,398
Endometrial	17,912
Esophageal	1,134
Head and Neck	8,596
Kidney'	14,934
Leukemia	13,763
Liver	3,077
Lung	12,367
Melanoma	125,364
Myeloma	7,127
NH lymphoma	17,643
Ovarian	13,044
Pancreatic	2,910
Prostate	71,616
SCC	218,805
Stomach	3,508
Thyroid	27,259 Iotal: 1.133.442

"I" Immune phenotypes	Cases
Vitiligo	60,701
Alopecia areata	56,233
Hashimoto's	186,069
IBD	116,788
Atopic dermatitis	716,447
Poison oak rash	783,604
Allergy	2,053,011
Food allergy	213,185
Asthma	1,128,292
Tonsillectomy	270,499
Toenail Fungus	276,405
Psoriasis	277,525
Hidradenitis suppurativa	31,008
Lupus	58,414

Biological processes of interest captured in "I" phenotypes, not targeted in the clinic yet

Autoimmunity
Immune Polarization
Аtору
Inflammation
Chronic Infection
Tissue Repair

POWER: 23andMe Database Contains >150 Immune Disease Phenotypes With Up To 100s of Novel Genetic Insights Per Disease <u>for Immunology Discovery</u>

Drugs with human
genetic support are



more likely to succeed<sup>1</sup>

Disease	23andMe GWAS cases	Public GWAS cases	23andMe hits beyond largest public GWAS
Asthma	1.1M	65k	716
COPD	83k	36k	171
Atopic dermatitis	716k	84k	399
Psoriasis	278k	19k	319
Severe acne	535k	34k	735
Urticaria	461k	41k	386
Hidradenitis	31k	1.6k	148
Rosacea	352k	73k	421
Alopecia areata	56k	3k	67
Vitiligo	61k	4.7k	75
IBD	117k	60k	54

<sup>1</sup> 23andMe multi-ancestry meta-analysis GWAS as of October 2023

## GWAS: The Initial Foundation for Genome Analysis



GWAS = <u>Genome-Wide Association Study</u>
 SNPs associated with disease found at different frequencies in case vs controls
 Extensive know-how required to get from

association to therapeutic target



SNPs are tested across the genome and disease associations mapped to specific regions



## PheWAS: Breadth of Phenotyping Elucidates Critical Disease Drivers

23andMe runs GWAS in >1,000 phenotypes

PheWAS (<u>Phe</u>nome-<u>W</u>ide <u>A</u>ssociation <u>S</u>tudy) captures <u>pleiotropic</u> effects of genetic variants and points to possible <u>unwanted toxicities</u> or potential <u>indication expansions</u>



- We observe a clear genetic signal linking TSLP to asthma
- We do not observe signals in phenotypes that would point to safety issues
- Amgen clinical trials of anti-TSLP mAb as eczema target failed. We do not observe a statistically significant genetic signal linking TSLP to eczema
- We observe a strong genetic signal linking TSLP to eosinophilic esophagitis → potential indication expansion in a rare disease



## **POWER:** Immune Genetics Implemented as an IO Clinical Biomarker





POWER: Combining Extensive Pleiotropy in the 23andMe Database and Computational Biology for Target Discovery

#### Genetic insights

GWAS signals / pleiotropy (one variant affecting multiple traits)



#### signal 1 signal 2 signal 4 signal 5 signal 6

Computational Biology ML / Al

QTL-based and custom ML models for gene mapping and target hypothesis prioritization

Interpretation of GWAS signals making extensive use of pleiotropy and allelic series and to increase reliability of biological conclusions

Analysis of bulk/single cell/differential gene expression

#### **Biological insights**

genes, mechanisms, pathways and cell types



Utilizing the World's Largest Human Pleiotropy Map to Address Unmet Medical Need

## **NEED:** Our Unique Approach to De-risk Development:

Leveraging Pleiotropy to Characterize Novel Cancer Targets



\*Currently in Phase 2a portion of Phase 1/2a

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## NEED: Our FxG Efforts Leverage Pleiotropy to Identify Targets in Defined Areas of Medical Need in Asthma



Validated targets with pharmacologically meaningful effects in disease relevant assays



Progression of Therapeutics at Speed

## SPEED: Our In-House Expertise in Antibody and Protein Engineering Enables Rapid Therapeutic Generation

- Experienced Antibody and Protein Engineering group
- Deep experience in protein engineering, biochemistry, structural biology, enabling diverse approaches to antibody discovery, antibody engineering, and automation



# SPEED: Our lead IO program progressed from discovery to the clinic in 5 years





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23andMe Therapeutics: Clinical Development

## **Experienced Clinical Development Leadership**



Jennifer Low, MD, PhD Head of Development



LOXO

Erivedge (vismodegib) Vitrakvi (larotrectinib) Zelboraf (vemurafenib) **Cotellic** (cobimetinib)



Maike Schmidt, PhD Sr Group Head, **Translational Sciences** 

Genentech

**FivePrime** 

Avastin (bevacizumab) Tecentriq (atezolizumab)



Dylan Glatt, PhD Sr Clinical Pharmacologist, 23ME-00610 PTL

GILEAD

Jyseleca (filgotinib)



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## 23andMe Therapeutics IO Pipeline: First-in-Class Potential



#### 23ME'610/anti-CD200R1

- Targets Innate and Adaptive Immunity
- Potent Ab with great PK/PD
- Phase 1 monotx with on-target AEs
- Ph2a data expected to be presented mid-2024

#### 23ME'1473/anti-ULBP6

- Activator of tumor NK cells
- Effector-enhanced Ab with dual NKactivating MOA



# 23ME-00610\*

## Anti-CD200R1 Antibody for Hard-to-Treat Solid Tumors Phase 1/2a

\*Wholly owned; development ongoing in multiple relapsed/refractory solid tumors (including neuroendocrine and ovarian)

## '610 Development Rationale

#### Addressing Critical Unmet Need in Solid Tumors

#### Patients + Caregivers DESPERATELY seeking survival



#### CD200/R1 is a dominant immune checkpoint\*



\*PMIDs: 12960329, 23602662, 22264927, 19786546, 15557172, 22491458, 15220441, 34326171, 18081533, 24388216, 11099416

Potential activity in >60% of current patients not deriving efficacy from PD-(L)1 inhibitors



\*PMID: 31443741; https://investor.lilly.com/static-files/9efbede9-bd6a-4d7b-823e-2996b1c2d114

Week

Last dose



disease

### 23ME-00610 ('610), a Fully Humanized, Effectorless IgG1, Inhibits Immunosuppressive Signaling via High Affinity Binding to CD200R1

#### '610 Primary Pharmacology\*

- Subnanomolar affinity
- Kills tumor cells in vitro
- Anti-tumor activity in vivo
- Potential for monotherapy
   activity on huPBMCs that do not respond to PD-1 antibody
- Potential for combination



\*CD200-expressing cell types include tumor, stroma and endothelial IFN, interferon; IL, interleukin

#### '610 Clinical Development\*

- Well tolerated up to 1400 mg
- PK supports Q3W (or better)
- Promising therapeutic index, projected dose ≥ ~600 mg
- Monotherapy dev ongoing
- Further expansion in NE and OC for safety, PK, PD and dose selection
- Indication CDPs and TPPs

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\* Rasco, et al., 2023, SITC Annual Meeting #619; Glatt, et al., 2023 SITC Annual Meeting #609



## '610 Phase 1 Results: Dose Escalation Duration of Treatment

Stable disease rate across ALL Phase 1 patients is 52% with median duration of 18.6 weeks



Colored portions of the horizontal bars represent the dose level the participants received. Intra-patient dose escalation to the next cleared dose level was permitted for participants who did not experience a Grade 3 or above study-drug related AE.



## '610 Preliminary Clinical Activity in Neuroendocrine Cancer



- 23ME-00610 treatment was well tolerated
- **19%** reduction in target lesions at Week 24 and Week 40 assessment
- **58%** size reduction in longest dimension of paratracheal lesion
- Patient continues on study drug at Cycle 13 with stable disease at time of data cutoff (May 2023)



## '610 Phase 2a Data: Estimated Timeline\*





\*Part of the Phase 1/2a clinical study of '610. Strictly estimated dates for discussion purposes only. Based on calendar year. Subject to change.



#### '610 Differentiation: Inhibition of CD200R1 Has the Potential to Address Resistance to Anti-PD1 Therapies

Blocking the CD200R1 pathway enhanced IFNy production from SEB-stimulated PBMCs compared to isotype control and anti-PD1 in the majority of samples tested



PBMCs from each respective patient were incubated with 100 nM of 23ME-00610, anti-PD-1, or isotype control. Cells were stimulated with SEB. IFNy levels were determined by enzyme-linked immunosorbent assay. Mean biologic triplicates were normalized to isotype control. \* p-value<=0.05 compared to control Copyright © 2024 23andMe, Inc.



## '610 Differentiated Combo Potential: Anti-**CD200R1 with Anti-PD-1** Potentially Enhances Immune Activation



• Preliminary data from ex-vivo combination of anti-PD-1 and anti-CD200R1 blockade increased IFNy (interferon-gamma) secretion from primary human T-cells



## '610 Next Steps

- Complete enrollment of Phase 2a Dose Expansion Cohorts
  - Recently expanded Neuroendocrine, Ovarian cohorts
  - Initial Phase 2a data cohorts planned to be presented mid-2024
  - Clinical development planning for Fast-to-Market strategies
  - Potential clinical combinations with assets with complementary mechanisms, to support earlier line indications
- Seeking partnerships to expand Phase 2a and conduct randomized Phase 2b/3 clinical trials – *multiple readouts expected in 2024*



# 23ME-01473

Genetically validated NK Cell Activator (Anti-ULBP6) Antibody for [Metastatic] Solid Tumors

#### 23ME'1473: Tumor Cell Killing-Enhanced Antibody Targets Major Resistance Mechanisms Hampering Immune Oncology

Targeting NK cells and NKG2D shows clinical promise

**ULBP6** inhibition could benefit patients in broad range of tumor types with neoantigen loss

Tumor type	Tumor ULBP6	Soluble ULBP6	Loss of antigen presentation <sup>1</sup>
HNSC <sup>2</sup>	+++	Under CDA	++
CESC <sup>3</sup>	+++	Under CDA	+++
Additional tumor types under CDA	+++	Under CDA	+++

<sup>1</sup>Dhatchinamoorthy et al., Front Immunol 2021

<sup>2</sup>HNSC, Head and Neck Squamous Cancer; <sup>3</sup>CESC, Cervical Squamous Cell Cancer

**Dual MOA achieves** synergistic NK activation and tumor cell killing



#### 23andMe developed major methodological improvements to targeting ULBP6

#### External clinical validation:

Monotherapy activity observed in NKG2D pathway activator (related mechanism) with complete and partial responses at a tolerable dose in early phase clinical trial<sup>4</sup>

23andMe '1473 targets the highest affinity NKG2D ligand with a tumor cell killing-enhanced antibody

4Wang, et al., CLN-619 ASCO 2023

'1473 Dual MOA: Effector Enhanced Antibody Binds to Tumor Cell Surface ULBP6/2/5 to Bolster NK Cell Antitumor Activity via ADCC



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23andMe Therapeutics: Target Discovery

## **Experienced Discovery Leadership**



**Bill Richards** 

Head of Therapeutics

Discovery

AMGEN



**Vladimir Vacic** Research Fellow. Computational Biology





**Patrick Collins** Director. **Functional Genomics** 



**Antony Symons** Senior Director Immunology & Inflammation



**Germaine Fuh** Senior Director Antibody & Protein Engineering

		AMGEN	AIMGEN	Genentech	
Insights from the 23andMe database	Computational Biology	Functional Genomics	Immunology / Discovery Biology	Antibody Engineering	

Experienced team that delivered genetics-based targets from discovery to the clinic

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## Leveraging Pleiotropy to Expand Airway Target Space

Hypothesis: loci associated with related phenotypes prioritize biologies not addressed by standard of care



Pleiotropy + functional genomics = best targets



## Strategic Sequencing Based on Polygenic Risk Scores

Sequencing individuals from the tail ends of the polygenic risk score (PRS) distribution for whom the actual disease status does not match predictions



#### 

Discovery of genes harboring rare variants of large effect





## FxG in Respiratory Disease & Beyond

	Cell type	Disease opportunities*	
	Macrophage	Br <b>oad immune</b> : skin, lung, Gl	
	Mast cells	<u>Urticaria</u> , allergy, RA, eczema	
	Fibroblasts	<u>Fibrosis</u> , lung, skin, RA, IPF	
	T cell	Broad immune: skin, lung, Gl	
	Sensory Neurons	Respiratory, IBD, eczema	
$\bigcirc$	Endothelial cells	RA, sarcoidosis, IBD, PAH	
	Airway Smooth Muscle	Asthma, COPD, PAH	
ZOF	Dendritic cell	Broad autoimmune: T1D, Graves	
	Keratinocytes	Skin	



