

# Human Genetics in Research & Development at GSK

## Making new medicines “driven by genetics”



### What we do in Human Genetics at GSK

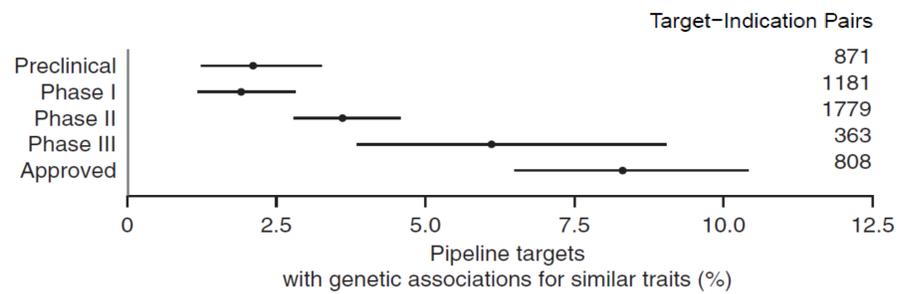
- GSK-led work showed that targets with genetic evidence are more likely to be safe and efficacious (Figure 1). Our R&D is now “driven by genetics”. Most new targets are supported by genetic evidence.
- We use genetics to guide target discovery (Figure 2) and target validation (Figure 3). These approaches are now routinely applied at large scale during drug development to guide indication prioritisation (Figure 4) and to support target discovery (K Sieber, Session 9: Omics and colocalization)
- To realise our vision, we make field-leading investments in the very best genetic resources, including UK Biobank, FinnGen and 23andMe, genome-wide data from thousands of phenotypes on millions of individuals (Figure 5). This, coupled with innovation in methods and technologies, allows us to develop new disease modifying therapies to benefit patients.
- We apply the best methods to apply genetic evidence to target discovery and validation. We have a range of ongoing collaborations with a range of leading academic groups, including the MRC IEU, to develop new MR approaches.
- This forms a core part of an integrated pipeline from recognising unmet need through to drug development (Figure 6), finding targets with the strongest genetic evidence and opportunity to benefit patients.

### Figure 1

## The support of human genetic evidence for approved drug indications



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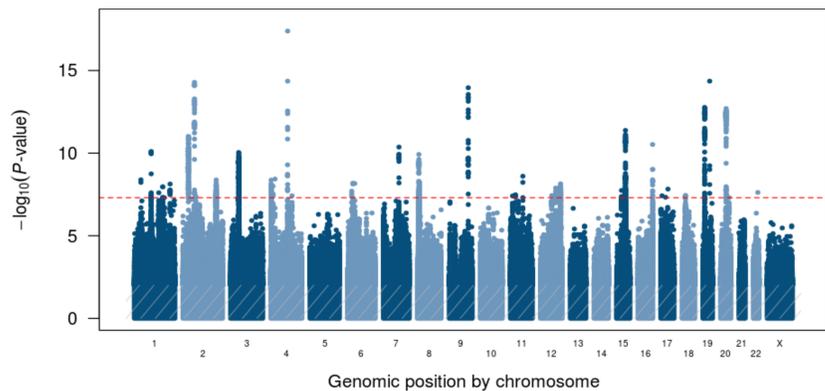


### Figure 2

## Identification of new therapeutic targets for osteoarthritis through genome-wide analyses of UK Biobank data



Tachmazidou et al., 2018

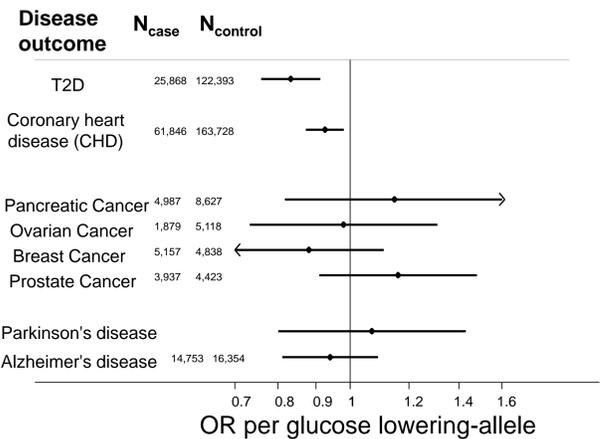


### Figure 3

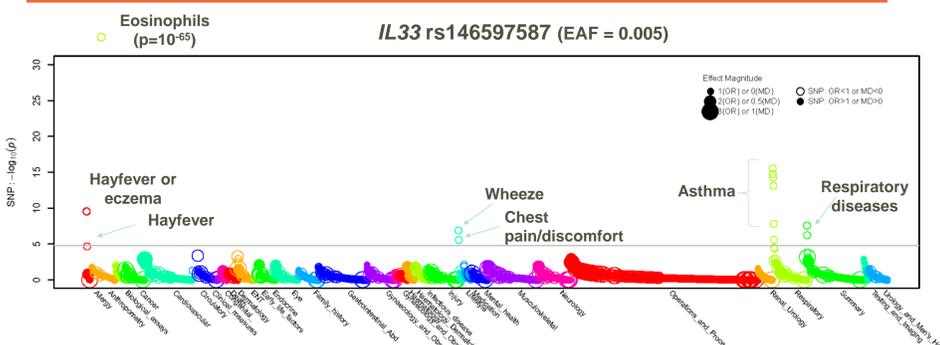
## Science Translational Medicine

### A genomic approach to therapeutic target validation identifies a glucose-lowering *GLP1R* variant protective for coronary heart disease

Scott et al., 2018

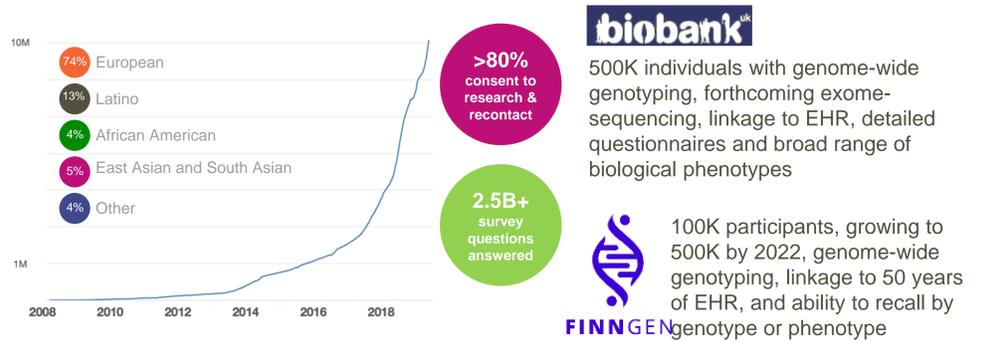


### Figure 4



PheWAS of IL33 LoF variant in *IL33* against 2500 phenotypes in UK Biobank

### Figure 5



### Figure 6

#### Find genetic associations

- 23andMe, UKB, FinnGen, EBI
- UKB analysis capabilities
- UKB exome sequence

#### Variant-to-gene mapping

- Effector gene
- Cellular context
- Analytical capabilities

#### In vitro elucidation

- Gene editing
- High throughput assays

#### Pathway/network expansion

- Pathway analysis
- Network propagation

#### Synthesis & decisions

- MOA
- Probability of success
- Target filters
- Portfolio view

#### Understanding genetic impacts

- PheWAS
- MR
- Direction of effects

## Join us



Have you ever considered a career in the pharmaceutical industry?  
Have you ever asked yourself these questions?

- Would I like to apply my skills in genetics to benefit patients?
- What skills will I develop?
- How might the focus of my research change?
- What are the benefits of joining a pharmaceutical company?

Ask us to find out! Positions open at a range of levels available in genetics, statistical genetics, and computational biology.

To find out more, go to [gsk.com/careers](https://gsk.com/careers) and search for GSKGenetics