RAREBASE

3,700 disease-causing genes: Our plan to fill the void in rare disease drug discovery

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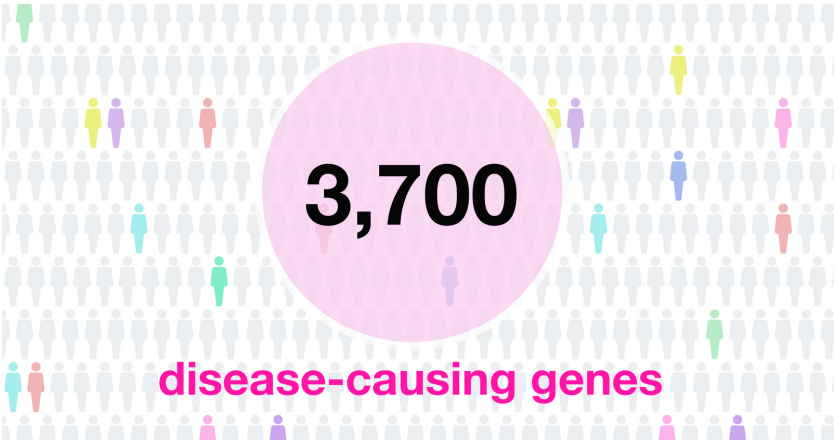

Introduction

Rare diseases are not as rare as we think. They impact 1 in 10 Americans — a startling 30 million individuals in total — of whom half are children.

are shining a light on the unmet need for rare disease therapies — and how Rarebase is accelerating drug discovery to provide a practical path forward for people affected by rare diseases who do not yet have an effective treatment.

Rare diseases are overlooked by drug discovery research

The fact remains that rare diseases often do not make the cut for drug discovery research — leaving many rare disease patients medically underserved. The expense of bringing a new compound to market is staggering, costing upwards of $2-3 billion and 10-15 years of research efforts. For many pharmaceutical companies, the cost, risk of failure, and sluggish development time in rare, or 'orphan', drug discovery are too great. Such a large investment for conditions with small patient populations is also unlikely to provide a financial return large enough to recoup the development costs. As our Chief Scientific Officer Chris Moxham, Ph.D., explains, "More often than not, individual rare diseases with smaller numbers of patients equate to lower or no probability for a return on the investment. Traditionally, they just don't make the cut as companies make choices about where to deploy their resources and capital."

Even if a drug candidate reaches the clinical trials phase, rare diseases are notoriously difficult to study in these trials. Lack of knowledge about the

utilize alternative study designs instead of traditional trial methods. These challenges have led patient groups to turn toward other innovative solutions to power rare disease research.

Innovative drug discovery strategies – including drug repurposing – offer a possible solution

Drug repurposing provides a more practical and complementary approach to traditional drug discovery for rare diseases. Instead of developing a drug from scratch, scientists take therapies approved for other conditions and investigate their application in a new disease. The process lessens the burden associated with orphan drug development — it's cheaper, faster, and has a lower risk of failure than developing a novel compound.

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with gene expression profiling — like the Rarebase Function™ drug discovery platform — are powerful tools for identifying possible therapies for many rare diseases concurrently. Of the more than 10,000 rare diseases identified today, at least 70% have genetic underpinnings. Of those, more than half are attributed to mutations, or variants, in individual genes. Rarebase has identified 3,700 disease-causing genes that are strong candidates for Function.

For instance, SYNGAP1-related intellectual disability, one of the diseases in our research pipeline, is caused by mutations in one of the two copies of the SYNGAP1 gene. These mutations impair the production of the gene's protein product — SynGAP — in neurons, resulting in intellectual disability and other neurological conditions. Function has identified drug candidates that may dial expression of the remaining functional copy of SYNGAP1 "up" in neurons to potentially rebalance the root cause biology of the disorder.

Function can scale this general approach – identifying drugs that can dial expression of disease-related genes “up” or “down” in a targeted manner – across the entire landscape of rare genetic diseases. It is equipped to uncover multiple potential therapies for a rare genetic disease, which may in turn provide more shots on goal. Conversely, individual drug candidates may prove

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Today, and every day, the Rarebase mission is to leverage scientific innovation to accelerate drug discovery for people worldwide living with rare diseases. We have generated a premier drug screening dataset for neurogenetic disorders — and that is just the beginning. We aim to widen our portfolio to all rare genetic diseases to address the drug discovery void. As Moxham states, “Rarebase is enabling drug discovery for thousands of rare diseases and promoting novel innovation to expand the opportunity space for the rare disease community. This is a social imperative.” We look forward to celebrating the success of this vision in Rare Disease Days to come.

Contact us to learn more.