Personalized Medicine through the Lens of Asthma

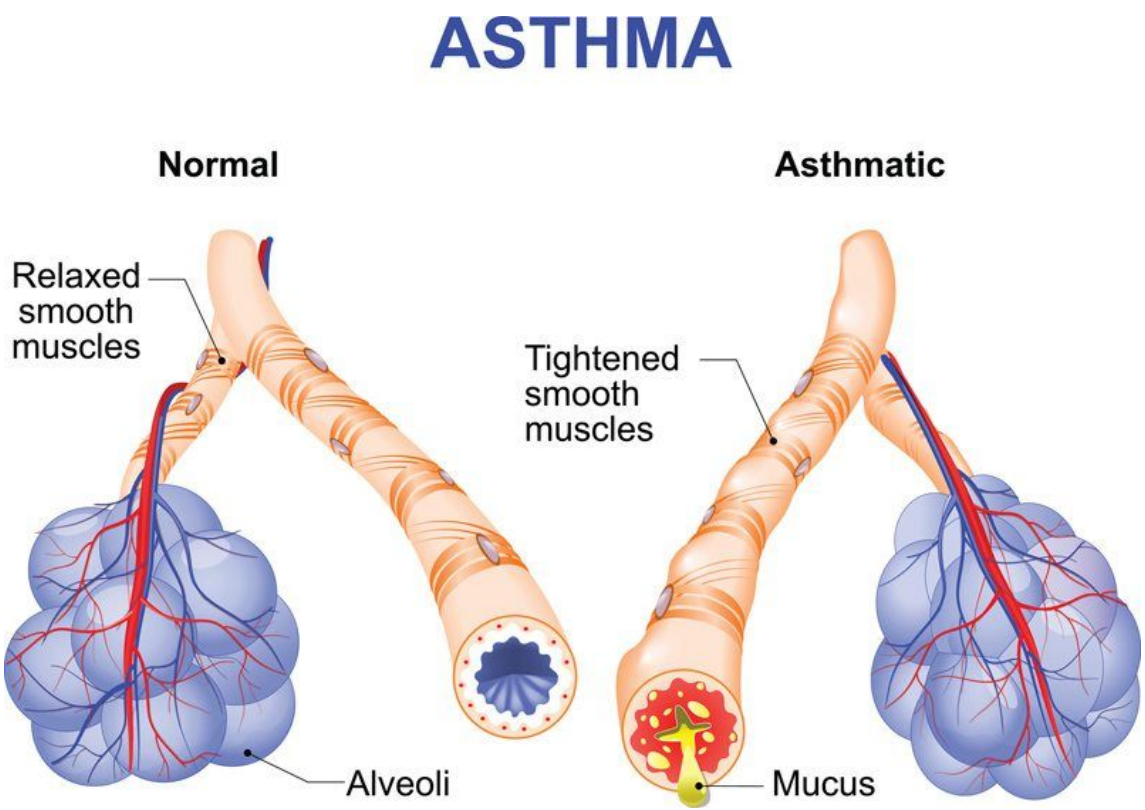
by Esther Ryu, Miko Liu, Jasmine Lai

What is Personalized Medicine?

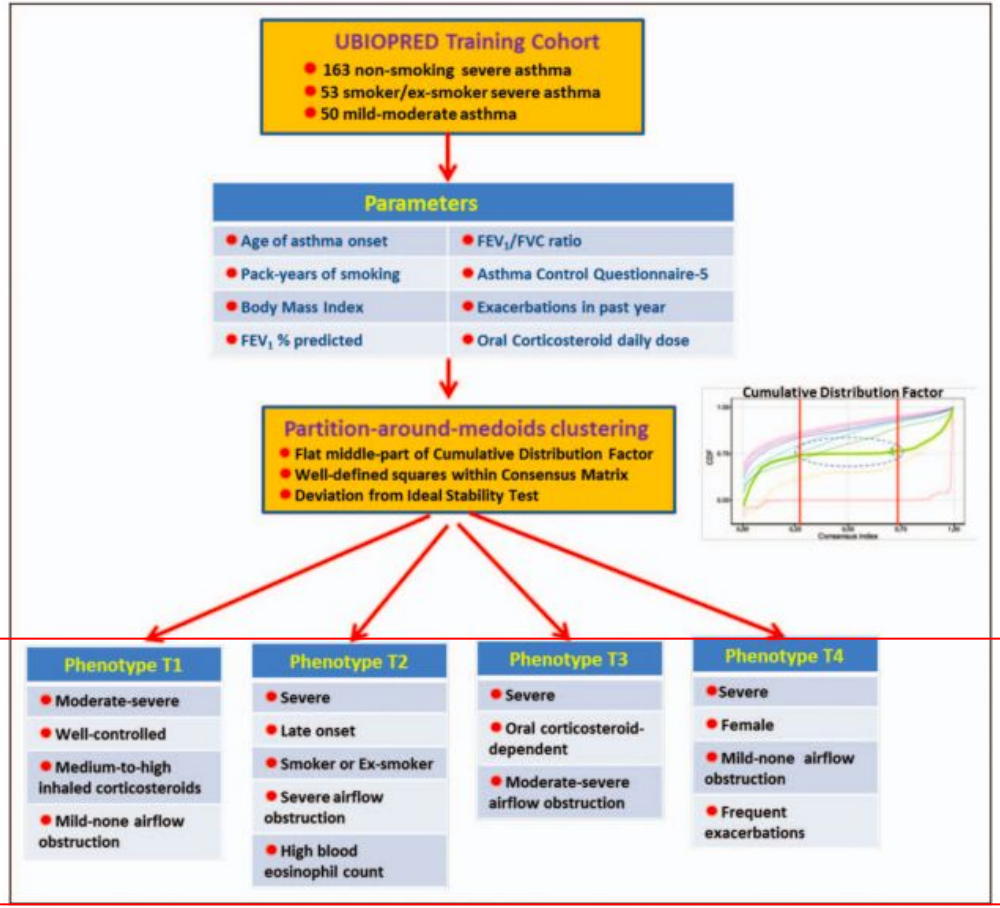
https://www.youtube.com/watch?v=HQKFgfMO5Sw

- A medical model
- Separates people into groups—with medical decisions, practices, interventions and/or products being tailored to the individual patient based on their predicted response or risk of disease

What is Asthma?



Separation of People into Groups



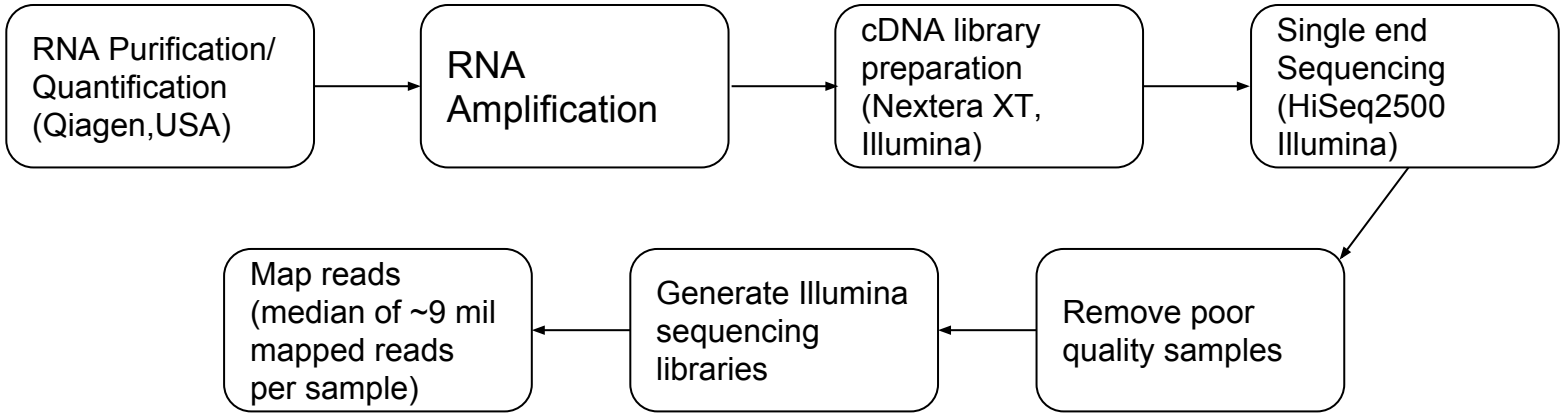
Transcriptional profiling of Th2 cells identifies pathogenic features associated with asthma

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4936908/

Biology behind Asthma

- Excessive allergen-induced type 2 inflammation, orchestrated by memory $CD4^+$ T cells that produce type 2 cytokines ($Th2$ cells)
- Pathway for rhinitis also involves $Th2$ cells
- Currently no cure: newer therapies are only partially successful in certain subtypes

RNA Sequencing



RNA-Seq Analysis & Network Analysis

GOAL

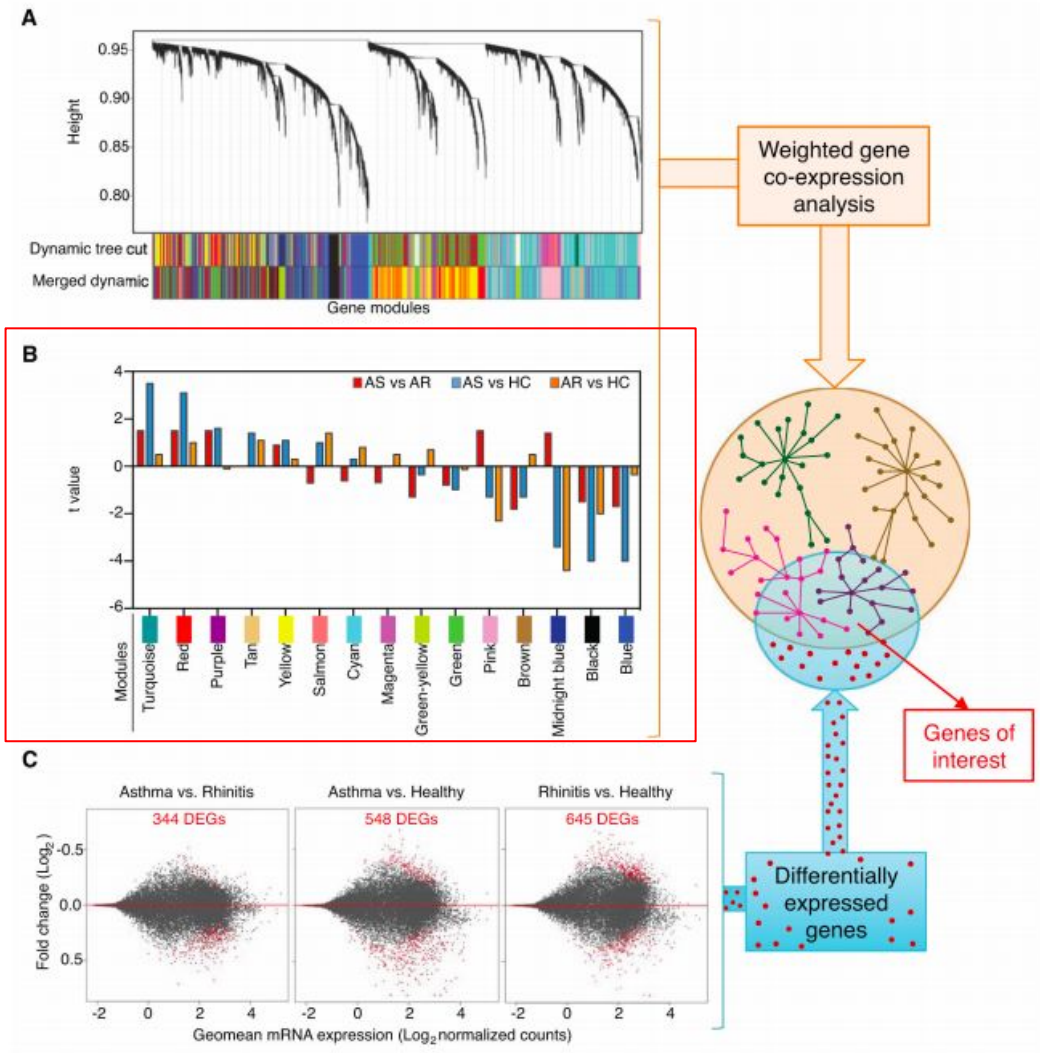
Identify genes differentially expressed between allergic asthma, rhinitis & healthy control groups

METHOD

Performed negative binomial tests for pairwise comparisons employing the Bioconductor package DESeq2

Results

- Identified a total of 15 distinct gene modules
- DESeq analysis found 500 genes differentially expressed between asthmatic subjects and healthy subjects (Genes for apoptosis, zinc transporters, MAPK, NF-κB, TNF)
- Expression of most of these genes was similar between rhinitis and asthma
- Genes that differentiate asthmatic from healthy subjects show an intermediate phenotype in allergic rhinitis subjects



Thank you!