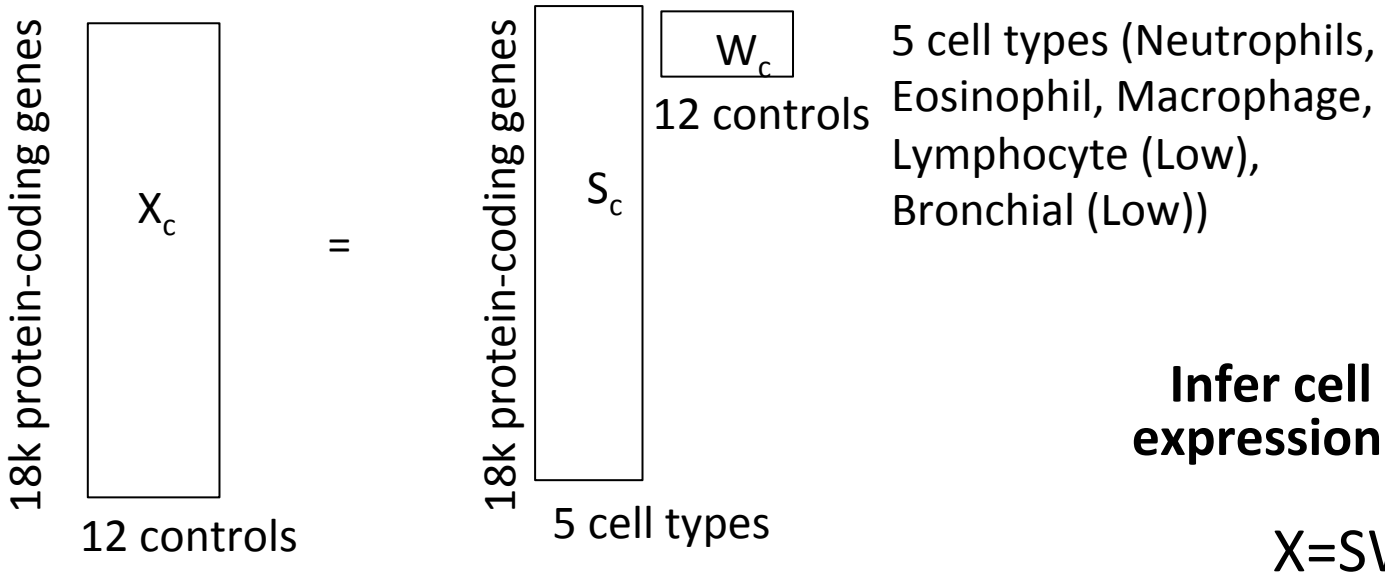
Sputum gene expression data analysis

DW

Tech 20150730

Gene expression matrix X

Cell type fractions (%) matrix W

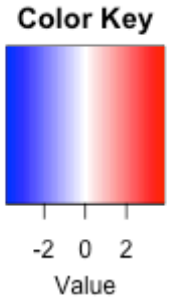


Infer cell type gene expression signature S

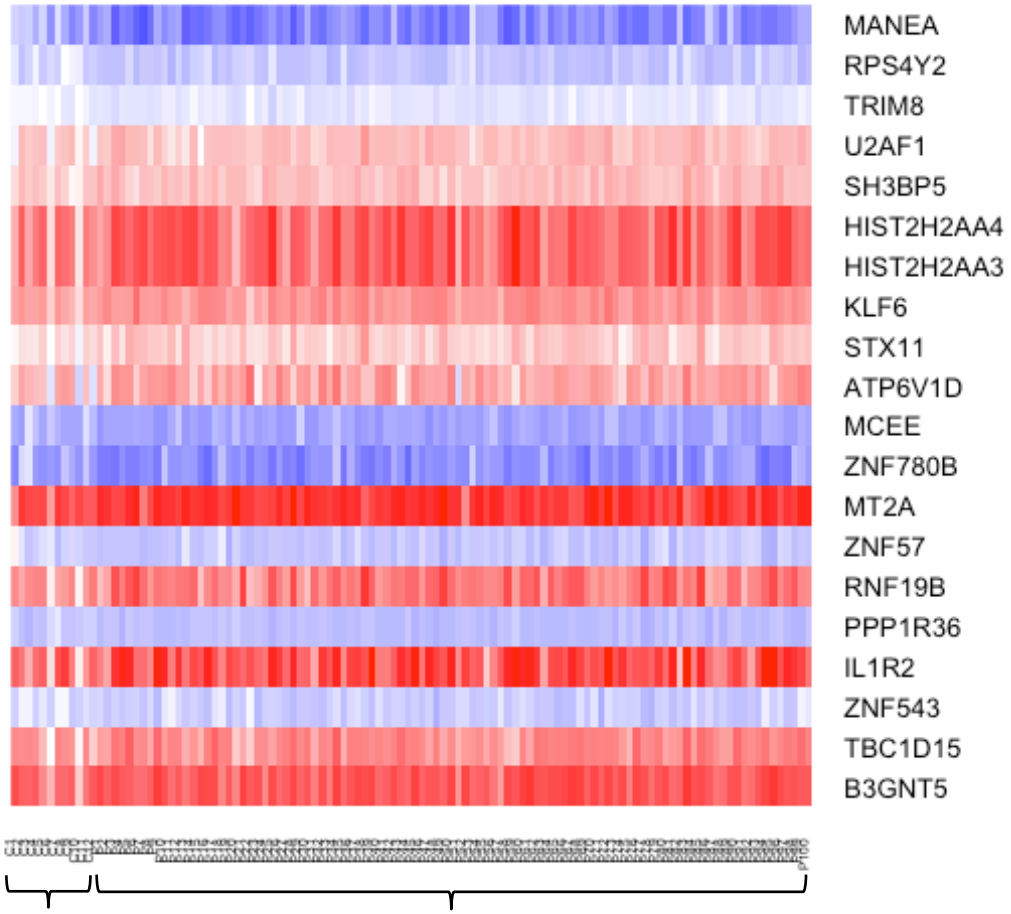
$X=SW \Rightarrow$

$S=XW^*$ s.t.

$WW^*=I$

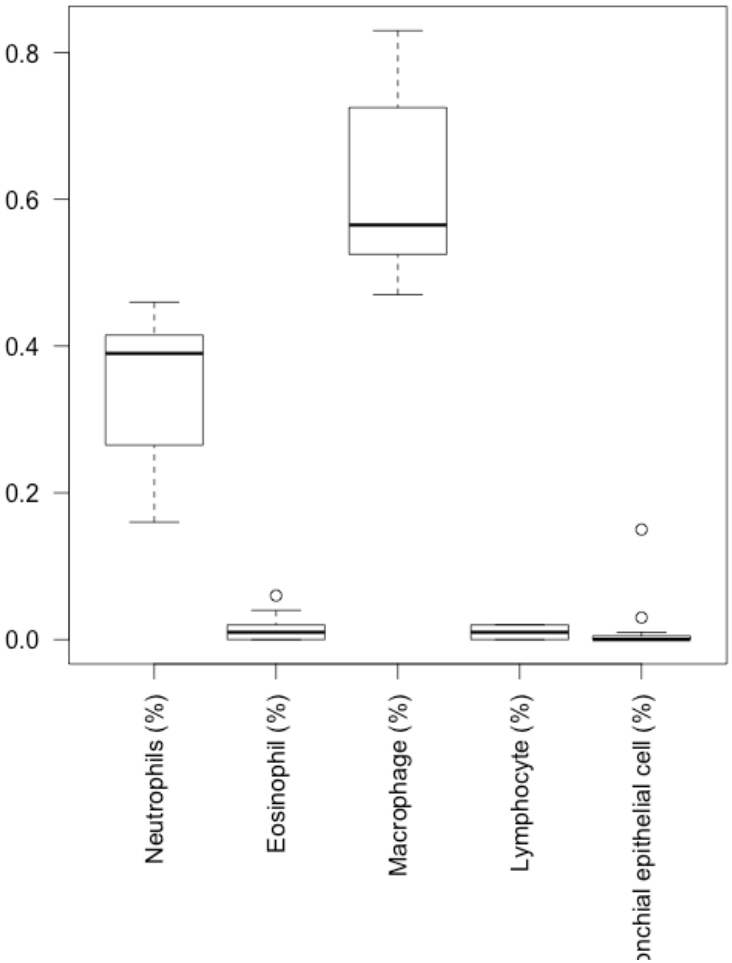


Top 20 differential expressed genes

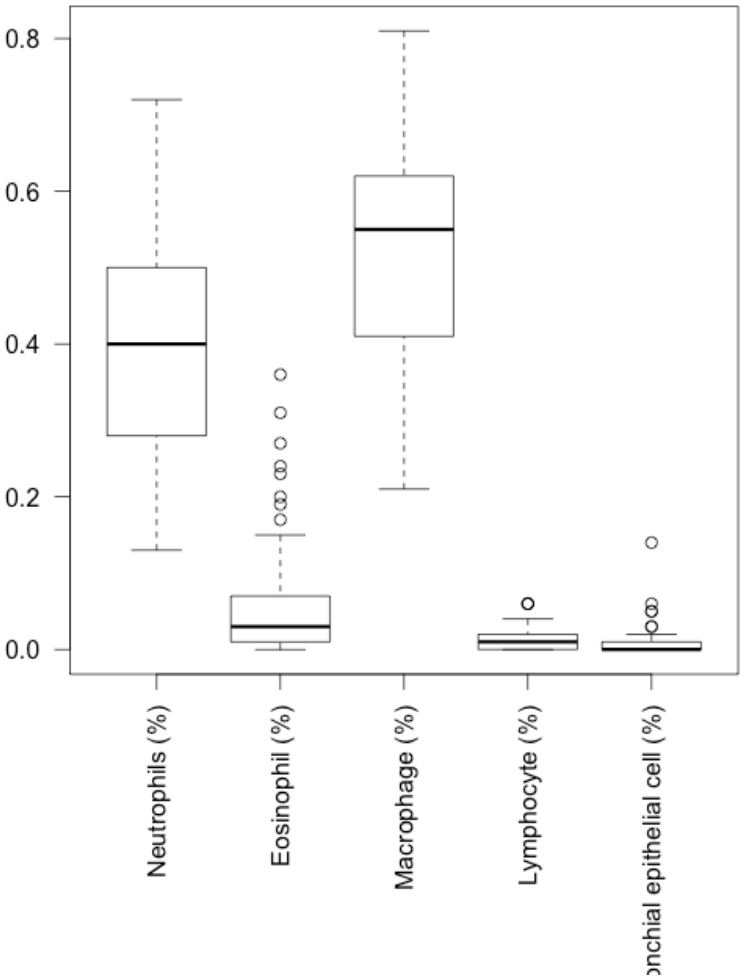


Cell type fraction distributions

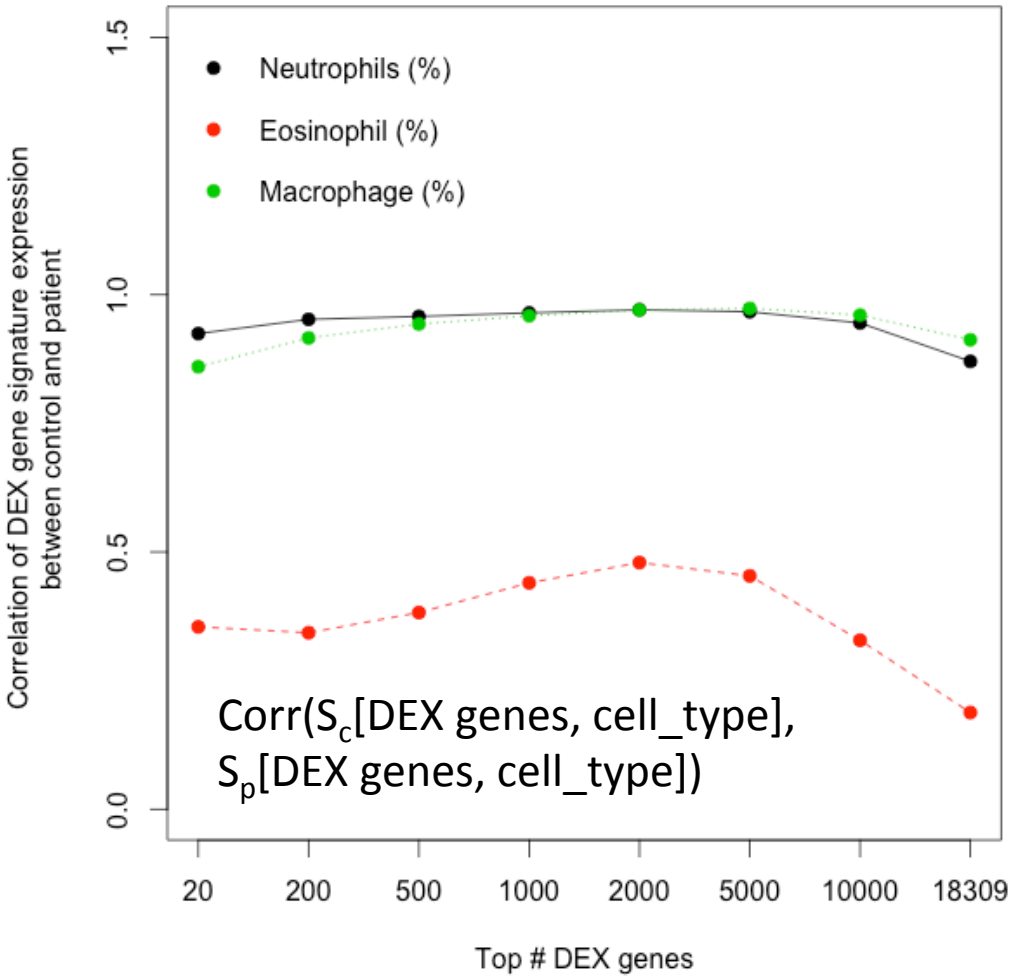
Control (12)

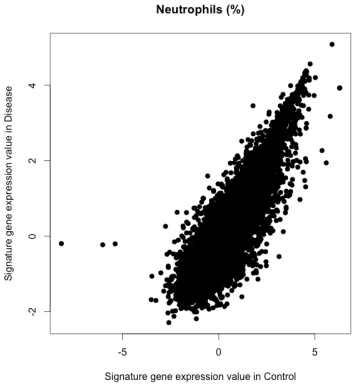


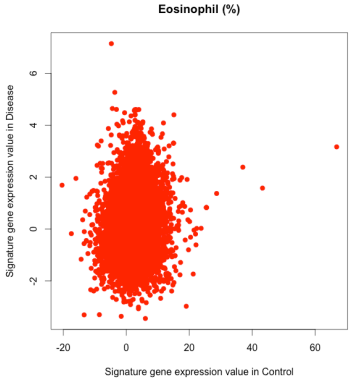
Disease (100)

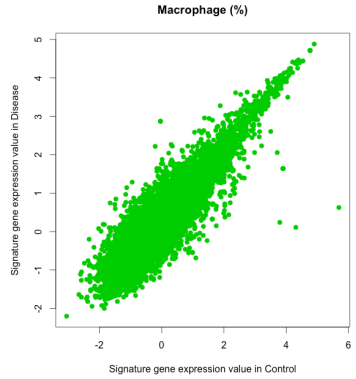


3 cell type signature correlation between control and disease









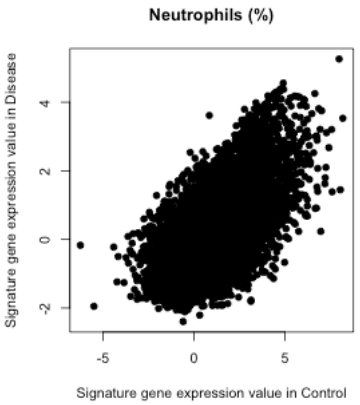
cell types

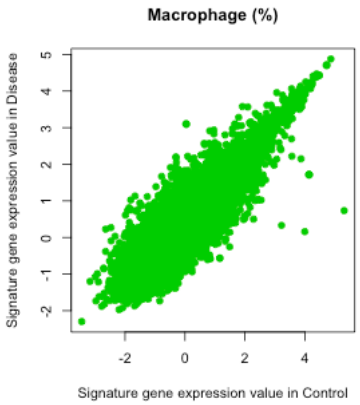
The kinds of white blood cell are:

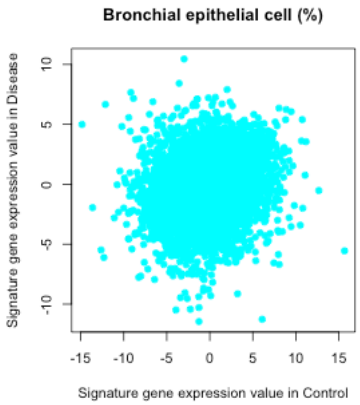
- Neutrophils, which can remove and kill bacteria and particles of foreign material.
- Lymphocytes, are the cells help tell our body the difference between substances which do or don't belong there.
- Monocytes, help break up foreign particles and substances for the lymphocytes, which can recognition of the small fragments.
- Eosinophils, gather wherever there is a parasite infection or an allergic reaction such as allergic asthma, and then release chemicals. The chemicals are very efficient at fighting parasites, but they can also harm the body if released in the wrong place. So the lining of the lungs becomes damaged in asthma.
- Basophils, (as well as mast cells) release histamine when an allergic reaction happens, but also other chemicals which are similar to histamine in effect.
- Blood platelets, aid in clotting of the blood and protect us from bleeding dangerously from small injuries.

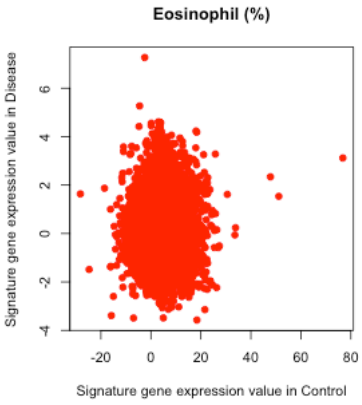
from https://www.aafa.org/display.cfm?id=8&sub=17&cont=801

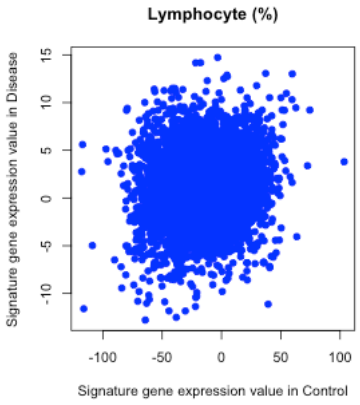
5 cell types

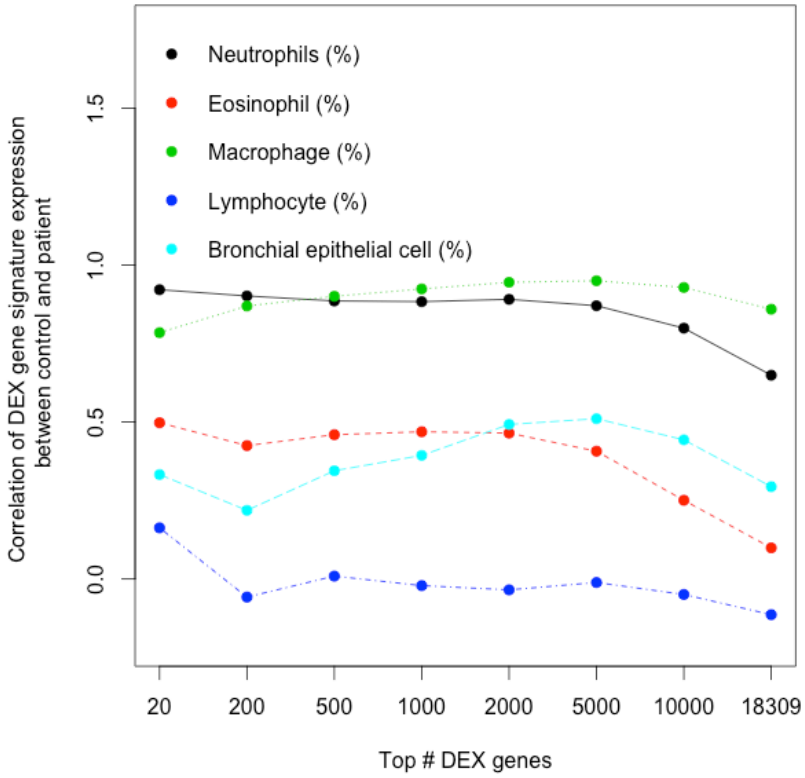

Neutrophils (%)
Signature gene expression value in Disease
Signature gene expression value in Control


Macrophage (%)
Signature gene expression value in Disease
Signature gene expression value in Control


Bronchial epithelial cell (%)
Signature gene expression value in Disease
Signature gene expression value in Control


Eosinophil (%)
Signature gene expression value in Disease
Signature gene expression value in Control


Lymphocyte (%)
Signature gene expression value in Disease
Signature gene expression value in Control


Neutrophils (%)
Eosinophil (%)
Macrophage (%)
Lymphocyte (%)
Bronchial epithelial cell (%)
Correlation of DEX gene signature expression between control and patient
Top # DEX genes