Skin

Data

There are excel files containing gene expression from RT-PCR.
Data is split into 3 groups of expreriments: Controlls(25 healthy people), Psoriasis (35 patients) and Vitiligo(18 patients).
Data for psoriasis and vitiligo contains samples from healthy and disease skin.

Task

Compare the groups and answer the following questions:

1. How different healthy and diseased skin in psoriasis.
2. How different healthy and diseased skin from psoriasis patients from the controls.
3. How different healthy and diseased skin in vitiligo.
4. How different healthy and diseased skin from vitiligo patients from the controls.
5. How different are samples from diseased skin in psoriasis and vitiligo.
6. How different are samples from healthy skin in psoriasis and vitiligo.
7. +- How different healthy samples from psoriasis and vitiligo from the controls.
8. +- How different diseased samples from psoriasis and vitiligo from the controls.

Analysis. R scripts.

1. CompareGroupsPVC.R finds differentially expressed genes between general groups(Skin samples only!) without taking to account phenotype and specific subgroups.
2. Specific group comparisons are in phenoLimma.R
3. Metadata is created in the file CreateMetadata.R
4. CT-calculators are processed and new dataset is assembled in CT-files.R Data provided by Pärt's group required more filtering. Reference gene's expression was not always stable. It lead to the errors in expression of the gene of interest.

In order to avoid including samples with the corrupted gene expression, the data in each CT calculator was filtered based on < (median(reference gene expression)+3SDT(reference gene expression)).

Script also has PCA analysis for all samples.

The following groups are compared:

C - Controls
PT- Psoriaas Terve
PH- Psoriaas Haige
VT- Vitiliigo Terve
VH- Vitiliigo Haige

PCA for all samples:

https://biit.cs.ut.ee/redmine/attachments/download/254/PCA_all_samples.png
[[https://biit.cs.ut.ee/redmine/attachments/download/253/PCA_all_samples.pdf]]

PCA Rdata is available from here:
[[https://biit.cs.ut.ee/redmine/attachments/download/255/pca.all.RData]]
Missing data was removed from the analysis.

From the figure we can conclude that:

1. PH is clearly separated from Controls and PT, and also from VH and VT. Therefore samples
2. VH and VT are not separated. There is almost no difference shown between healthy and diseased samples in vitiligo.
3. Investigation of the differences between the groups is continued in the section "Differential expression analysis".

Differential expression analysis.

For each group the following files are attached:

- Heatmap of the differentially expressed genes.
- List of up-regulated genes in the compared conditions.
- List of down-regulated genes in the compared conditions.

1. Psoriasis

1.1 PHvsPT
[[https://biit.cs.ut.ee/redmine/attachments/download/227/PHvsPT.pdf]]
[[https://biit.cs.ut.ee/redmine/attachments/download/236/PHvsPTup.txt]]
[[https://biit.cs.ut.ee/redmine/attachments/download/246/PHvsPTdown.txt]]

1.2 PHvsC
[[https://biit.cs.ut.ee/redmine/attachments/download/232/PHvsC.pdf]]
[[https://biit.cs.ut.ee/redmine/attachments/download/248/PHvsCup.txt]]
[[https://biit.cs.ut.ee/redmine/attachments/download/247/PHvsCdown.txt]]

1.3 PTvsC
[[https://biit.cs.ut.ee/redmine/attachments/download/233/PTvsC.pdf]]
[[https://biit.cs.ut.ee/redmine/attachments/download/242/PTvsCup.txt]]
[[https://biit.cs.ut.ee/redmine/attachments/download/241/PTvsCdown.txt]]

2. Vitiligo

2.1 VHvsVT No genes were found to be differentially expressed.

2.2 VHvsC
[[https://biit.cs.ut.ee/redmine/attachments/download/235/VHvsC.pdf]]
[[https://biit.cs.ut.ee/redmine/attachments/download/238/VHvsCup.txt]]
[[https://biit.cs.ut.ee/redmine/attachments/download/237/VHvsCdown.txt]]

2.3 VTvsC
[[https://biit.cs.ut.ee/redmine/attachments/download/234/VTvsC.pdf]]
[[https://biit.cs.ut.ee/redmine/attachments/download/240/VTvsCup.txt]]
[[https://biit.cs.ut.ee/redmine/attachments/download/239/VTvsCdown.txt]]

3. Psoriasis & Vitiligo

3.1 PHvsVH
[[https://biit.cs.ut.ee/redmine/attachments/download/229/PHvsVH.pdf]]
[[https://biit.cs.ut.ee/redmine/attachments/download/249/PHvsVHup.txt]]
[[https://biit.cs.ut.ee/redmine/attachments/download/250/PHvsVHdown.txt]]

3.2 PTvsVT No genes were found to be differentially expressed.

3.3 PHVH vs PTVT genes from psoriasis start to prevail on the genes from vitiligo.

3.4 PHVH vs C
[[https://biit.cs.ut.ee/redmine/attachments/download/230/PH_VH_vs_C.pdf]]
[[https://biit.cs.ut.ee/redmine/attachments/download/244/PH_VH_vs_C_up.txt]]
[[https://biit.cs.ut.ee/redmine/attachments/download/243/PH_VH_vs_C_down.txt]]

3.5 PTVT vs C
[[https://biit.cs.ut.ee/redmine/attachments/download/231/PT_VT_vs_C.pdf]]
[[https://biit.cs.ut.ee/redmine/attachments/download/251/PT_VT_vs_C_up.txt]]
[[https://biit.cs.ut.ee/redmine/attachments/download/245/PT_VT_vs_C_down.txt]]

Venn Diagram of Differentially expressed genes

[[https://biit.cs.ut.ee/redmine/attachments/download/252/VennDiagram.pdf]]

[[Analysis involving metadata]]