Exploring Melanoma Single Cell RNA seq. Data Set to Investigate Iron Metabolism in Different Cases of Melanoma
What is melanoma?
Cancerous growths on skin; caused by mutations as a result of un-repaired damage to DNA of skin cells by UV radiation

Melanoma General Statistics

- Incidence of melanoma has doubled over the past 3 decades
- Use of tanning beds increases risk of melanoma by 75%


Why Look at Iron Metabolism?

- Maintains homeostasis in body
- Iron in human body = necessary & potentially toxic
- Iron has role in tumor microenvironment & metastasis (Torti, Torti)
- Iron pathways are perturbed in cancer => reprogramming of iron metabolism (Torti, Torti)

The Data Set

- 15 different cases of melanoma
- Over 20,000 different genes

Cell types:
- Malignant
- Non-Malignant
  - T cells, B cells, Macrophages, etc.


https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4944528/
What does Single-cell RNA seq. tell you?

What is t-SNE?

*t-SNE* takes high-dimensional data and reduces it to a low-dimensional graph that retains most of the original information.
Seeds

ATF3: induced in a variety of signals, including many of those encountered by cancer cells, and is involved in the process of cellular stress response.

TFRC: helps in iron uptake. High concentration in cancerous cells.

"TFRC," Genecards.org, www.genecards.org/cgi-bin/carddisp.pl?
gene=TFRC&keywords=tfrc.
t-SNE plot

CD8A: essential role in the immune response and serves multiple functions in responses against both external and internal offenses; in T-Cells... processes lead to allow cells to recognize and eliminate infected cells and tumor cells

“CD8A.” Genecards.org, www.genecards.org/cgi-bin/carddisp.pl?gene=CD8A
Number of cells in the 6 melanomas: 1061
Number of cells which co-express TFRC and MYC: 364
Percentage of cells which co-express TFRC and MYC: 34.307257304%

TFRC: helps in iron uptake. High concentration in cancerous cells


MYC: in B cells, it induces IRP2 expression and represses ferritin expression, demonstrated in colon cancer; oncogene

What are Diffusion Maps?


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NRAS: encodes a membrane protein that shuttles between the Golgi apparatus and the plasma membrane; Mutations in this gene have been associated with conditions including somatic rectal cancer and follicular thyroid cancer; oncogene

“NRAS.” Genecards.org, www.genecards.org/cgi-bin/carddisp.pl?gene=NRA.
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Works Cited