Iron can gain and lose electrons, making it enzymatically useful in cell replication, metabolism, and growth.

Cancer cells sequester iron by altering the expression of other genes/pathways involved in ovarian cancer.

To identify correlations between iron-related genes and other genes/pathways involved in ovarian cancer.

Adapted from [1].

Tothill et al. [2] identified two significant pathways in high-grade ovarian cancer patients.

Validation: TFRC & RRM2, p53 pathway

Unique results: HAMP & Immune pathways

Connections to iron and cancer:

Tumor cells secrete CSF1 to recruit monocytes, which differentiate into tumor-associated macrophages (TAMs).

In macrophages, IL4R increases HAMP expression.

IL6 is associated with increased HAMP expression.

Cytokine–cytokine receptor interaction pathway

Connections to iron and cancer:

Tumor cells secrete IL4 and CCL4 to promote an iron-influx phenotype in ovarian cancer tumor cells.

Testable Hypothesis

Future Work

Topics for experimental investigation of changes in iron levels in epithelial cells:

- Interrupt IL4 in macrophages or IL4R
- Disrupt CCL4/other CCR1 ligand or block CCR1
- Over-express CSF1 or CSF1R

Topics for computational investigation:

- Repeat analysis for subtypes of ovarian cancer to compare pathways perturbed by different cell types

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References

4. Vassar College, University of Puerto Rico at Cayey, Center for Quantitative Medicine, UConn Health, The Jackson Laboratory for Genomic Medicine.
5. These authors contributed equally to this work.