



How *Lactobacillus Iners* Affects Cisplatin Sensitivity in Cervical Cancer Cell Lines

Noah Que, Erica Lynn, Lauren Colbert M.D.

Division of Radiation Oncology

Background

In an attempt to better treatment methodology for cervical cancer patients who are at higher risk for responding poorly to standard forms of treatment, research is being conducted to develop more targeted approaches to improve chances of recovery.

A potential factor worth investigating is the tumor microenvironment and how the diversity or presence of particular bacterium may affect tumor response to treatment. *Lactobacillus Iners* has been identified as a species that may hinder a successful response of a tumor to chemoradiation treatment (CRT). This project seeks to investigate the validity of this specific effect.

Purpose & Hypothesis

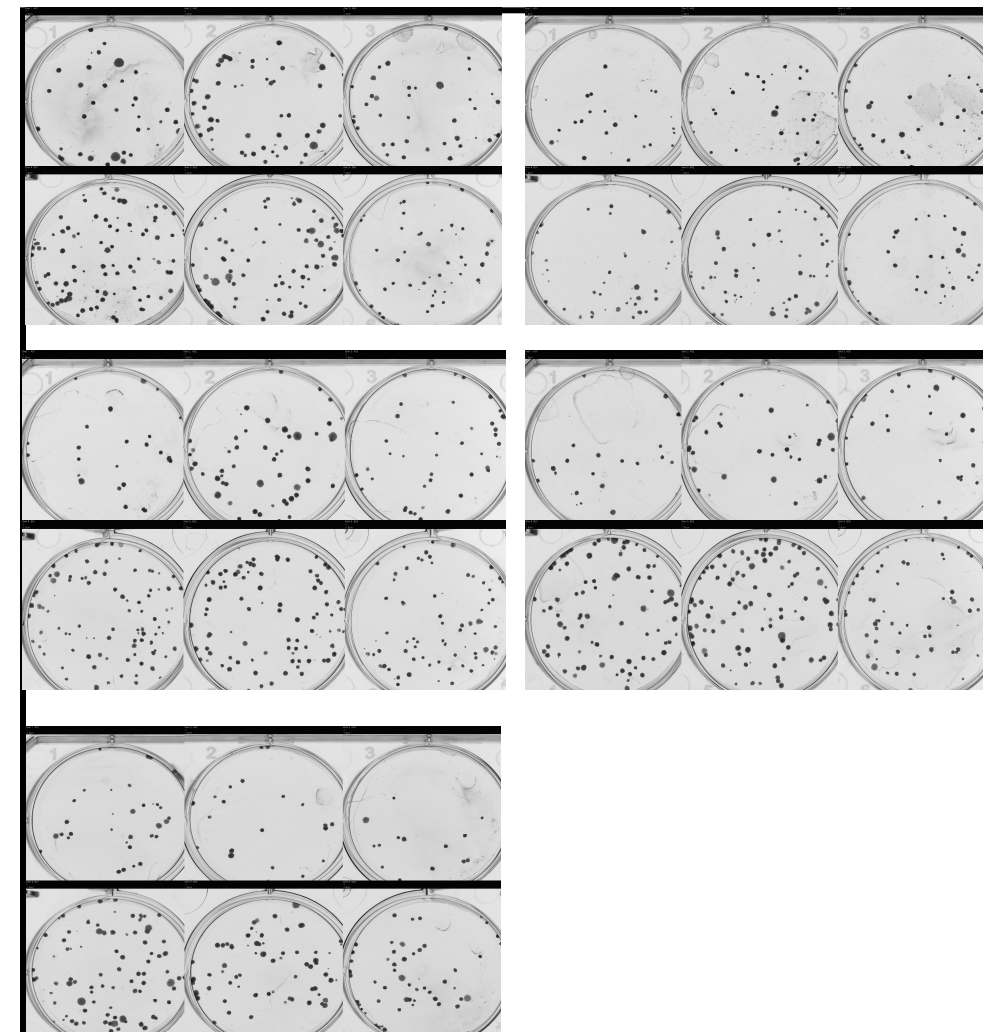
The purpose of this project is to gain a better understanding of the relationship between the tumor microenvironment and its ability to influence tumor response to standard forms of treatment for cervical cancers. Understanding how the presence of different strains of bacteria influence the efficacy of chemotherapy will help improve the efficacy of treatment in future patients.

We hypothesize that the presence of *Lactobacillus Iners* supernatant will decrease the radiosensitivity of tumor cells to chemotherapy in both the HeLa and SiHa cell lines.

Methods

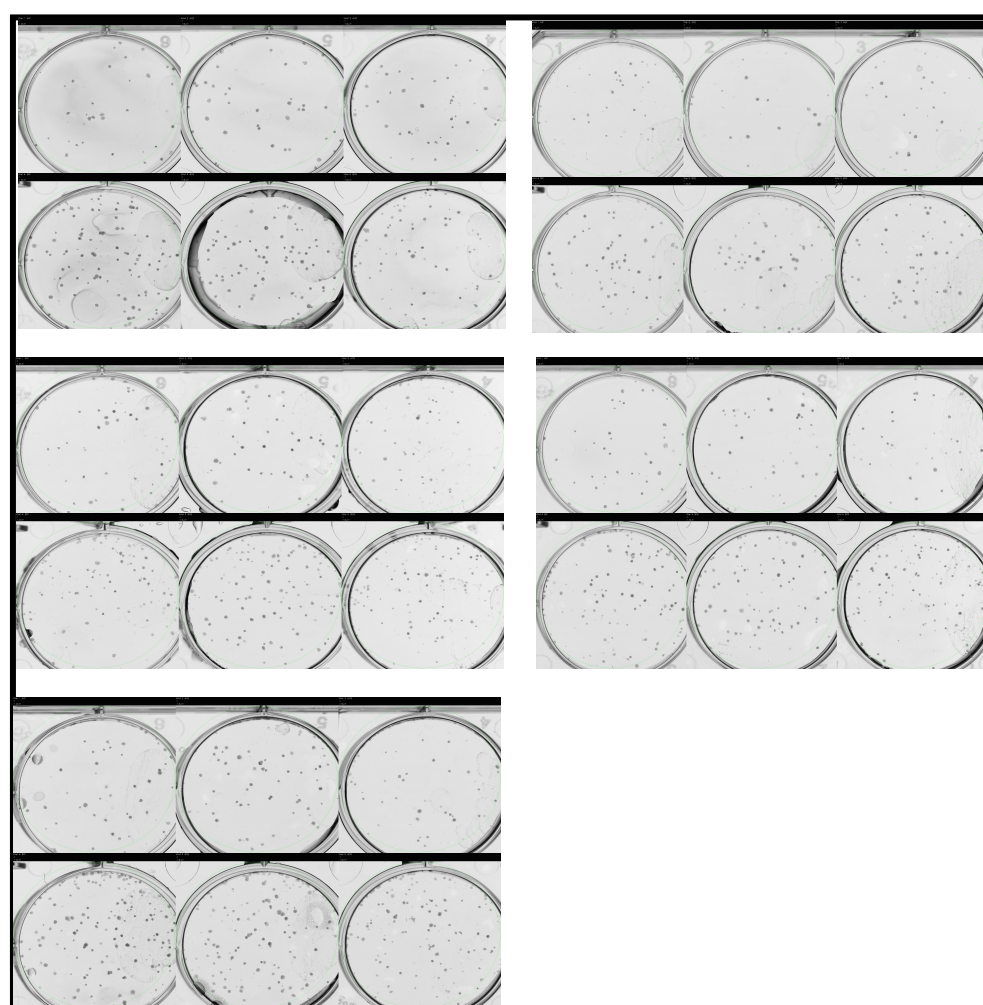
- 8 Supernatants/Media Controls
 - L.C. ATCC, L.C. Patient 39, L. Iners ATCC, L. Iners Patient 370, L. Iners Patient 366
 - MRS (Control), NYCIII (Control), Media (Control)
- Cell Lines and Cisplatin Dosages Used
 - HeLa: 0, 1, 2, 3, 4, 5 (ug/mL) (Removed after 1 hour)
 - Cells Seeded: 100, 250, 500, 750, 1000, 1500
 - SiHa: 0, 0.15, 0.3, 0.45, 0.6, 0.75 (ug/mL) (Removed after 4 hours)
 - Cells Seeded: 100, 250, 500, 750, 1000, 1500
- Incubation Periods
 - HeLa: 10 days (7/9/21-7/19/21)
 - SiHa: 14 days (7/8/21-7/22/21)

Images



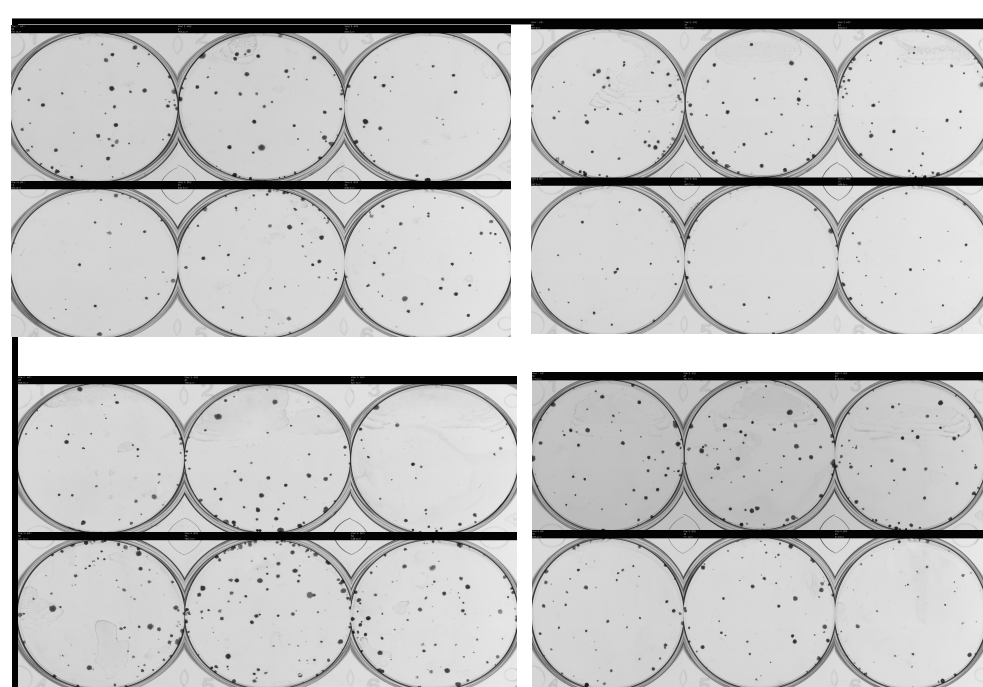
HeLa Clonogenic Assays: (0,1 ug/mL)

Top Row: L. Iners ATCC and L. Iners Patient 370
 Second Row: L. Iners Patient 366 and NYCIII (media ctrl.)
 Third Row: Media (media control)



SiHa Clonogenic Assays: (0, 0.15 ug/mL)

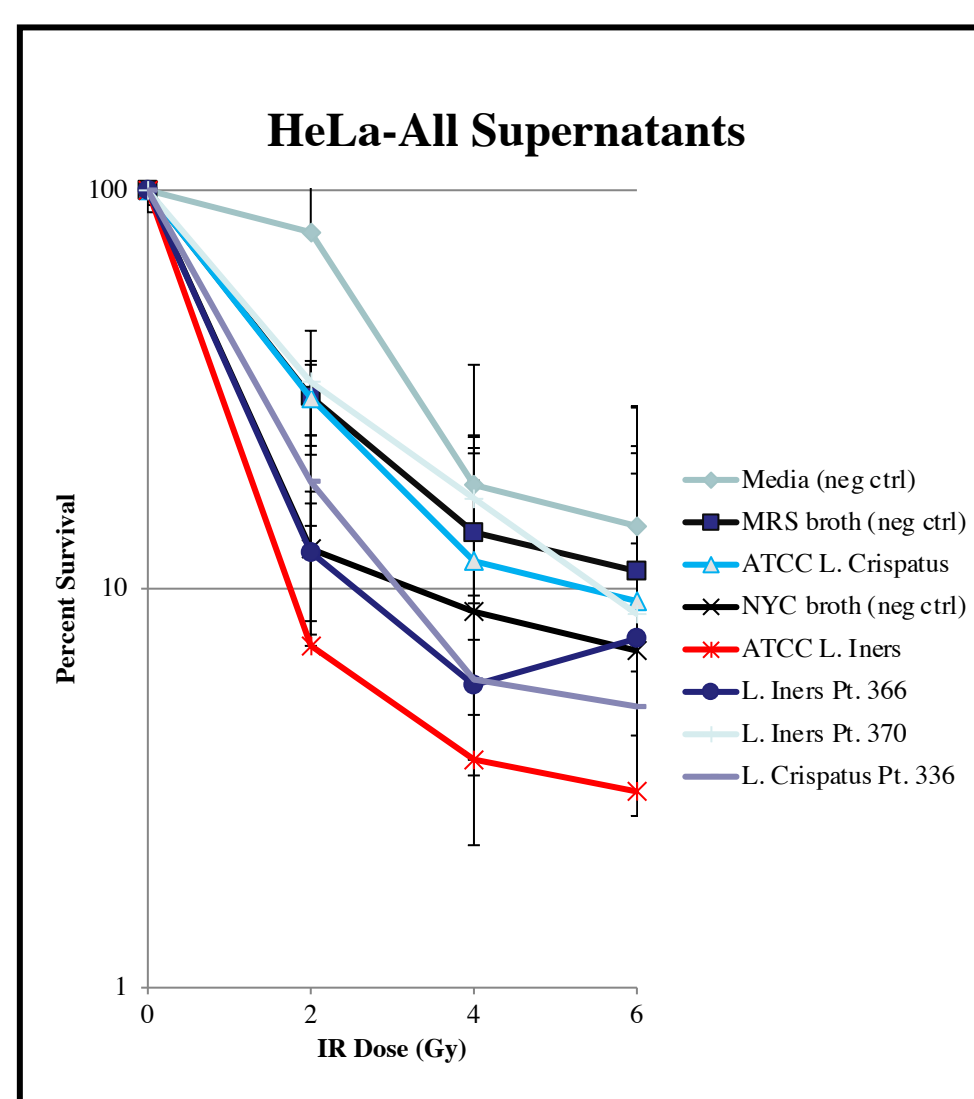
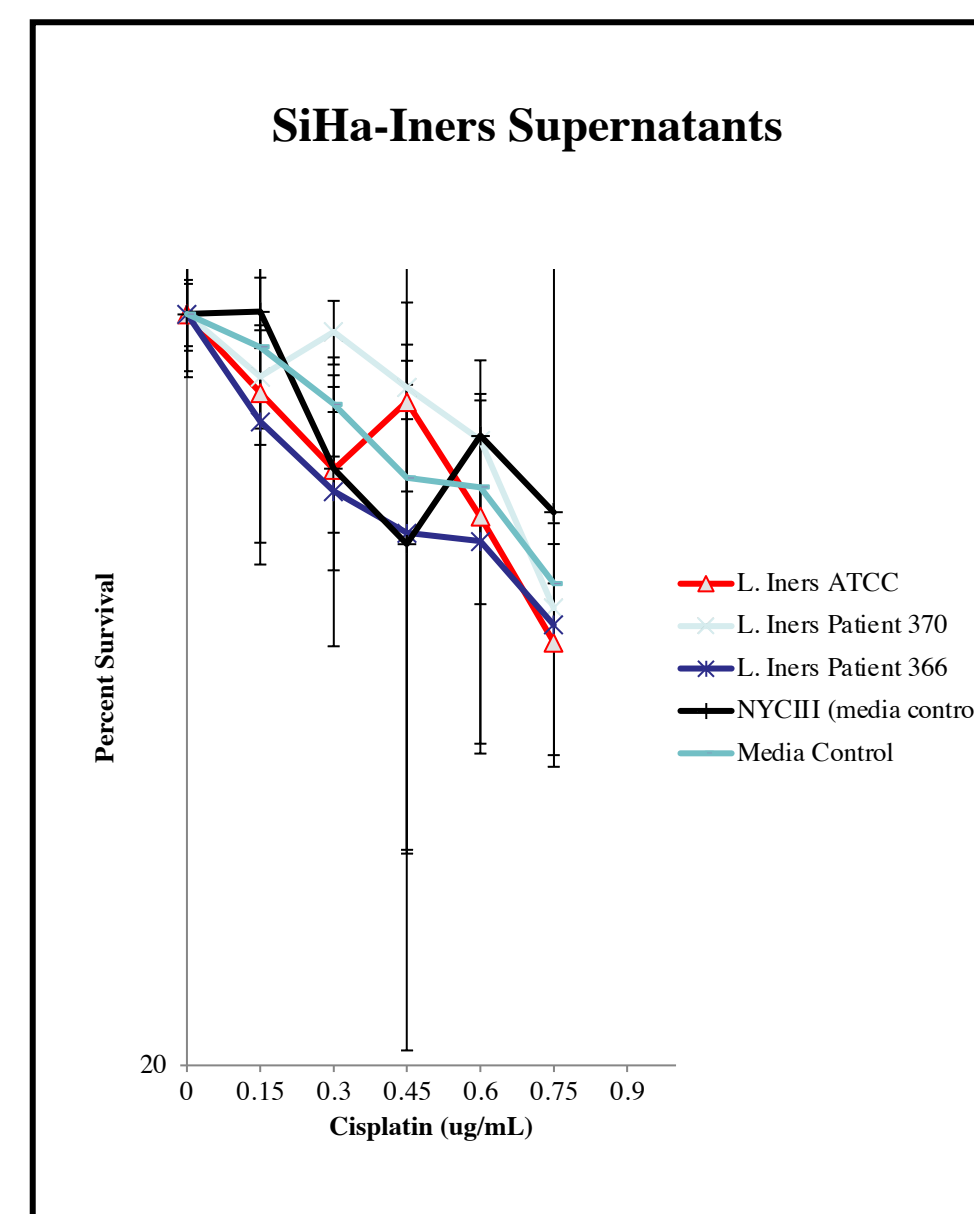
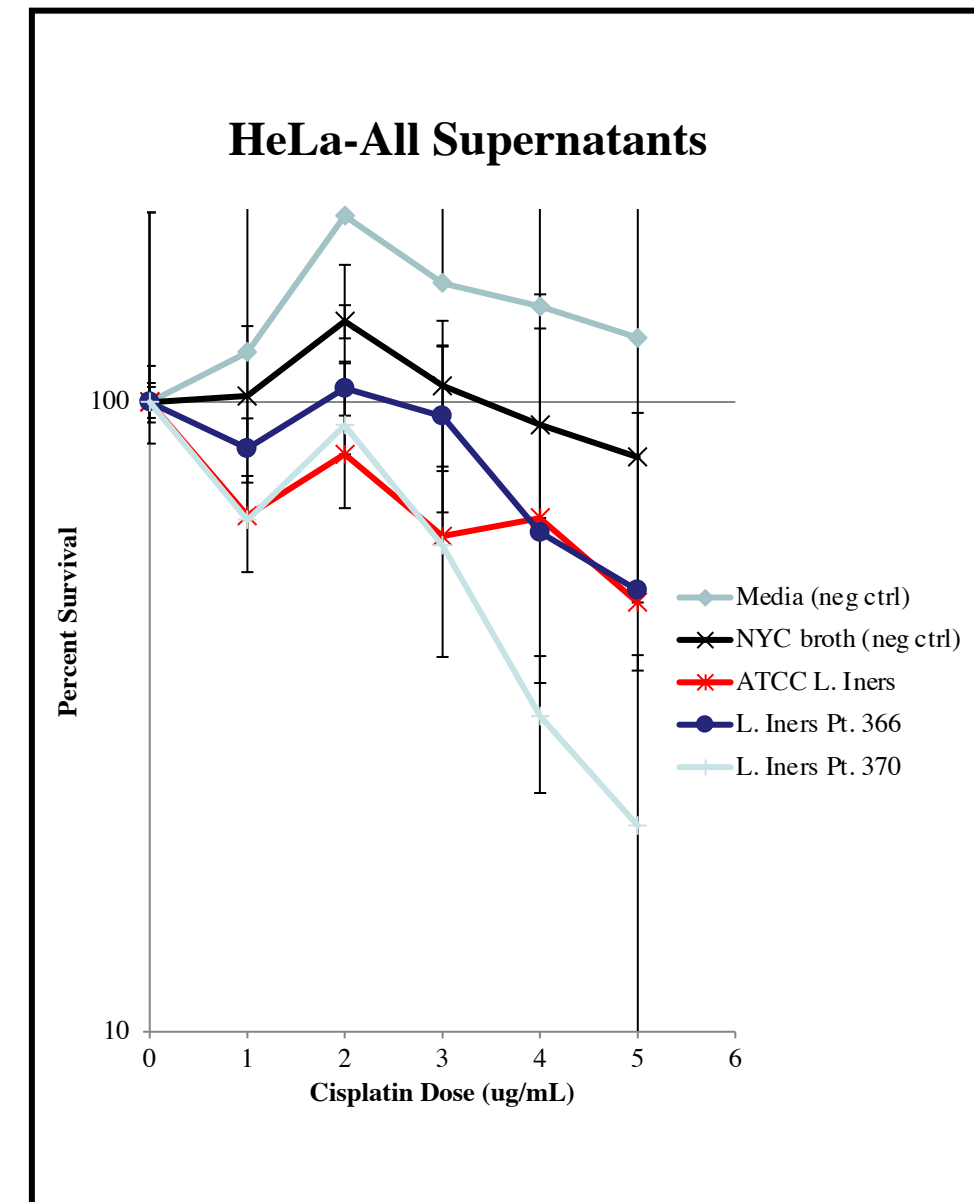
Top Row: L. Iners ATCC and L. Iners Patient 370
 Second Row: L. Iners Patient 366 and NYCIII (media ctrl.)
 Third Row: Media (media control)



HeLa Clonogenic Assays: (0, 2 Gy)

Top Row: NYCIII/L. Iners ATCC and L. Iners Patient 370/366
 Second Row: Media (media control)/MRS broth (media control) and L. Crispatus ATCC/366

Graphs



Results

For the HeLa cell line, colony formation of cells exposed to *Lactobacillus Iners* exhibited a smaller percent survival in comparison to cells treated with the negative media control, NYCIII. However, this slight trend is inconclusive as overlapping standard deviations suggest that the presence of *L. Iners* may not have a significant effect on cell recovery post treatment.

For the SiHa cell line, colony formation of cells exposed to *Lactobacillus Iners* also exhibited a smaller percent survival in comparison to the negative media control. However, large standard deviations again demonstrate that the presence of this bacteria in the tumor microbiome has a limited effect on the radio sensitization of tumor cells.

Interestingly, the difference in percent survival becomes significant at higher doses which may suggest that the sole presence of *Lactobacillus Iners* may actually heighten radiosensitivity to cisplatin.

Conclusions

The sole presence of *Lactobacillus Iners* in the tumor microenvironment does not seem to have its hypothesized effect on the ability of cells to successfully respond to standard chemoradiation treatment. Cells treated with *Lactobacillus Iners* supernatant did not have a more pronounced recovery when compared to its negative media control.

Future experimentation is needed to compare the difference between the presence of *Lactobacillus Iners* and *Lactobacillus Crispatus* in the tumor microbiome in addition to increased cell exposure to higher doses of cisplatin. Furthermore, clinical findings that suggest of a relationship between the presence of *Lactobacillus Iners* and decreased tumor radiosensitivity to chemotherapy may be a result of a combination of factors rather than the sole existence of *Lactobacillus Iners* in the tumor microenvironment.