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Understanding the effect of stress hormones on ovarian cancer cells

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Introduction and Background

- Ovarian cancer is the fifth most common cause of death in women.

- Understanding underlying mechanisms of ovarian cancer will help in developing better treatments.

- Recently, it has been found that ovarian cancer patients with poor prognosis' have presented with elevated stress hormones.

- This study was designed to find out the metabolic changes in ovarian cancer cells (HeyA8) when treated with a stress hormone cortisol.

- To study this, NMR spectroscopy has been employed as an analytical tool.

Hypothesis: Ovarian cancer cells treated with stress hormones show altered metabolism.
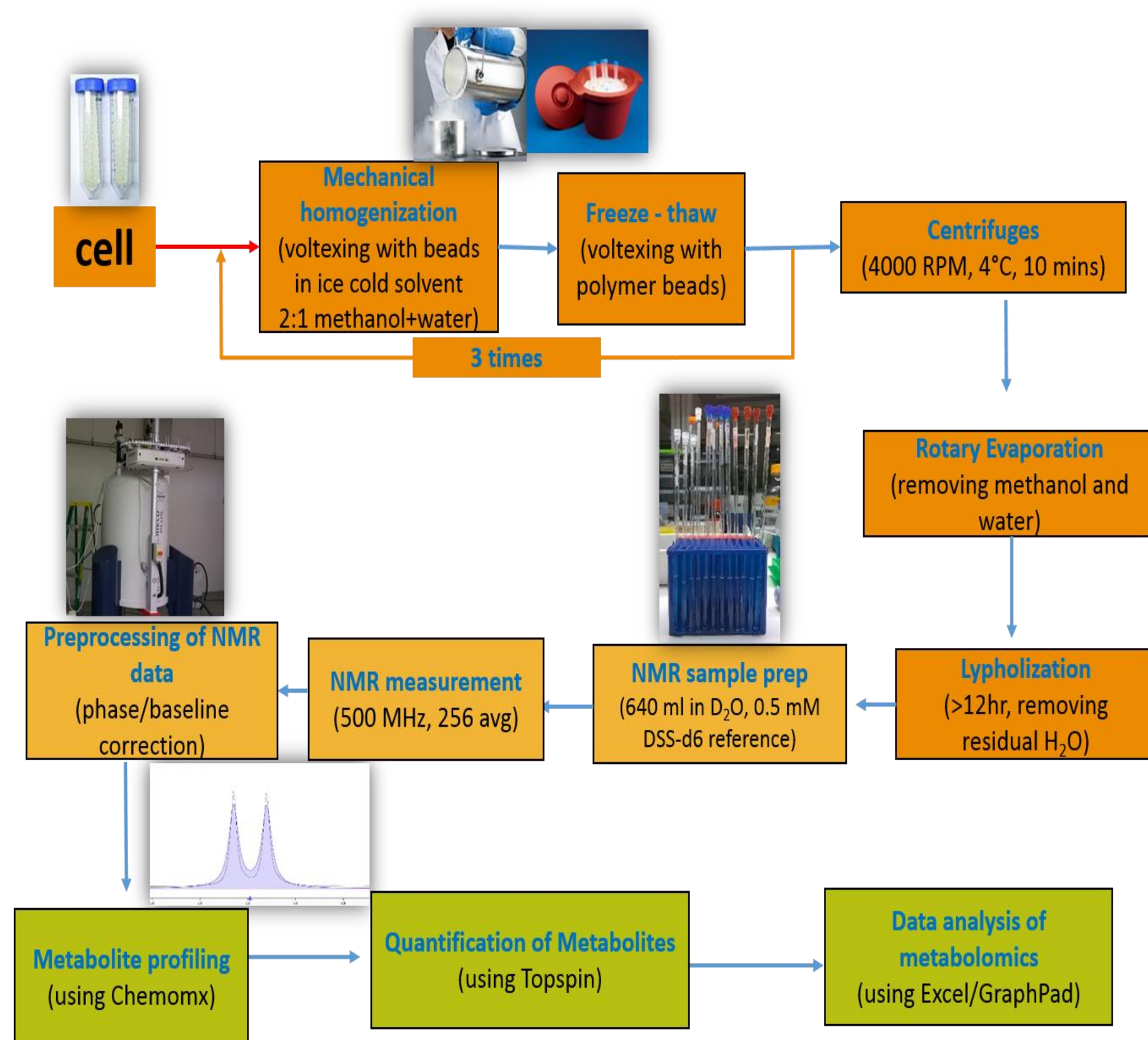
NMR Metabolomics Flow Chart

Figure 1. Flowchart for NMR Spectroscopy Based Metabolomics

Materials and Methods

- HeyA8 are high grade ovarian serous adenocarcinoma human cell lines used in this study.

- Metabolites are extracted from cancer cells using a methanol-water mixture, ceramic beads, three cycles of a mechanical homogenization and freeze-thawing process followed by centrifugation, rotary evaporation and lyophilization.

- The samples are prepared for nuclear magnetic resonance (NMR) spectroscopy by dissolving the sample in ^2H_2O containing the reference compound 4,4-dimethyl-4-silapentane-1-sulfonic acid-d6 (DSS).

- All the data was acquired on a Bruker NMR spectrometer operating at 500 MHz 1H resonance equipped with a cryogenically cooled triple resonance (1H, 13C, 15N) TXI probe.

- Identification of metabolite peaks was done through Chenomx and the Human Metabolomic Database (HMDB); finally, the peaks were integrated in Topspin and normalized to the reference compound (DSS). All 1-D proton NMR spectra were normalized to the cell count before analysis.
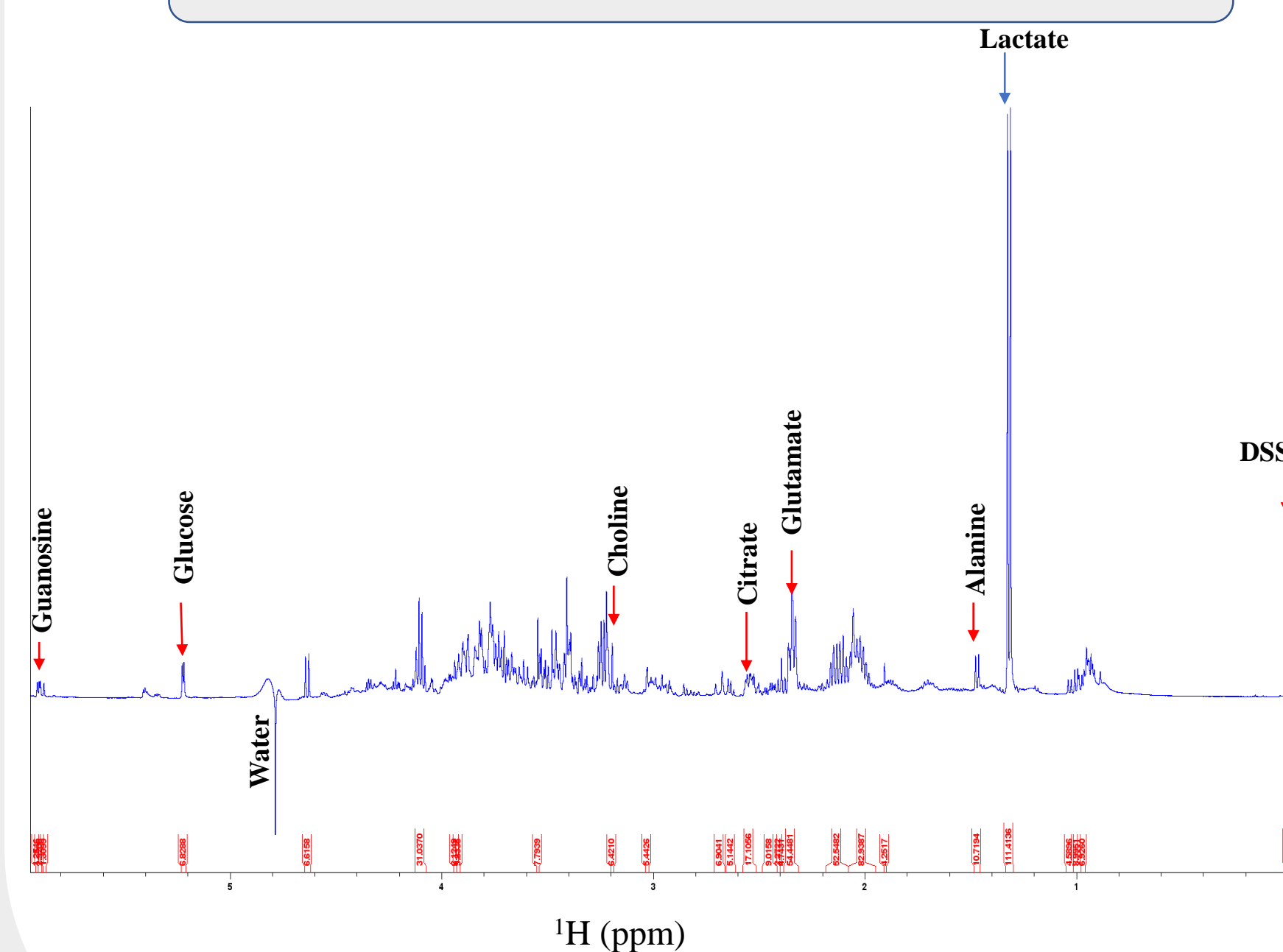
Results and Discussions

Figure 2: 1D ^1H NMR spectrum with assigned key metabolites

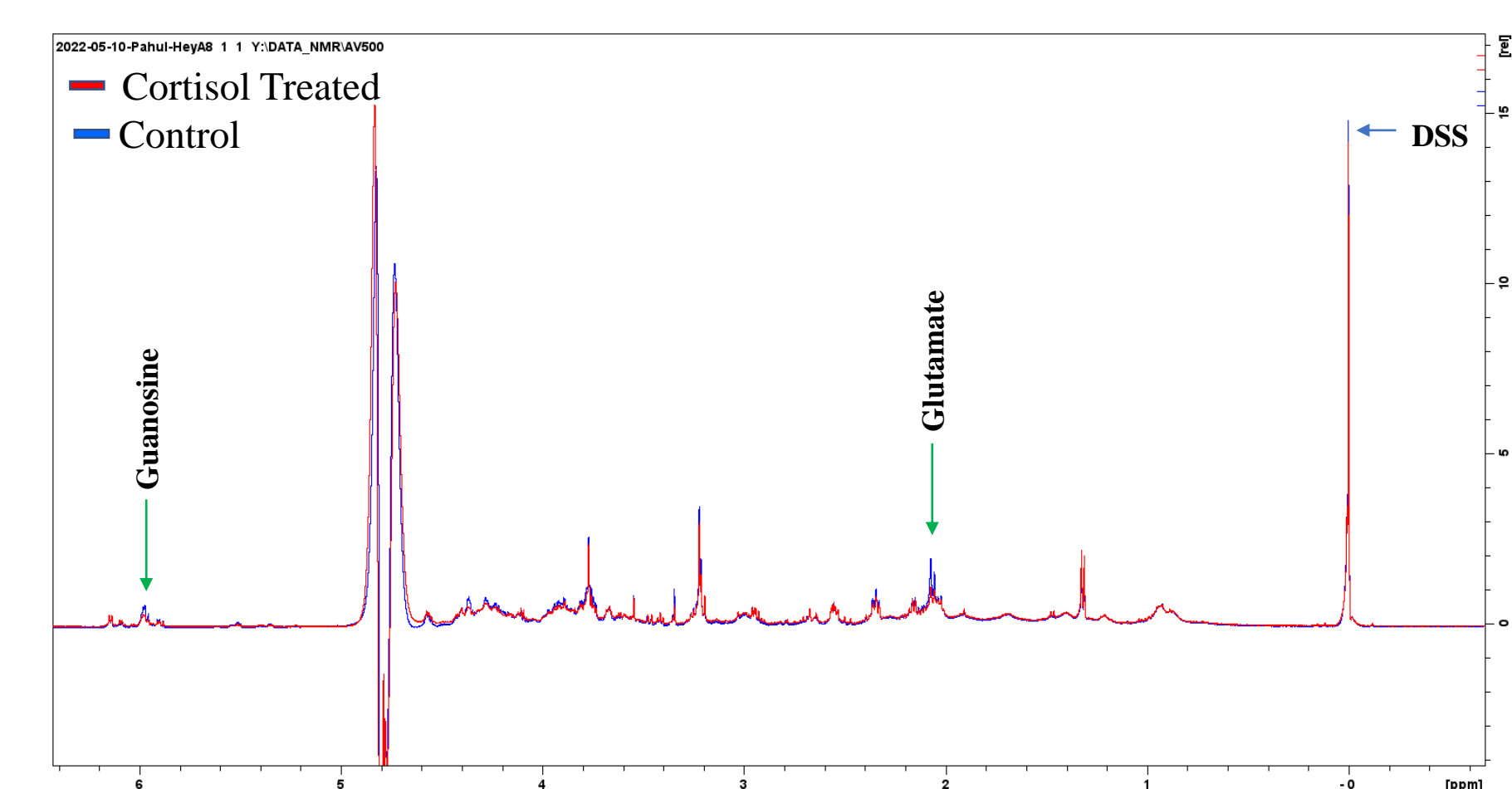**Figure 3**: Metabolites altered significantly in cortisol treated cells are shown in the 1D ^1H spectrum

Conclusions

- Initial studies showed a difference in metabolites glutamate, guanosine and uridine.

- However, more samples need to be analyzed to obtain statistical significance.

Acknowledgements

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