

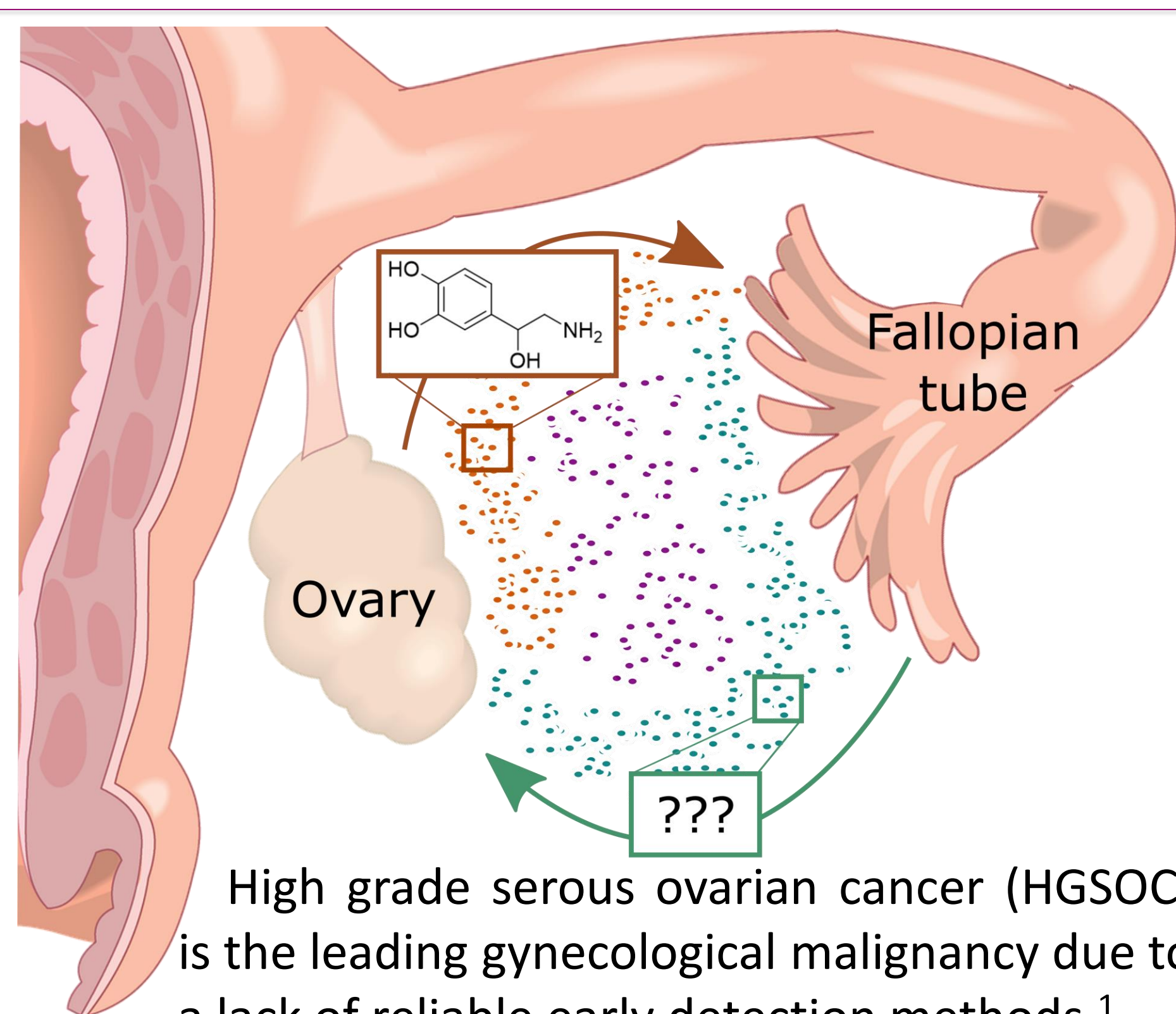


# A novel imaging mass spectrometry method for visualizing chemical communication in metastasis

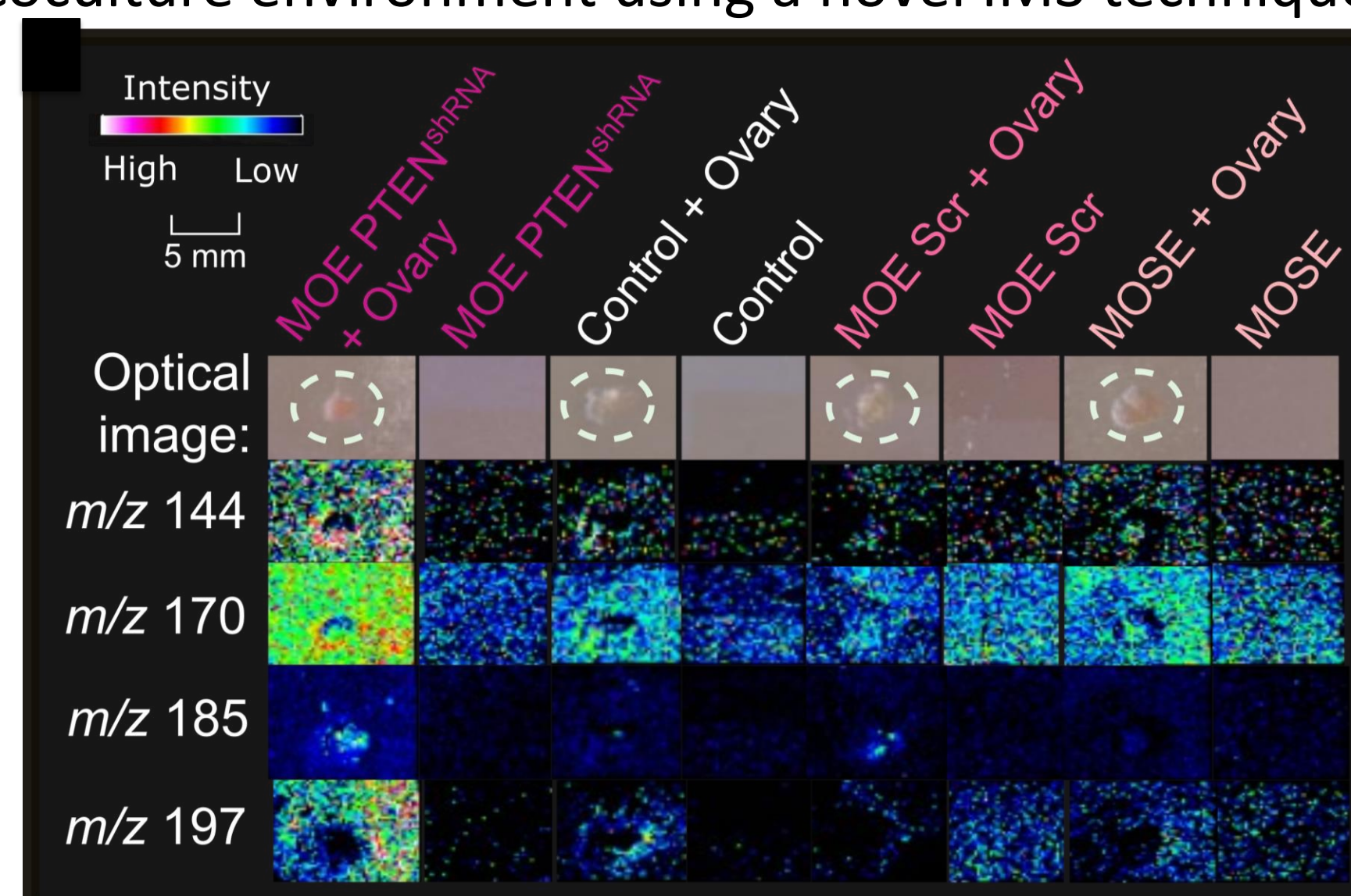


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## Introduction



High grade serous ovarian cancer (HGSOC) is the leading gynecological malignancy due to a lack of reliable early detection methods.<sup>1</sup> HGSOC begins in the fallopian tube epithelium (FTE) and migrates to the ovary during ovulation.<sup>2</sup> Norepinephrine (NE) has been detected in the coculture environment using a novel IMS technique.<sup>3</sup>



This method is capable of detecting molecules using any cell type and a wide range of tissue types.

## Aims

**Aim I:** Detect signals being produced from the fallopian tube cells relevant to primary metastasis. Ascertain the order of communication between the organ structures.

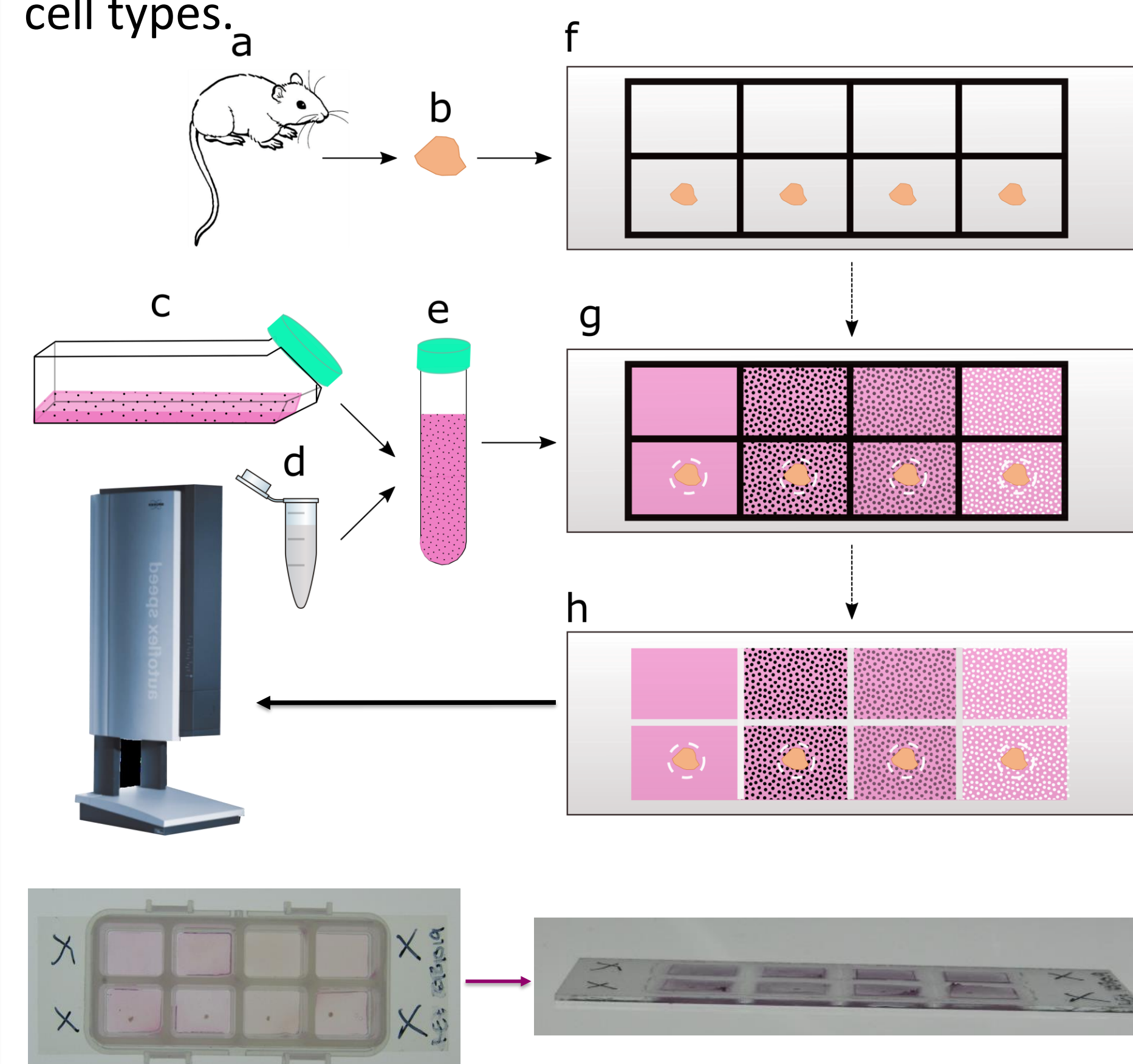
**Aim II:** Unveil chemical cues that indicate or drive secondary metastasis to the omentum.

## Hypothesis

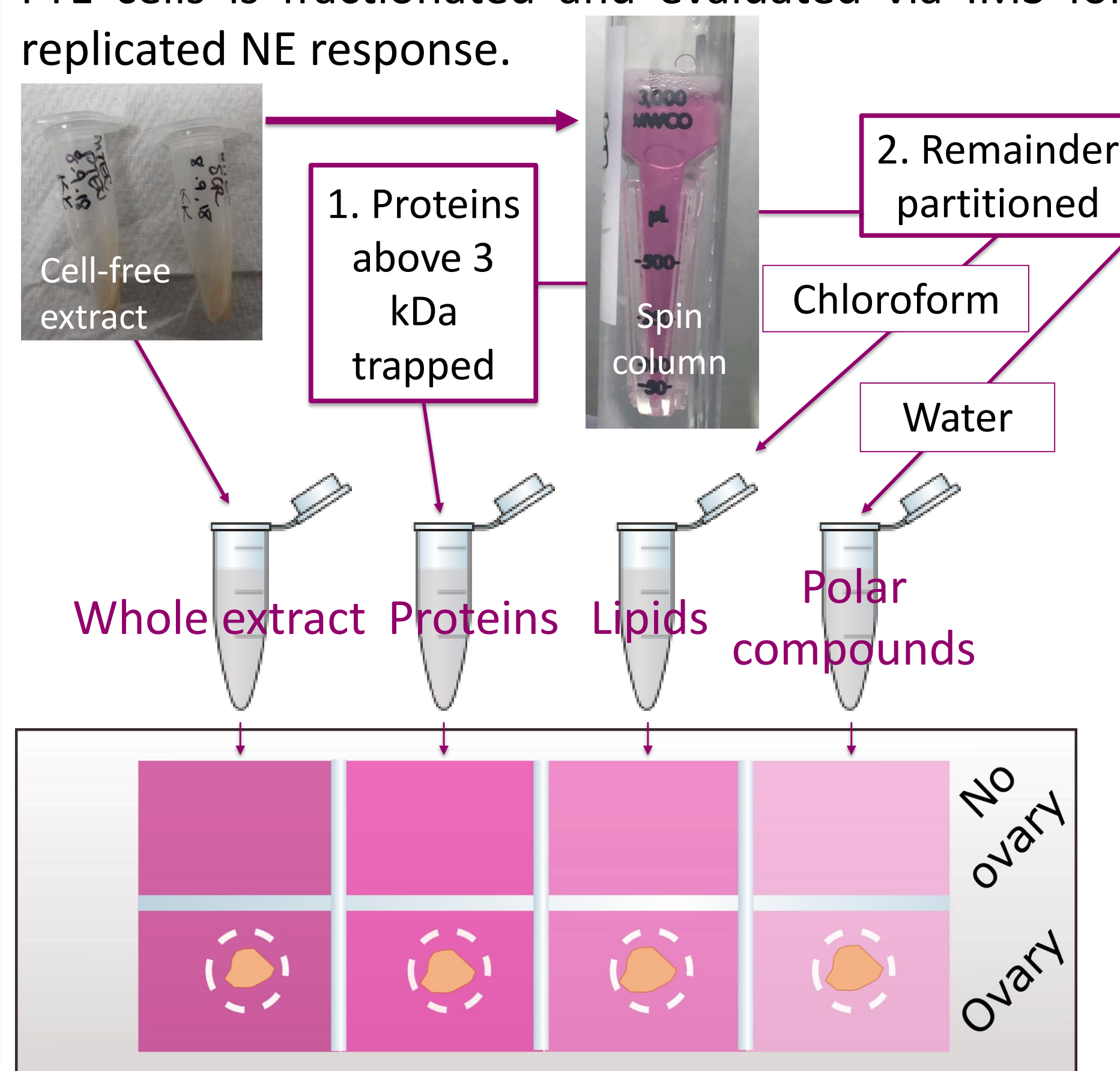
Small molecules may drive the communication that results in primary and secondary metastases of HGSOC, and can be detected using this novel IMS technique.

## A Novel IMS Method

Sample preparation<sup>3</sup>: Murine ovaries are collected from mice and cocultured with a cell culture of tumorigenic FTE cells embedded in agarose. The platform is IMS-compatible and is amenable to many cell types.

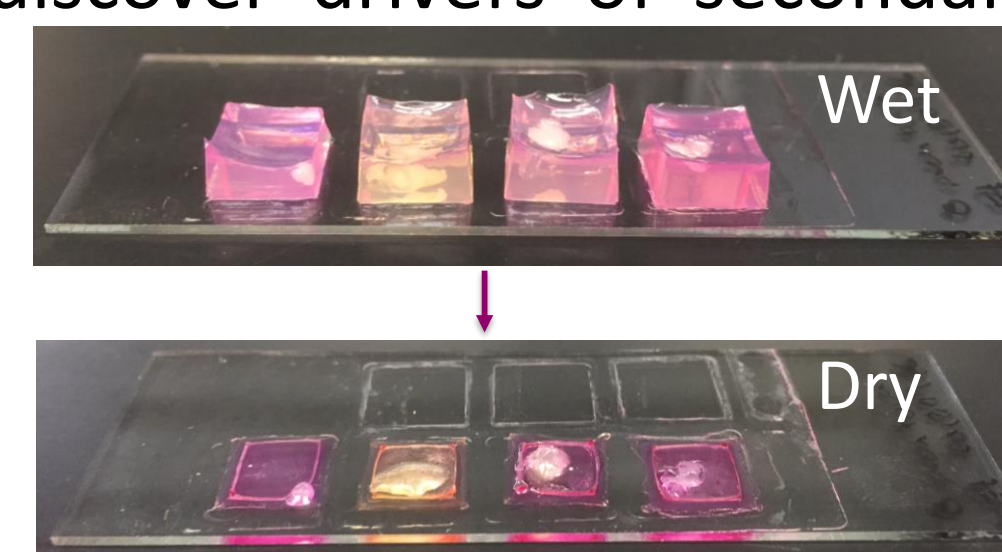


**Aim I:** Cell-free conditioned media from tumorigenic FTE cells is fractionated and evaluated via IMS for replicated NE response.



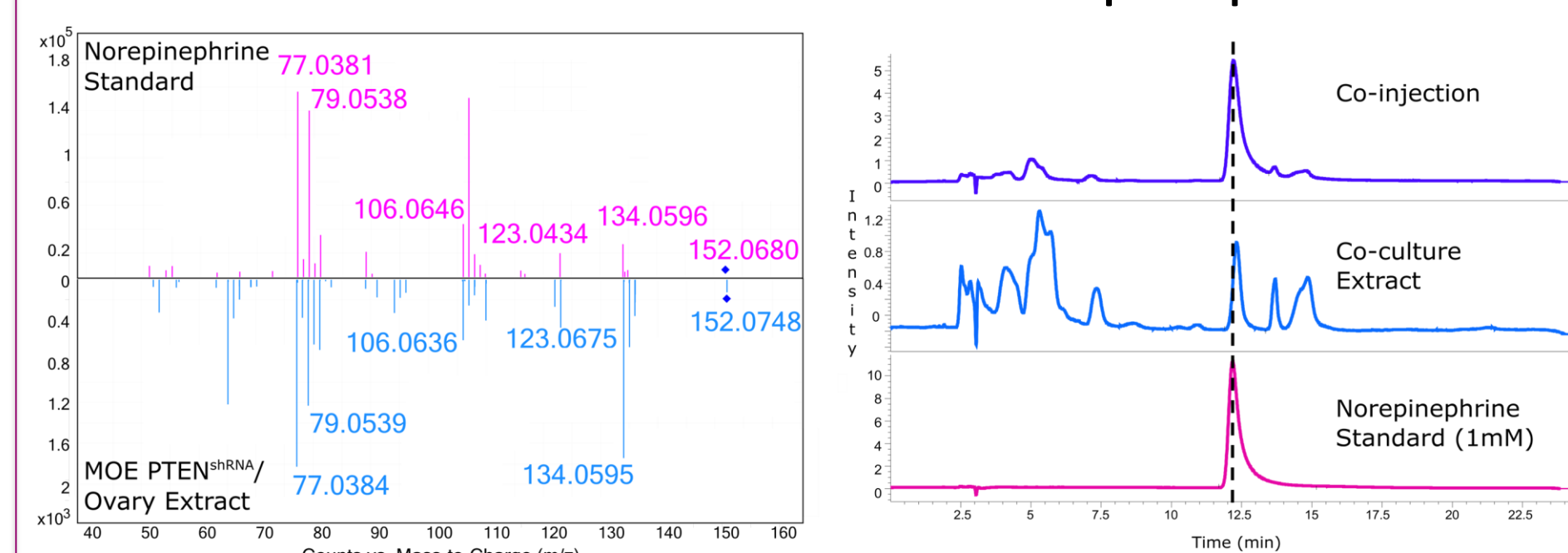
**Aim II:** Optimize conditions to embed omental tissue into agarose plug to discover drivers of secondary metastasis.

The omentum is the site of secondary metastasis of HGSOC from the ovary.

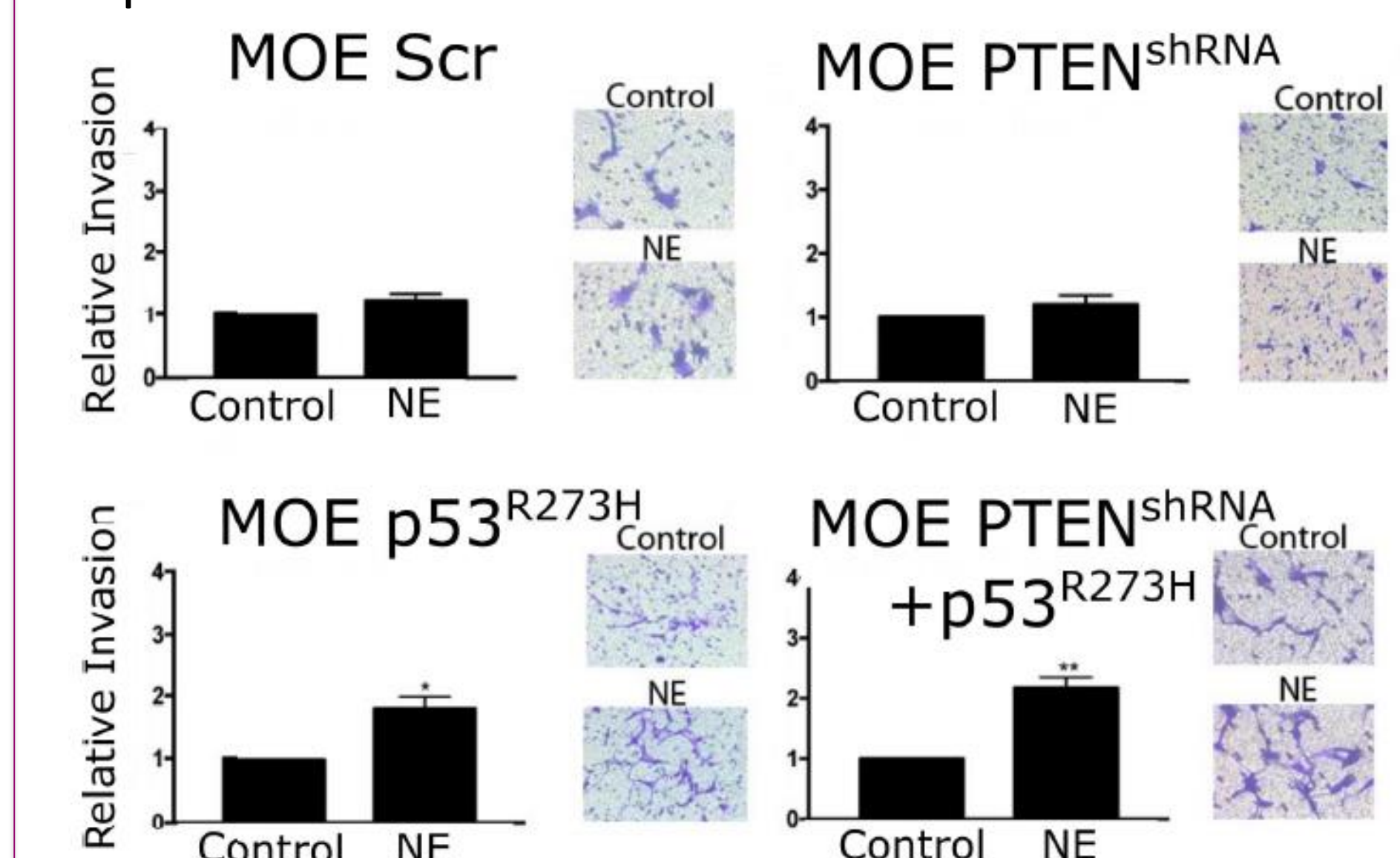


## Results

Orthogonal methods of dereplication have validated that the ovarian tissue releases norepinephrine.

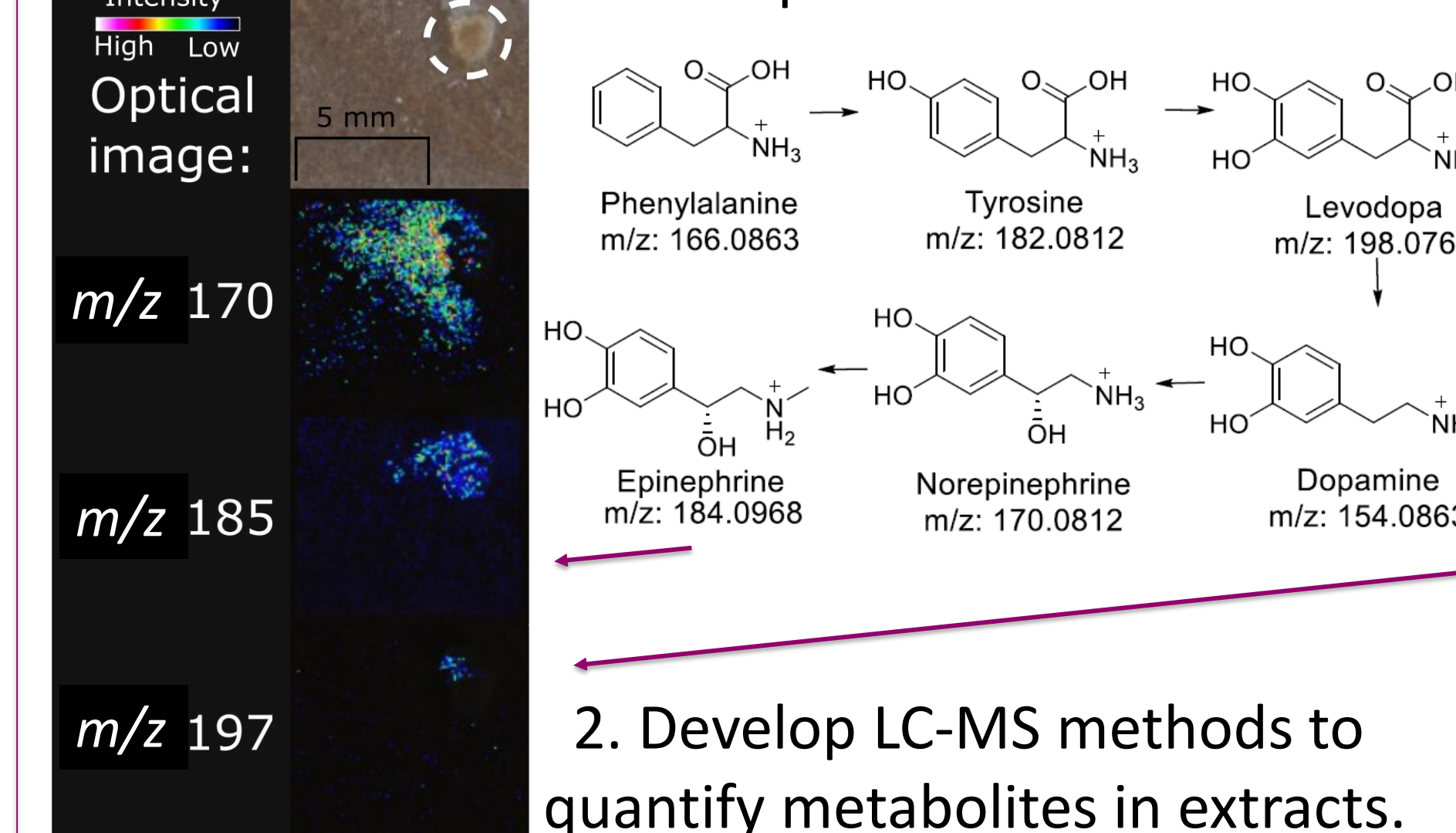


NE has previously been implicated in HGSOC, and further evidence suggests it influences the invasion of p53-altered FTE cells.<sup>3</sup>



## Future Directions

1. Identify remaining molecules produced by ovary in coculture conditions.<sup>3</sup> Known biosynthesis pathways provide starting point for dereplication.



2. Develop LC-MS methods to quantify metabolites in extracts.

## References & Acknowledgements

<sup>1</sup>Siegel et al, *CA Cancer J Clin.* **2018**, 68, 7–30  
<sup>2</sup>Labidi-Galy, S. et al, *Nat. Commun.* **2017**, 8, 1, 1093  
<sup>3</sup>Zink et al, *ACS Cent Sci.* **2018**, 4, 10, 1360-1370  
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