11th Annual Graduate Student Symposium (Virtual), 2020

Gas plasma effects on chemoresistance ovarian cells

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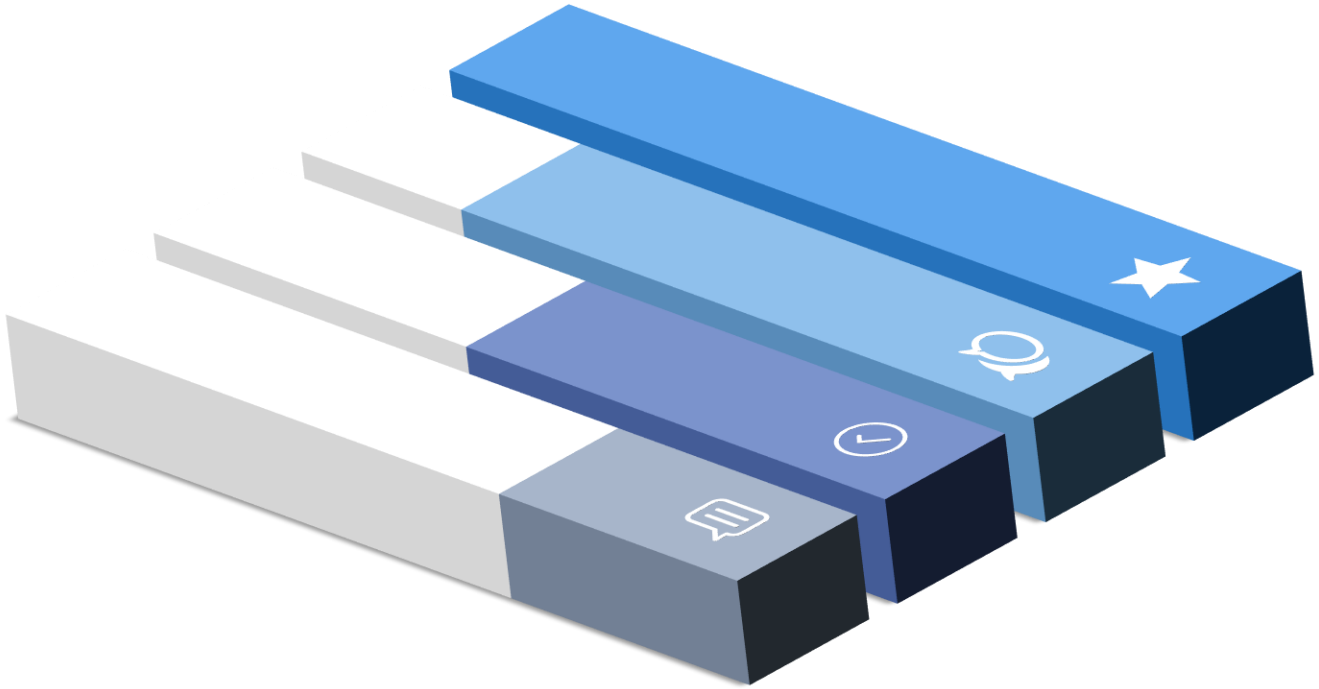
Outline

01 Introduction

02 Material and Methods

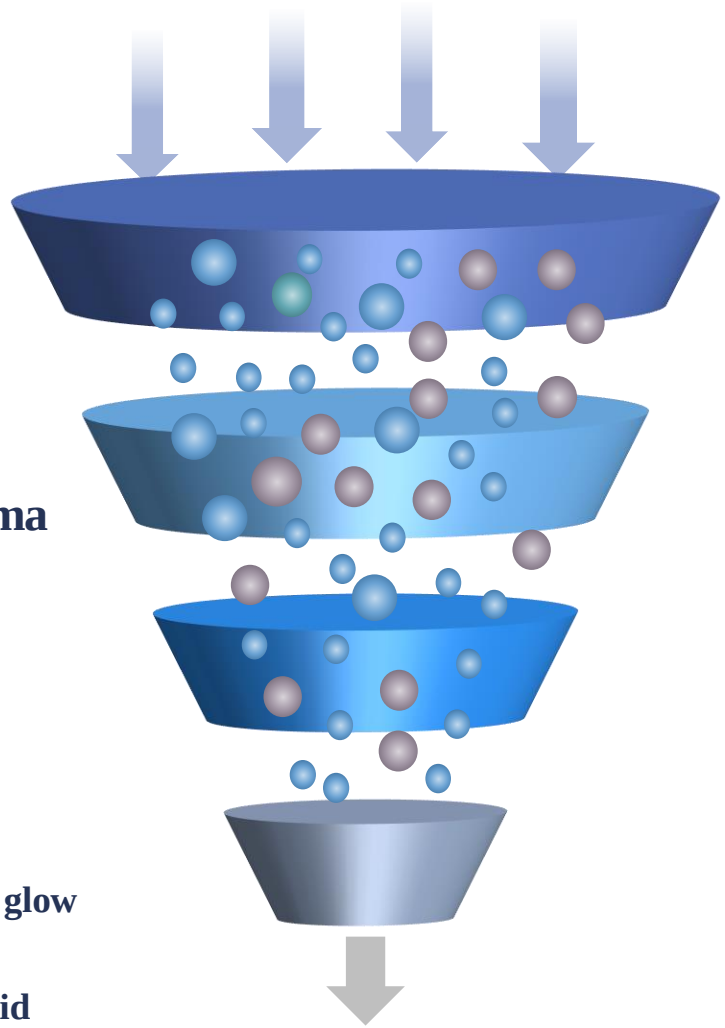
03 Results and Discussion

04 Conclusion



Interaction of plasma with biological objects

Time scale



ns-µs Plasma

µs-ms After glow

ms-min Liquid

s-day Cell/Tissue

A Plasma Physics

B Plasma Chemistry

C Solution Chemistry

D Biochemistry

CAP as a cocktail of chemical and physical factors

Equivalent total oxidation potential (ETOP) as the definition of plasma dose

1

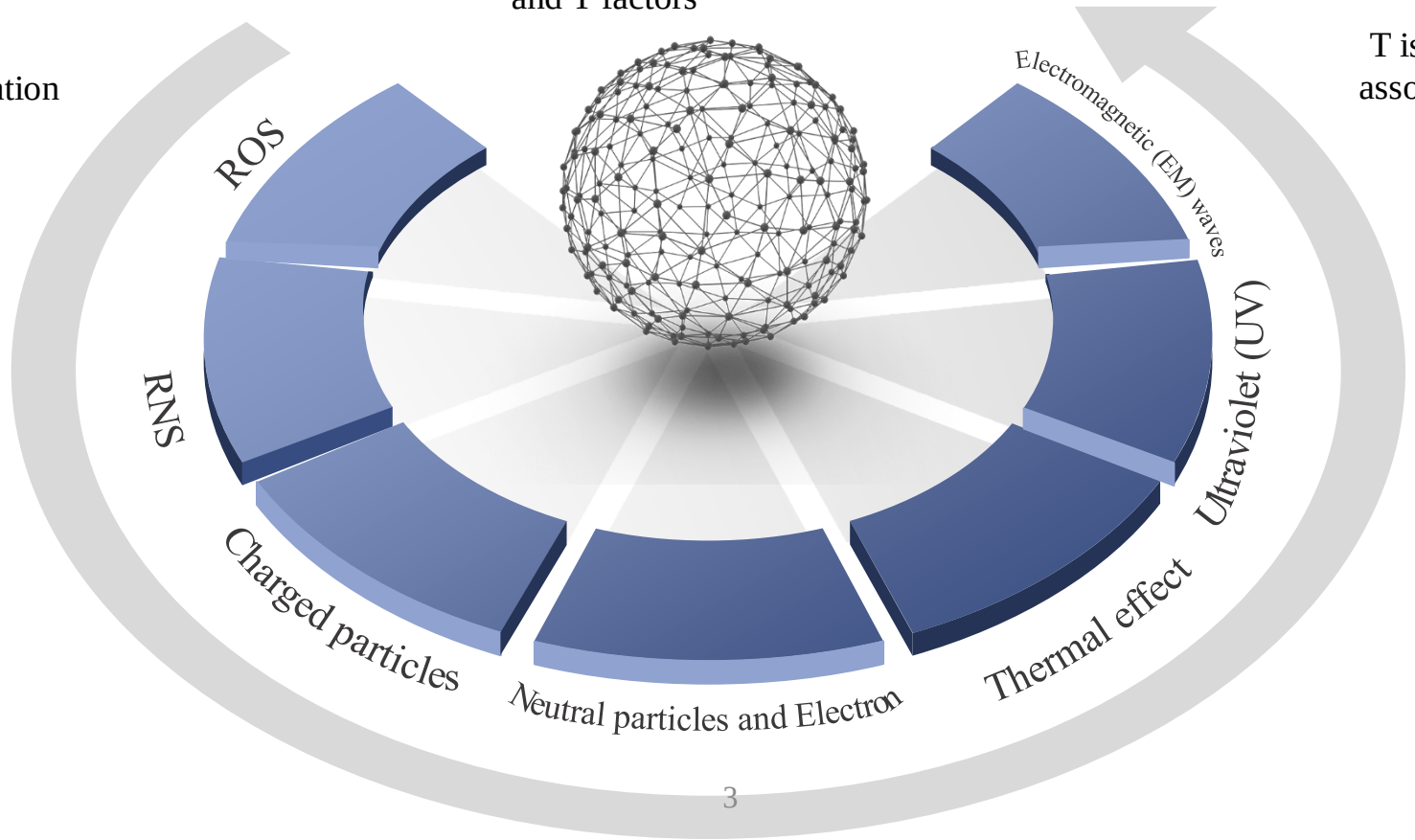
H is the equivalent total oxidation potential of the RONS

3

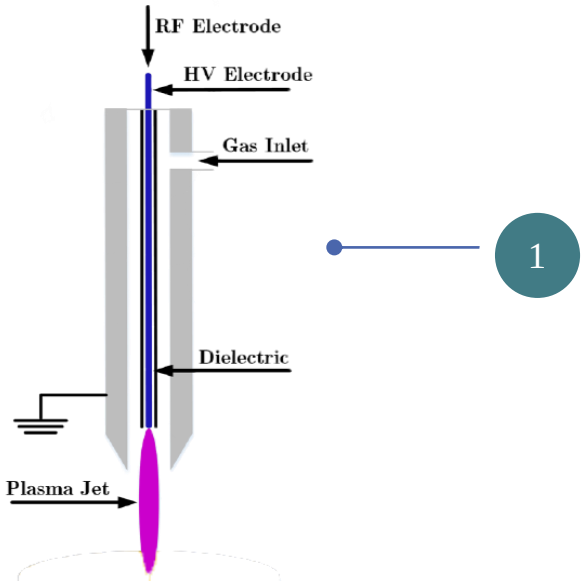
f(H, T) is the equivalent total oxidation potential related to the synergistic effects between H and T factors

2

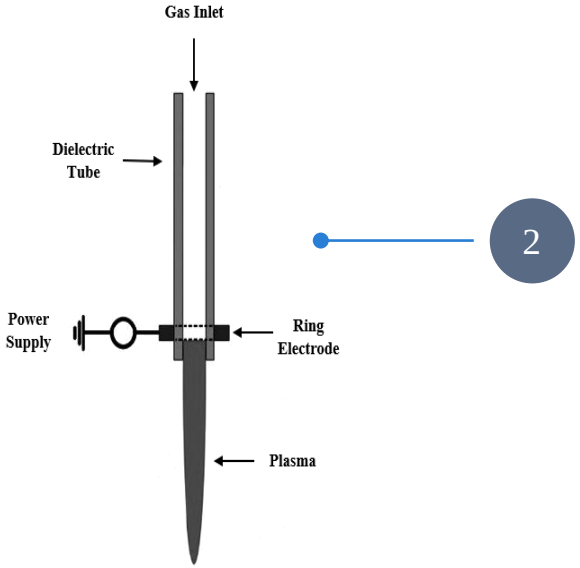
T is the equivalent total oxidation potential associated with the reactive agents unrelated to RONS, such as electric field and UV/VUV



Different configuration of plasma jets

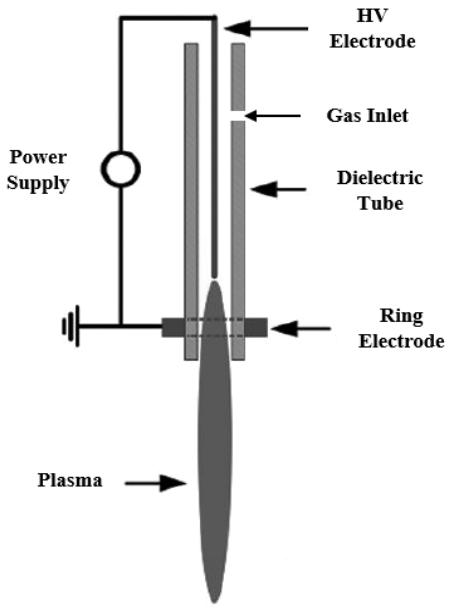


1



2

3



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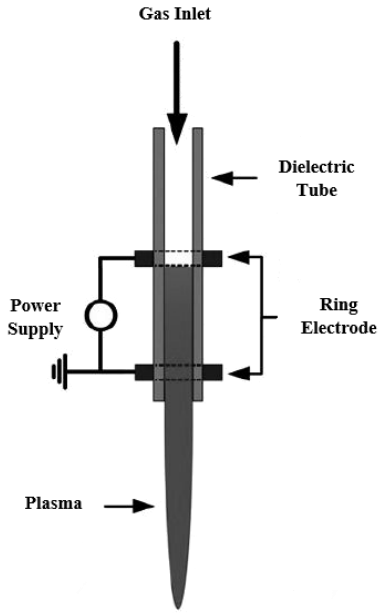

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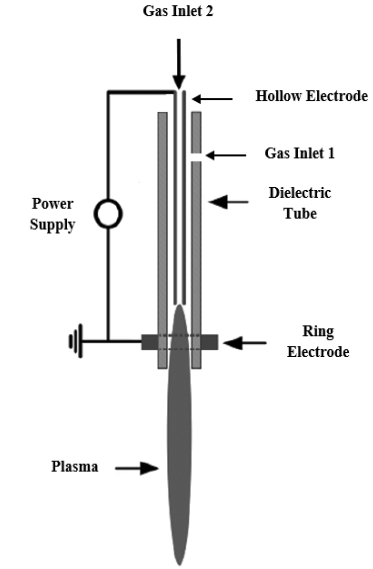
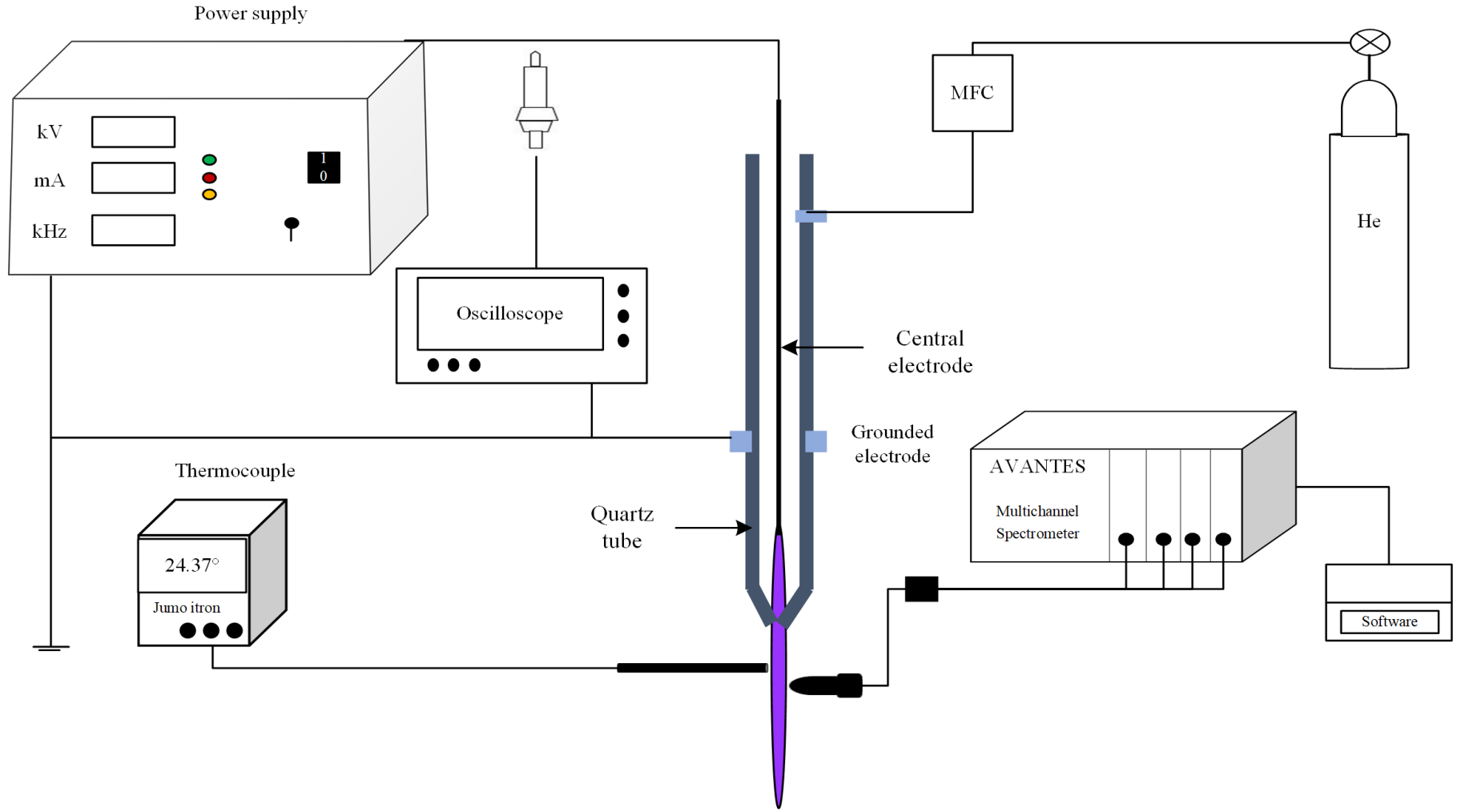
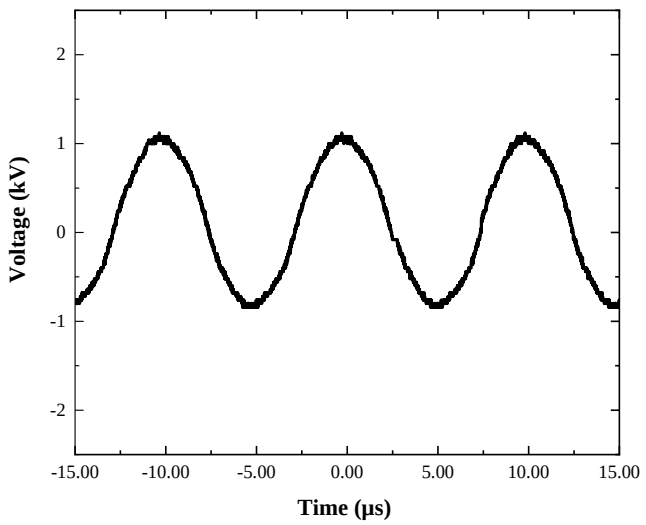


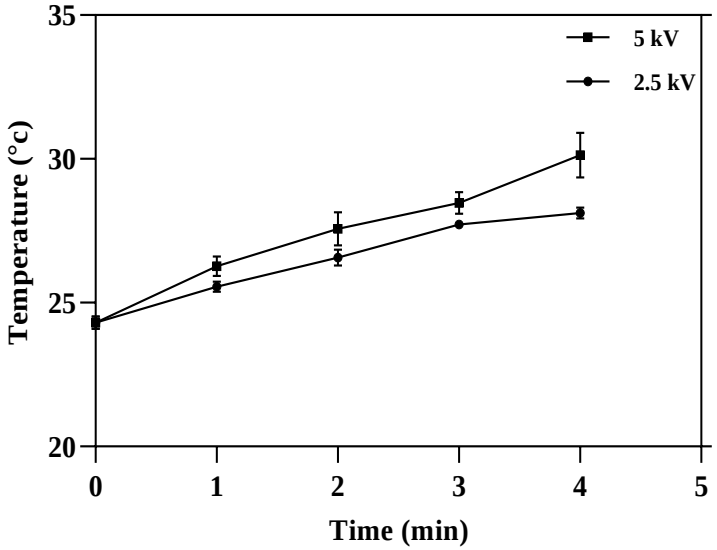
Schematic of the experimental setup



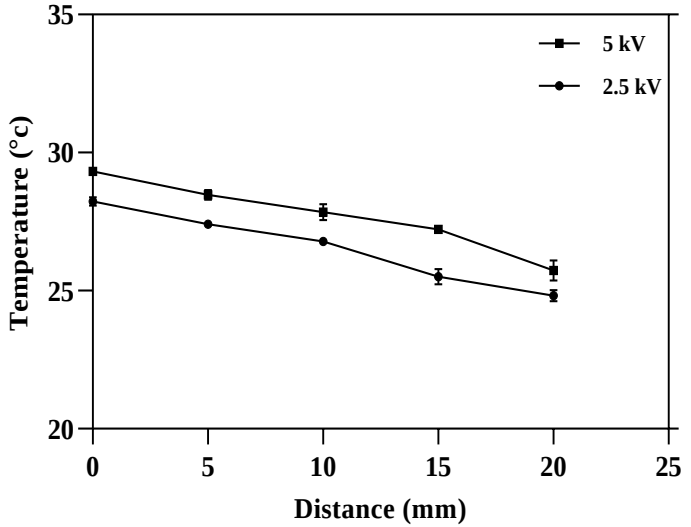
Physical characterization of plasma



The voltage waveform of plasma

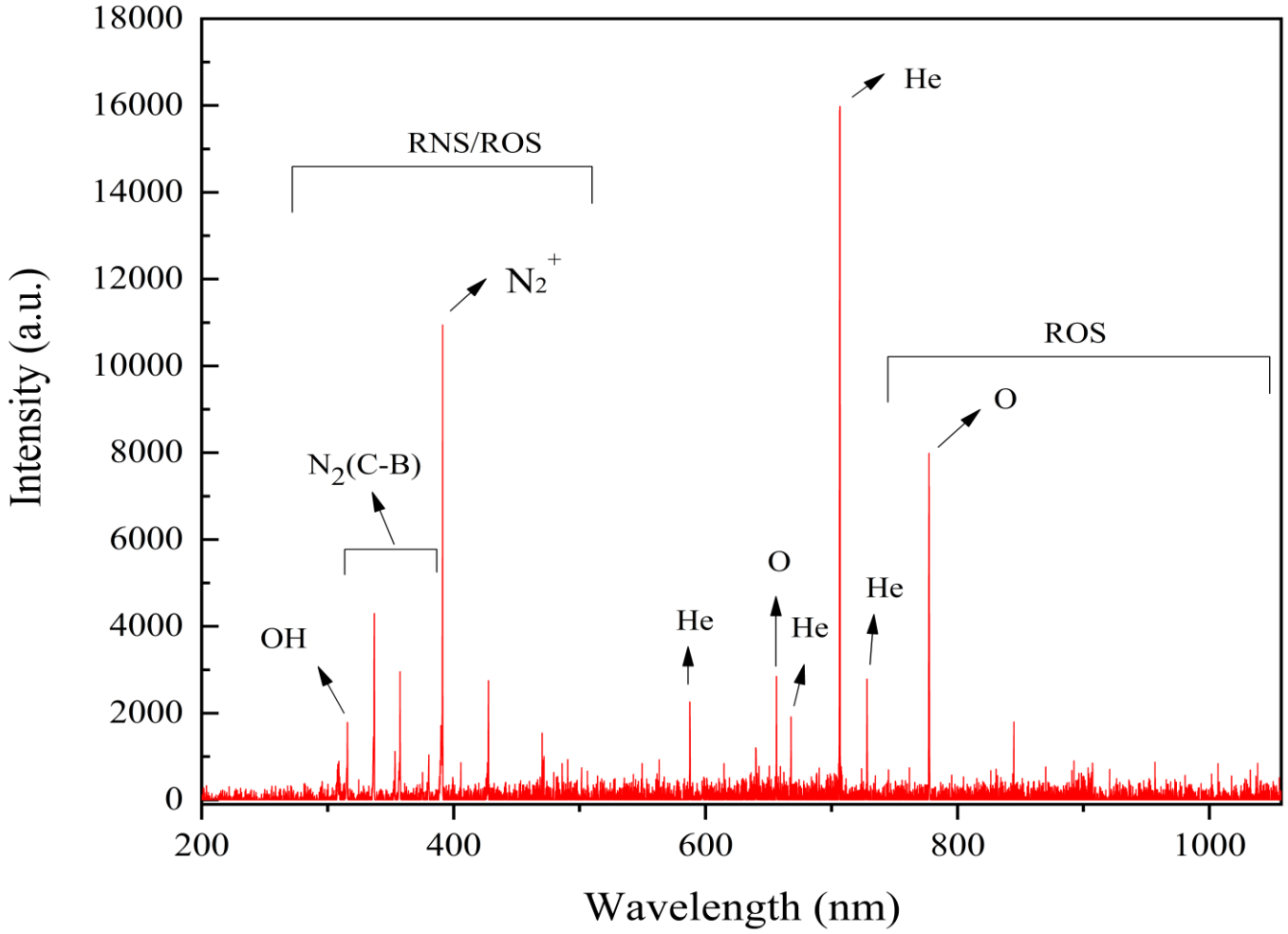


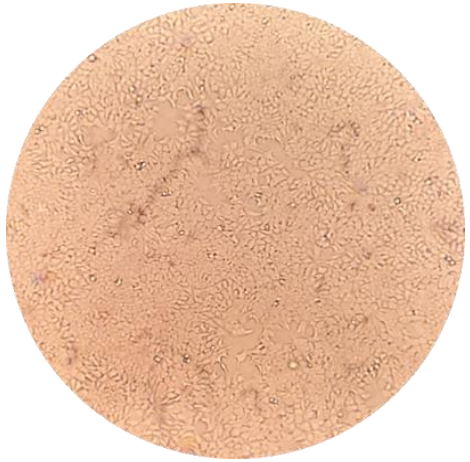
Plasma plume temperature measurements at different times



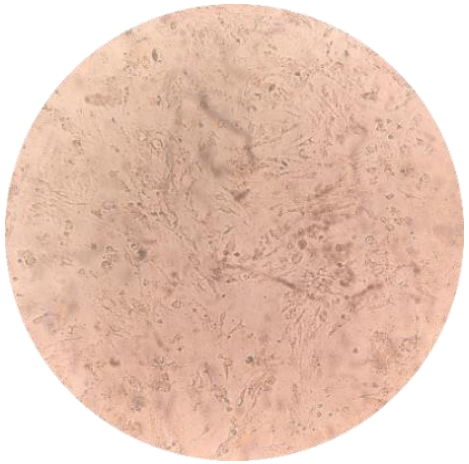
Plasma plume temperature measurements at different distances from nozzle

Optical emission spectroscopy of the plasma jet

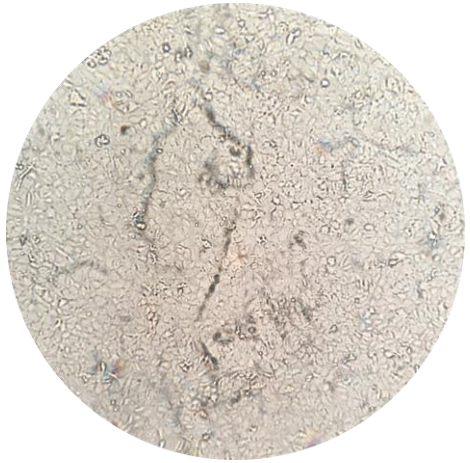




A2780 CP Cancer cells



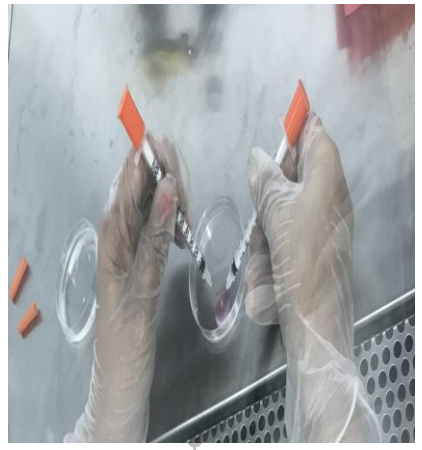
GCS Normal cells



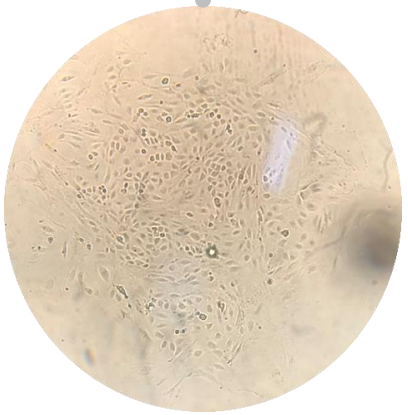
SKOV-3 Cancer cells

1. MTT Assay
2. H&E staining
3. Acridine orange (AO) propidium iodide (PI) staining
4. Quantitative real-time reverse-transcription polymerase chain reaction (qRT-PCR)

Isolation of granulosa cells



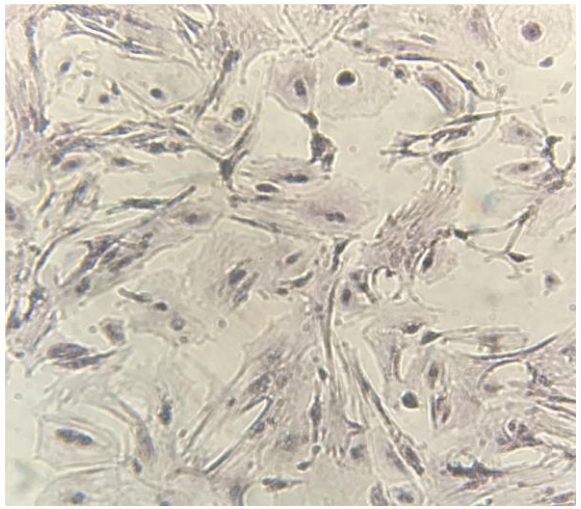
1 2 3 4 5 6 7



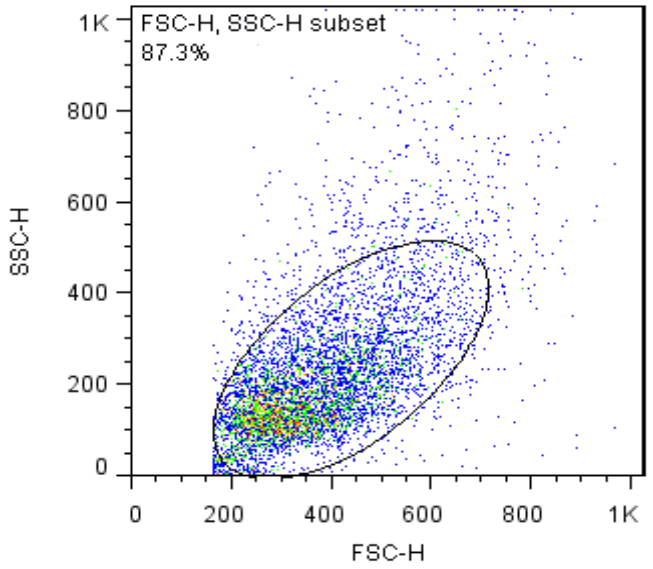
Mice were sacrified with cervical dislocation. ovaries were removed and punctured with two needles and then was used collagenase IV as enzymic digestion and after 30 min neutralized with FBS, so granulosa cells were released into media culture (α MEM, 1% antibiotic, 15% FBS).
Cells were cultured in α MEM supplemented with 10% FBS and 1% antibiotic at 37°C and 5% CO_2.

Proving the existence of granulosa cells

A



B



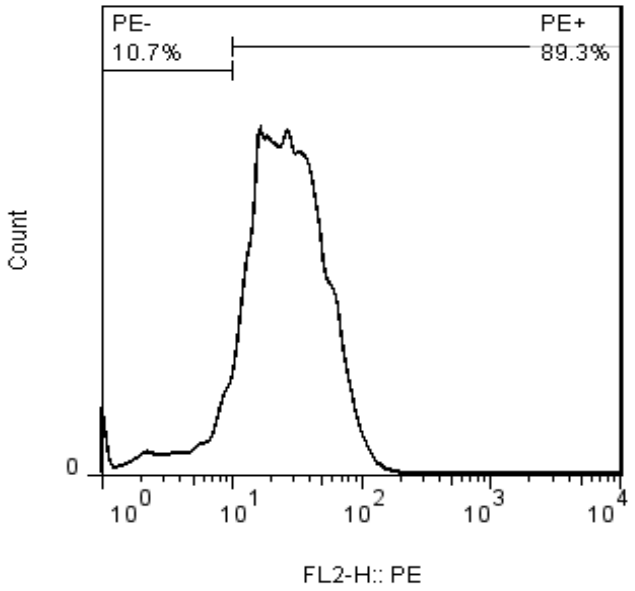
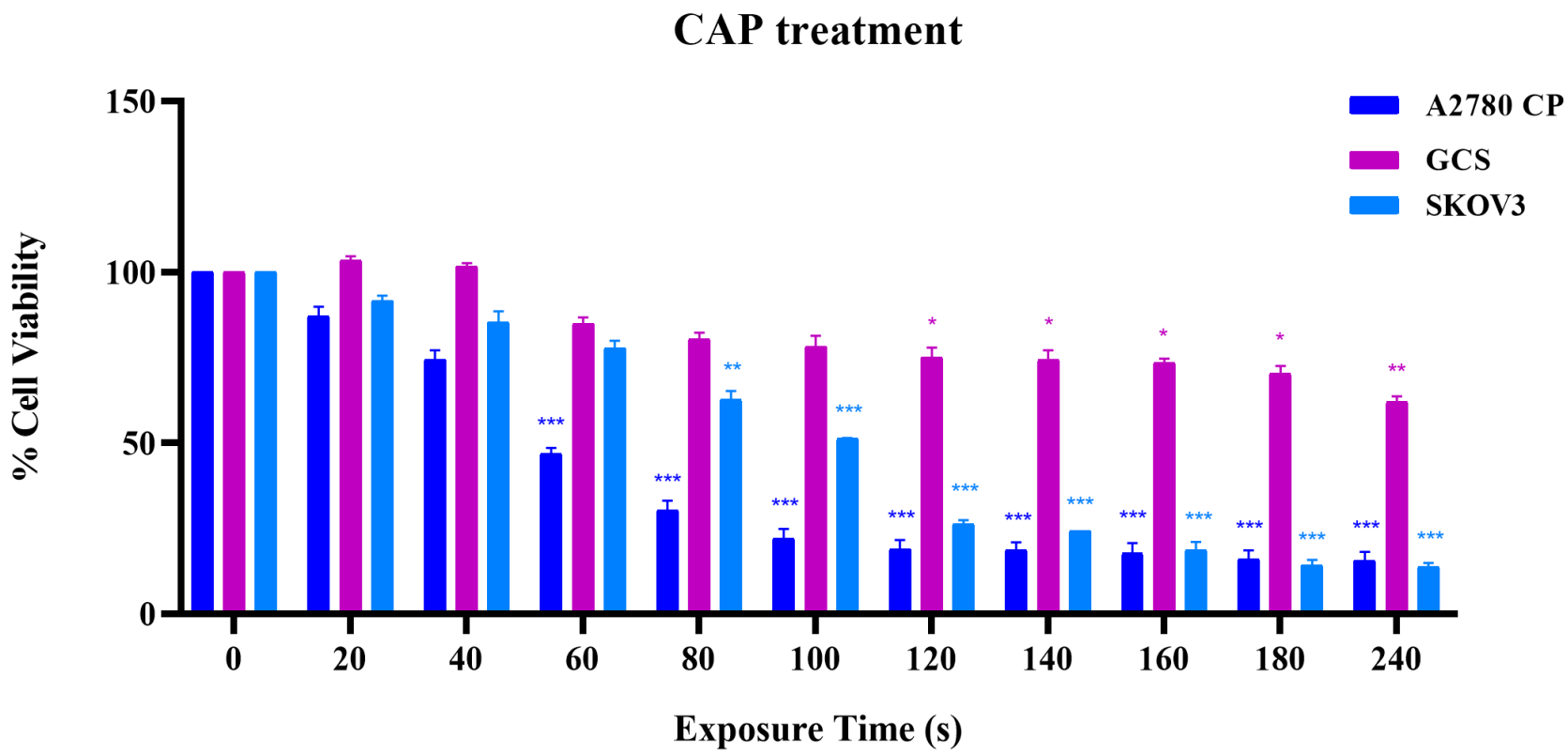
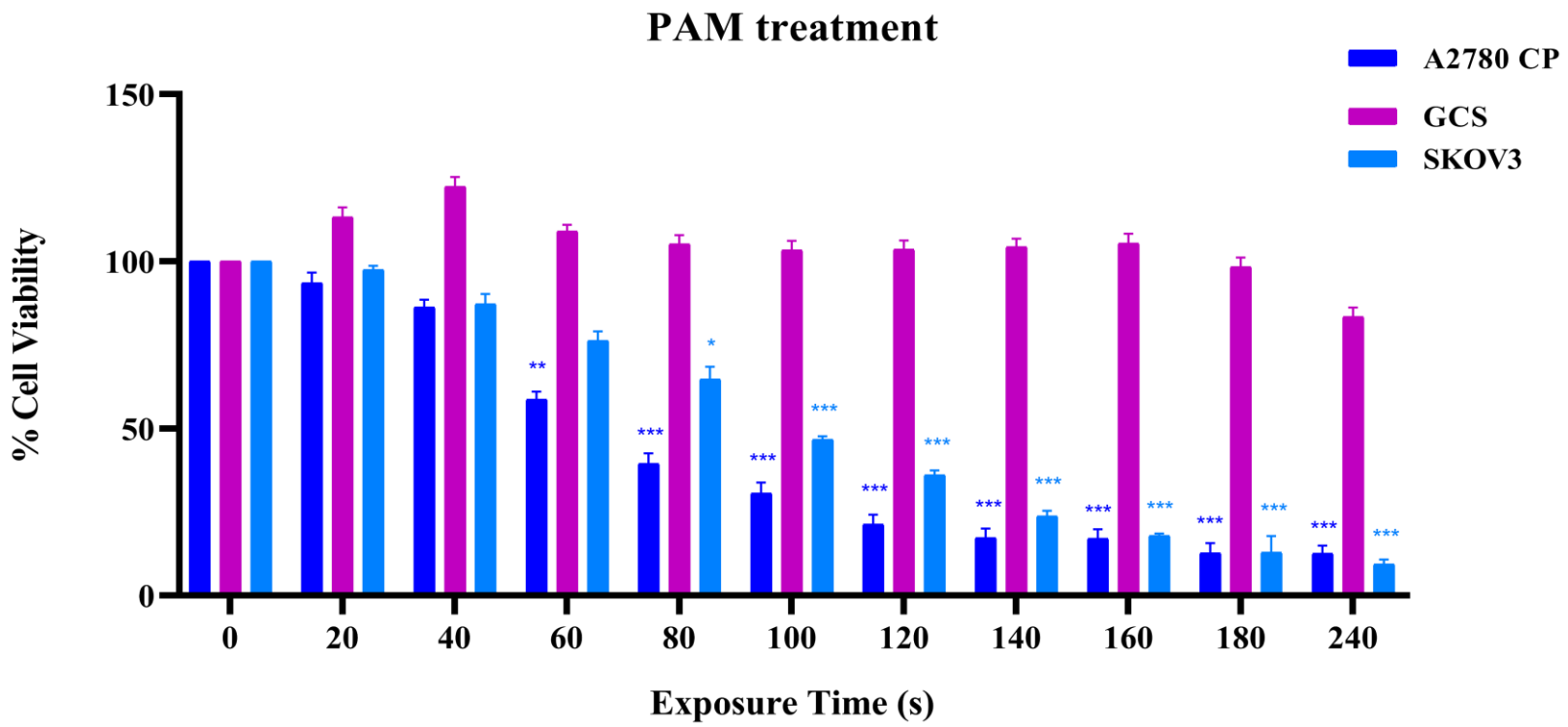


Fig. A. shows morphology of cultured granulosa cells, with H & E staining. **Fig. B.** Flow cytometry analysis for proving the existence of cultured granulosa cells with α-inhibin as a marker of granulosa cells.

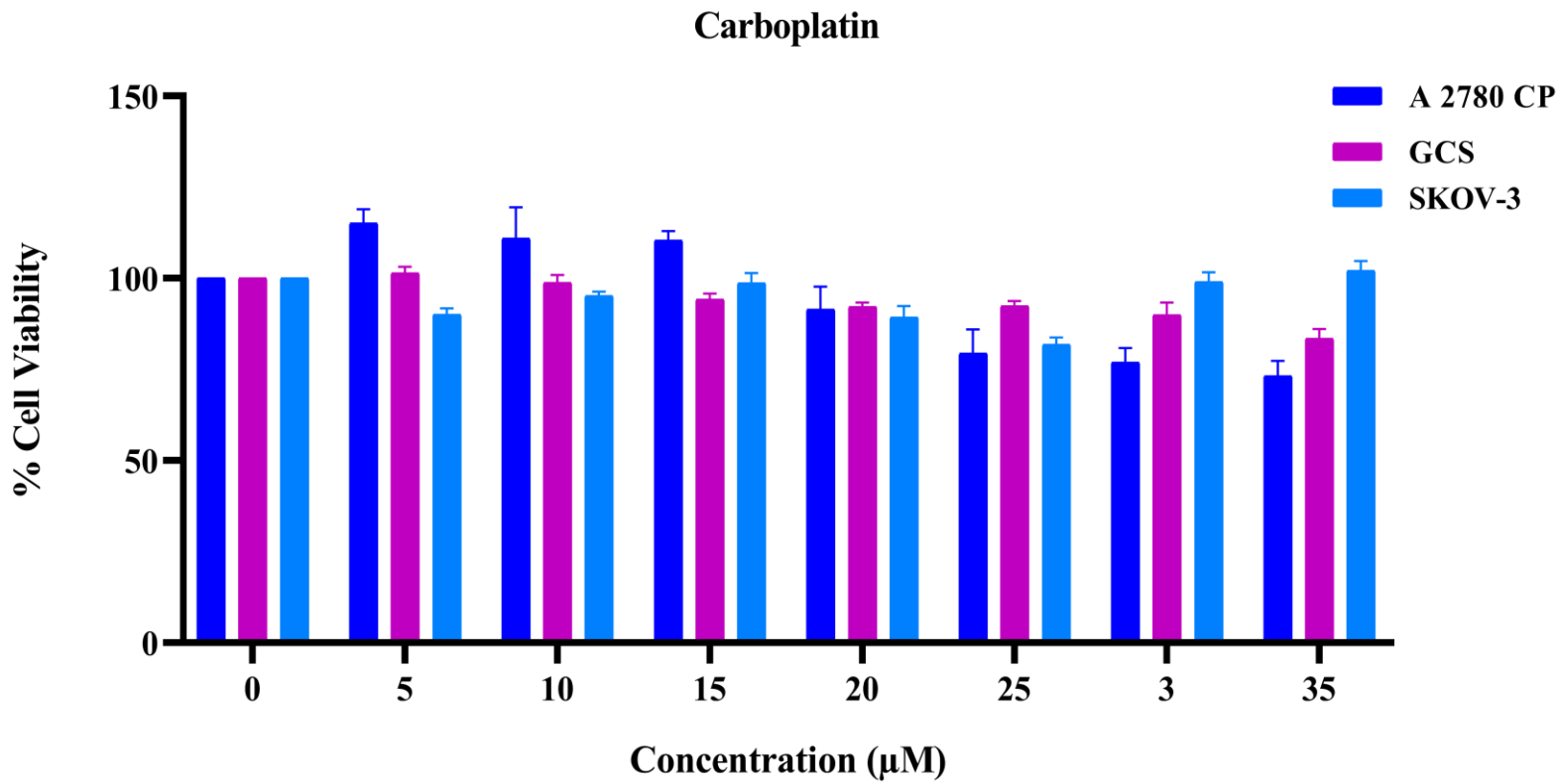
Viability of GCs, SKOV-3, and A2780 CP cells treated with CAP



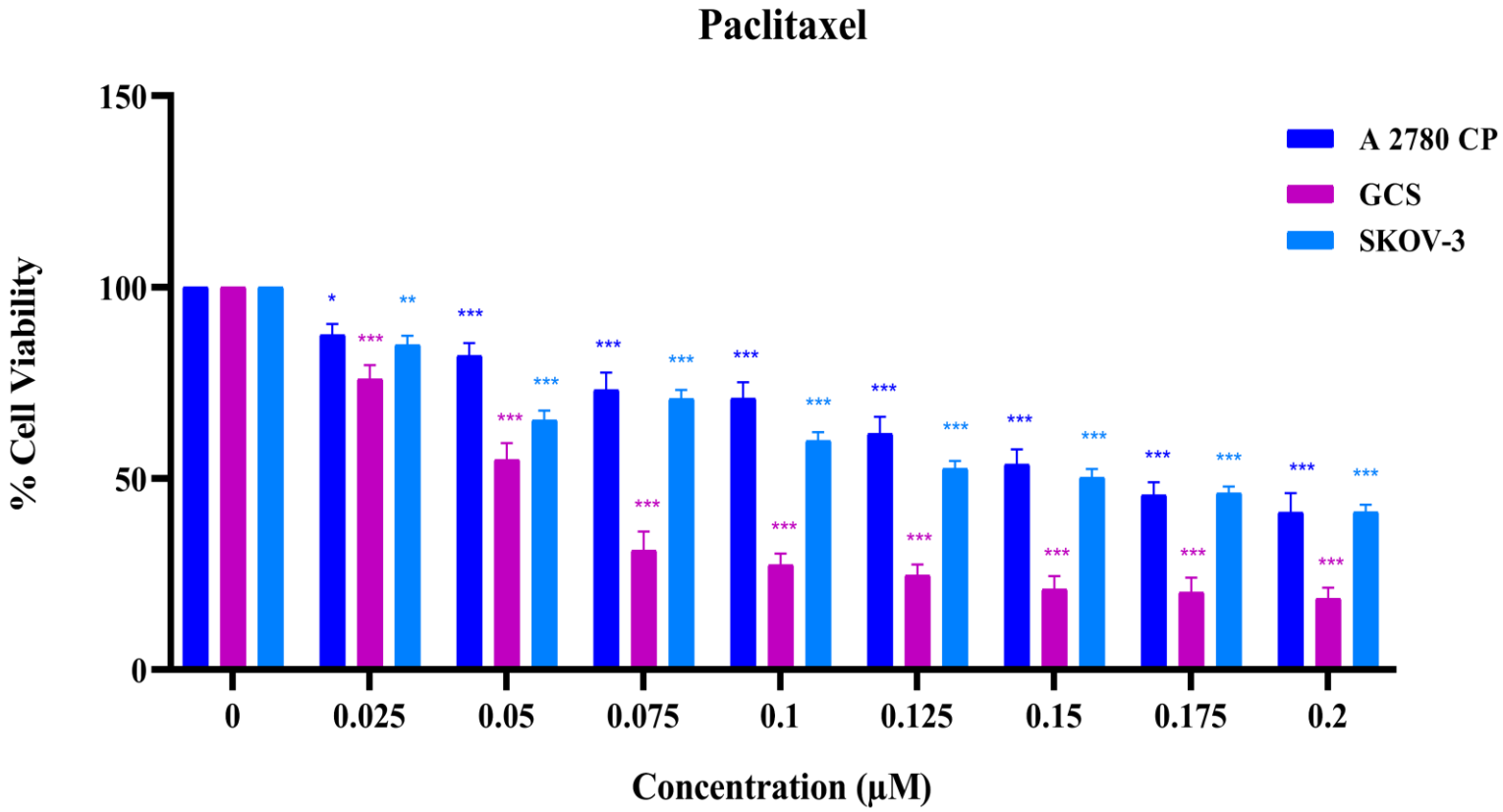
Viability of GCs, SKOV-3, and A2780 CP cells treated with PAM



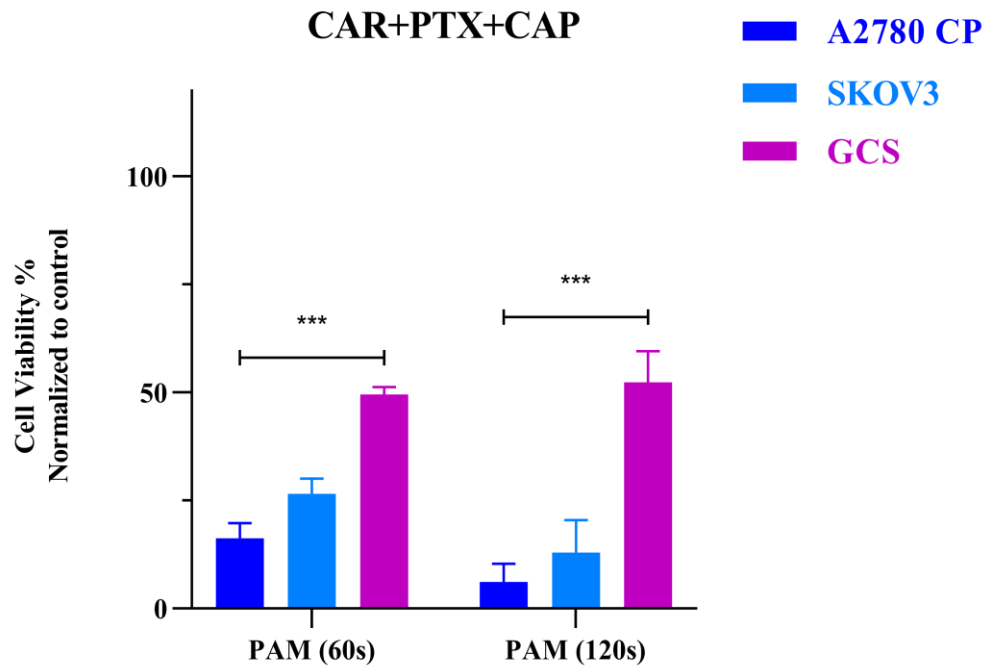
Viability of GCs, SKOV-3, and A2780 CP cells treated with CAR



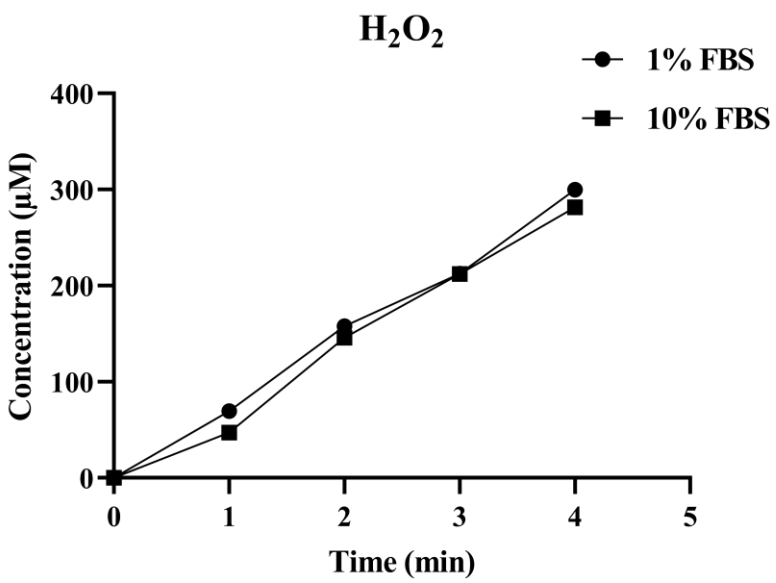
Viability of GCs, SKOV-3, and A2780 CP cells treated with PTX

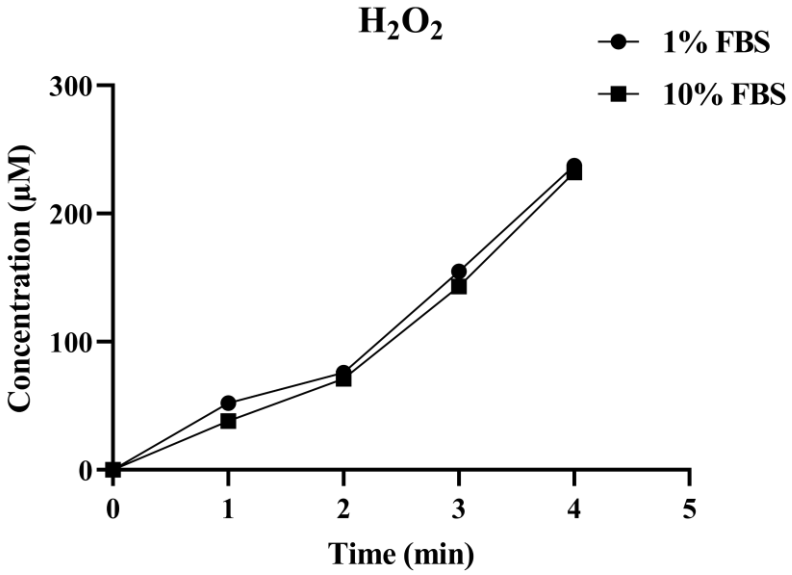


Viability of GCs, SKOV-3, and A2780 CP cells treated with CAR, PTX and CAP

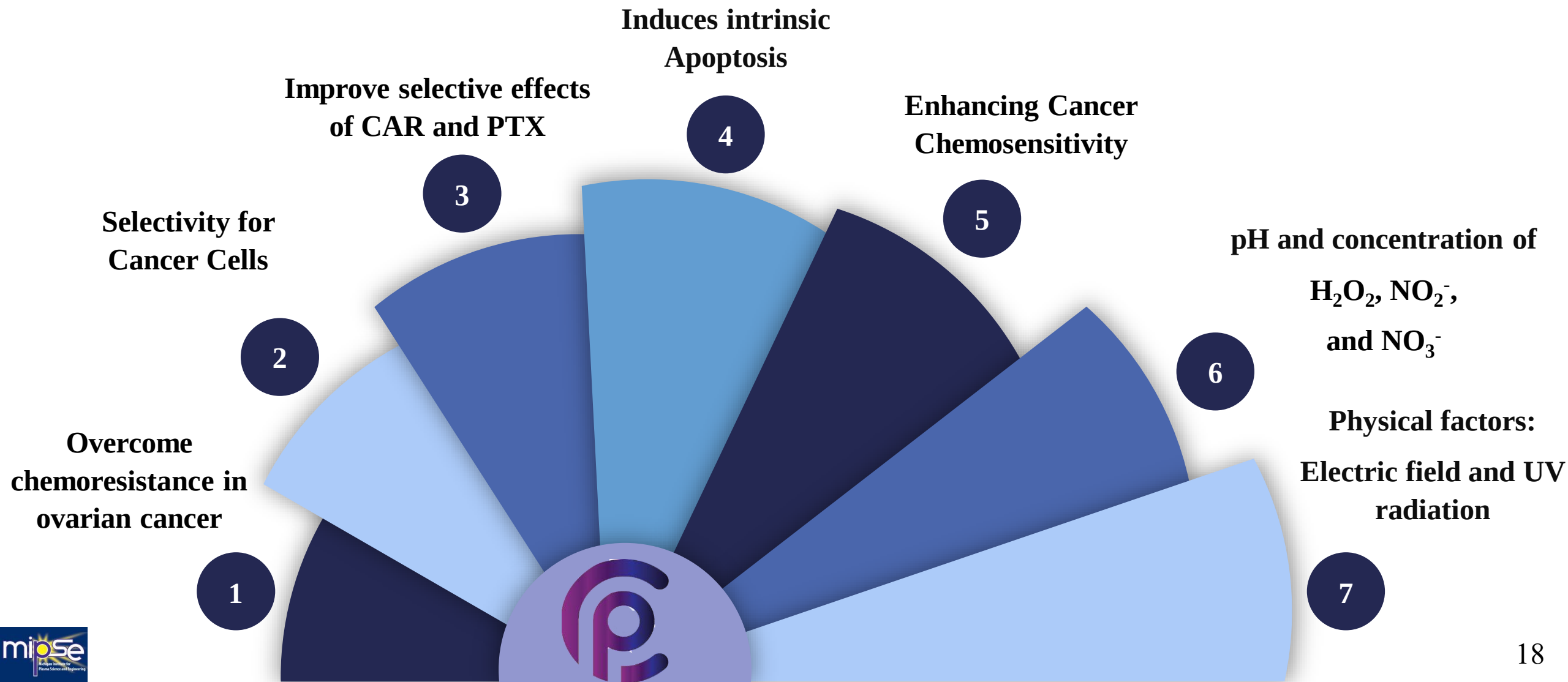


Extracellular H_2O_2 in two culture medium





Summary of key finding



Thank you for your attention

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