

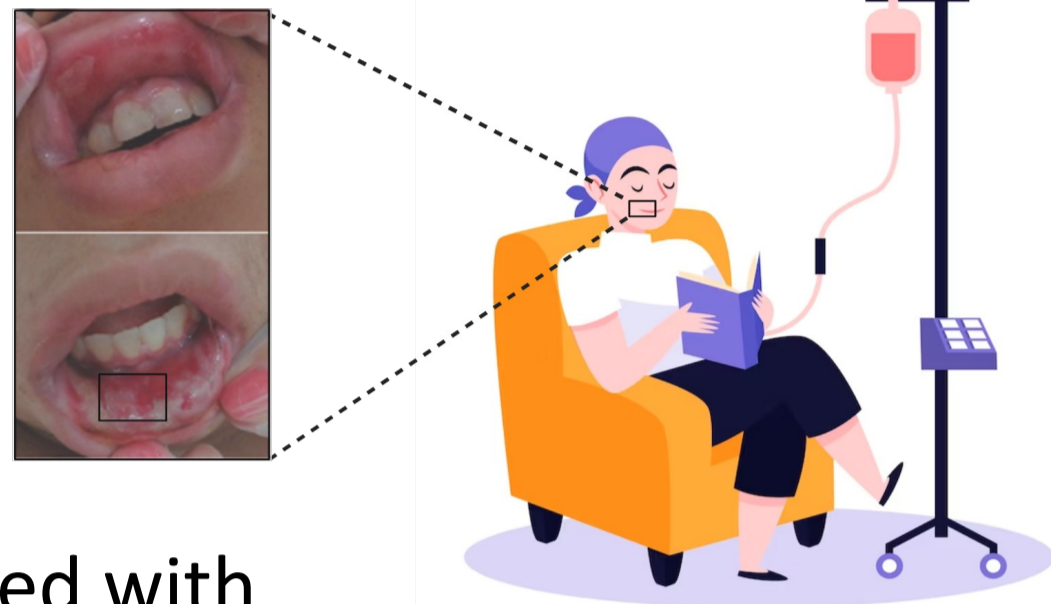
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1. INTRODUCTION

- **Chemotherapy-induced oral mucositis (CIOM)** is a painful and debilitating condition characterized by ulceration of the oral mucosa.¹
- CIOM decreases quality of life.¹
- CIOM affects 20-40% of all patients treated with chemotherapy; however, despite this prevalence, there is a lack of effective treatments.¹
- **Spermidine** is a natural polyamine present in all living organisms and an integral component of the human diet.²
- Recent studies found that spermidine demonstrates potential as an adjunctive therapy for Inflammatory Bowel Disease (IBD) in mice by promoting the action of inflammatory macrophages in the intestinal mucosa.^{2,3}



Research Question: Does spermidine attenuate the cytotoxic effects of chemotherapy-induced oral mucositis?

Hypothesis: I hypothesize that spermidine will attenuate the effects of chemotherapy-induced oral mucositis by increasing cell viability in a dose-dependent manner.

2. OBJECTIVES

1. Establish a 2D epithelium and characterize the damage caused by doxorubicin chemotherapy.
2. Add spermidine to the 2D epithelial model to observe potential dose effects.

4. PRELIMINARY RESULTS

1. Characterizing the damage caused by doxorubicin chemotherapy.

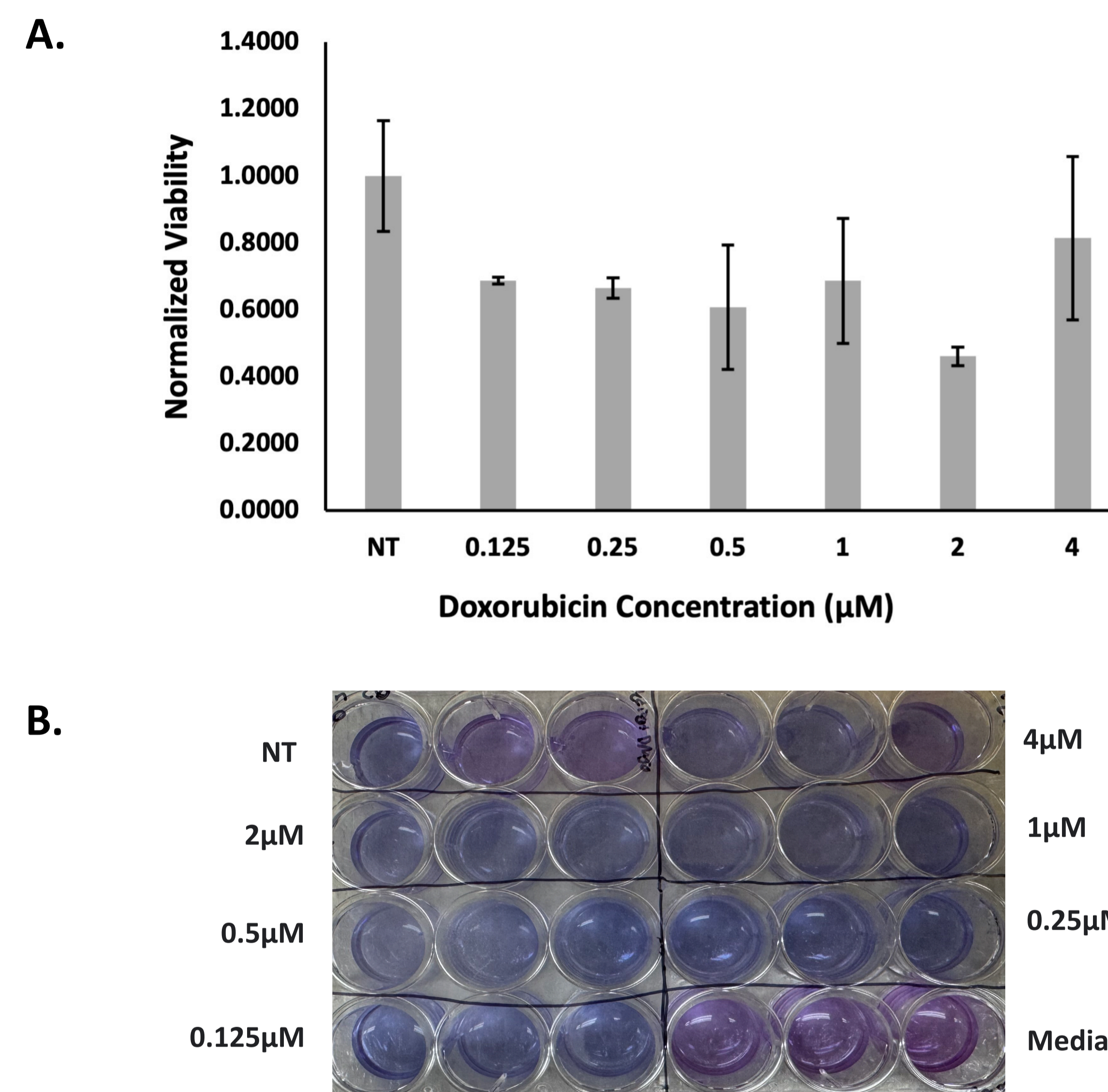


FIGURE 1 A: Graph of normalized viability of OKF6/TERT-2 as a function of doxorubicin treatment (0.125µM, 0.25µM, 0.5µM, 1µM, 2µM, 4µM or NT) and each diluted with DMSO. An alamarBlue assay was conducted and absorbance values were recorded after 4hrs of incubation at 37°C. Error bars represent the standard deviation (SD±). B: Image of 24-well plate of alamarBlue assay.

5. CONCLUSIONS AND FURTHER WORK

- OKF6/TERT-2 viability did not significantly decrease as a function of doxorubicin concentration.
- Live/dead assay and further alamarBlue assay replicates will be completed to verify results and establish a dose-response curve.
- The potential of spermidine as an adjunctive therapy for CIOM will be investigated and optimized.
- In previous studies, *Saccharomyces cerevisiae* has demonstrated potential as a sustained biomolecule delivery system.⁴
- **Future research** could investigate the effect of spermidine-secreting yeast on the cytotoxic effects of CIOM using an aqueous two-phase system.

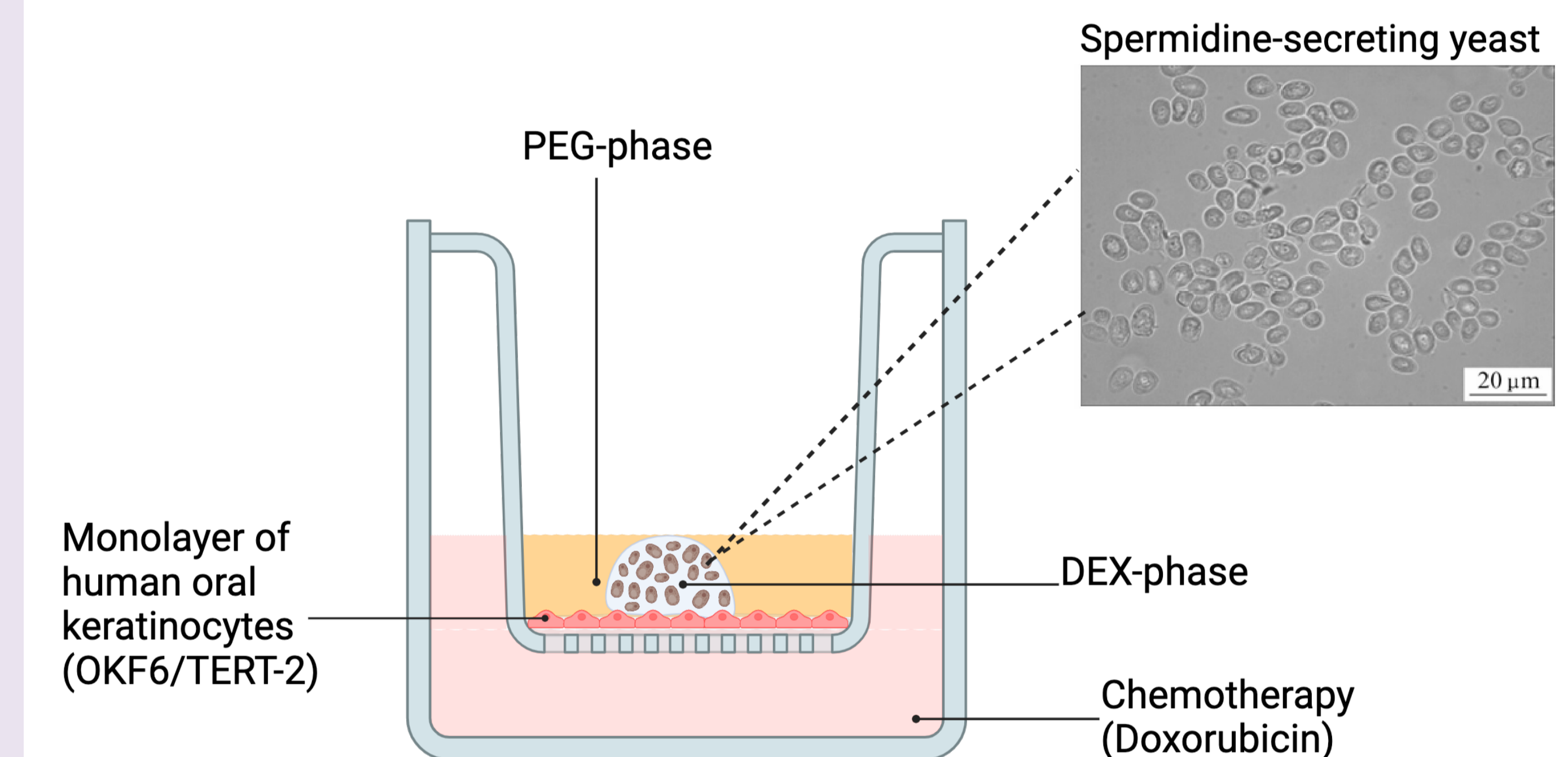
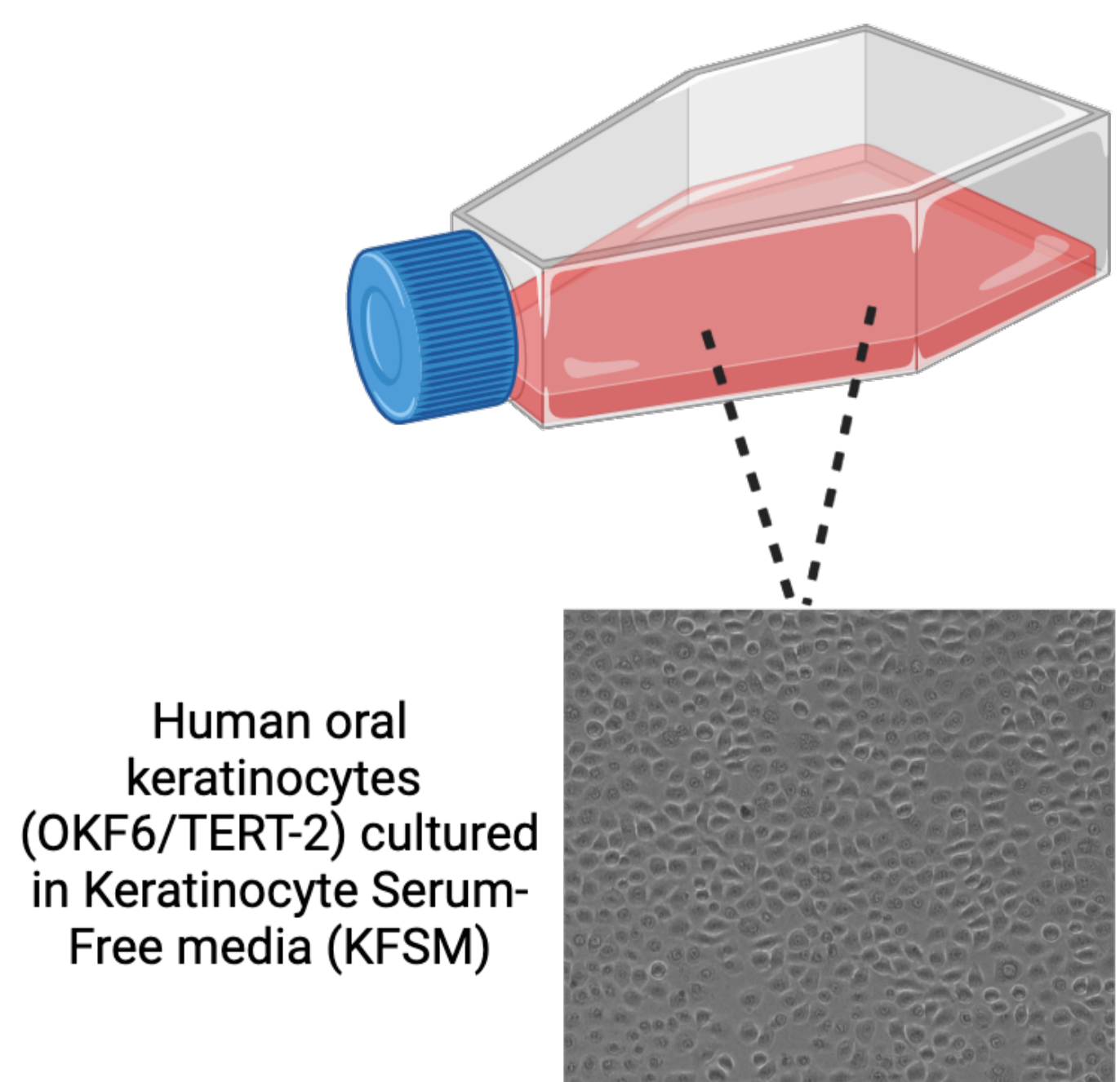


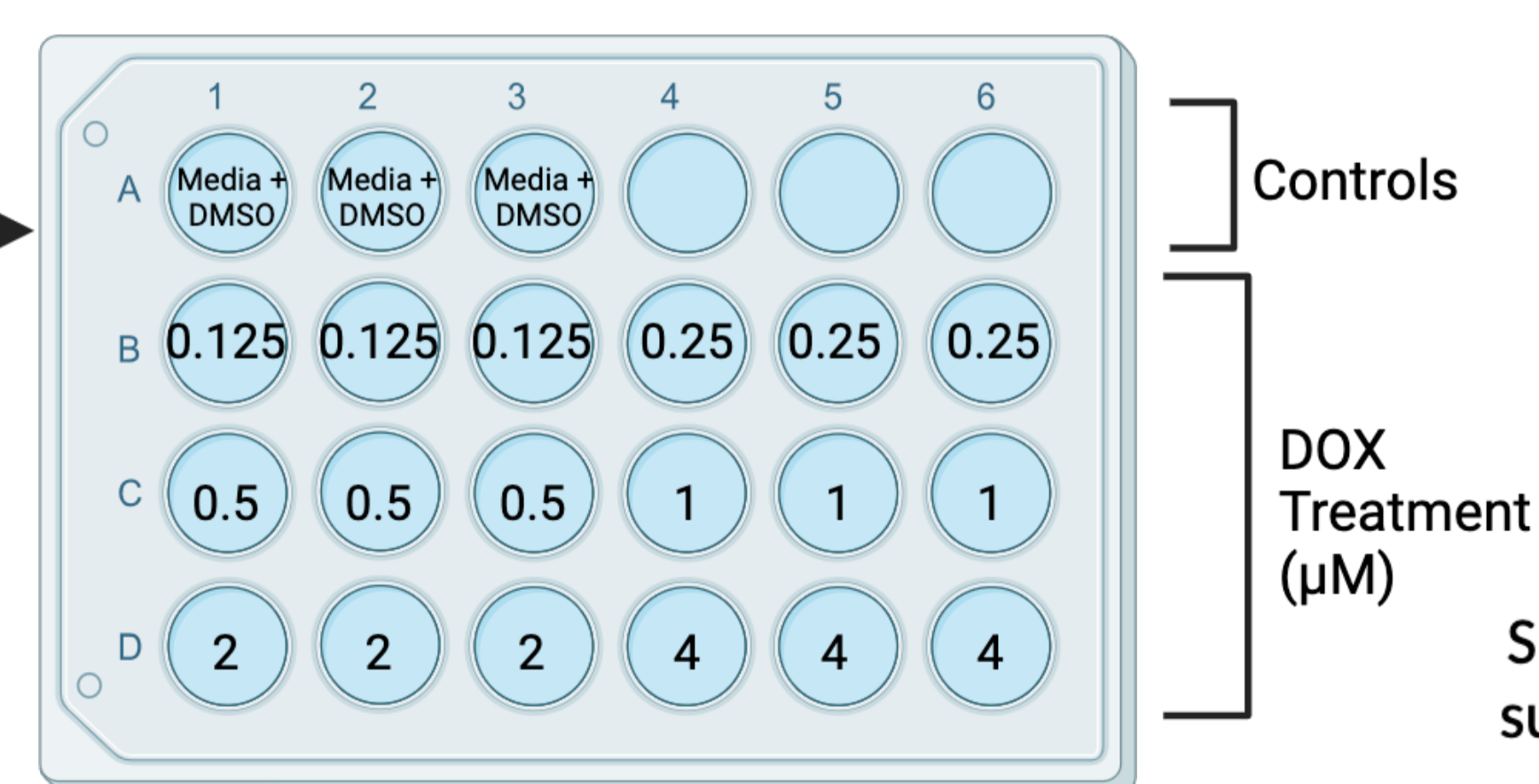
FIGURE 2 Schematic of a transwell model of spermidine-secreting yeast in an aqueous two-phase system (ATPS). Spermidine-secreting yeast are contained within dextran (DEX-phase) allowing the yeast to be confined but still chemically interact with OKF6/TERT-2 which are surrounded by polyethylene glycol (PEG-phase). OKF6/TERT-2 are treated basally with doxorubicin chemotherapy.

3. MATERIALS AND METHODS

Objective 1

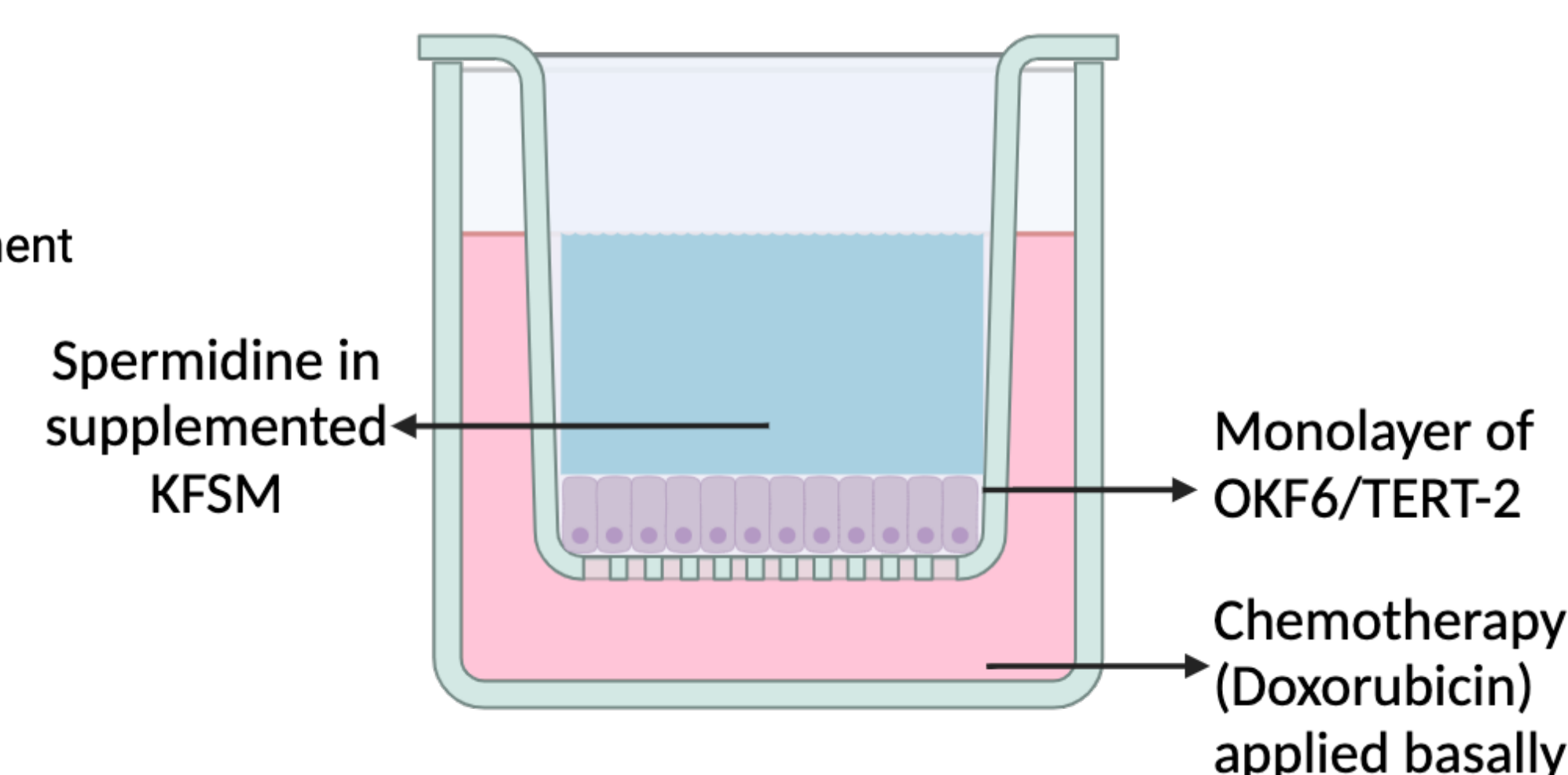


65,000 cells seeded per well



24hrs
alamarBlue assay to assess the metabolic activity of OKF6/TERT-2

Objective 2



References

- [1] - Lalla RV et al. 2009. Management of oral mucositis in patients with cancer. Dent Clin North Am. 52(1):61-77.
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- [3] - Niechcial A et al. 2023. Spermidine ameliorates colitis via induction of anti-inflammatory macrophages and prevention of intestinal dysbiosis. J Crohn's Colitis. 17(9):1489-1503.
- [4] - Kim S et al. 2017. Metabolic engineering of *Saccharomyces cerevisiae* for production of spermidine under optimal culture conditions. Enzyme Microb Technol. 101:30-35.

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