

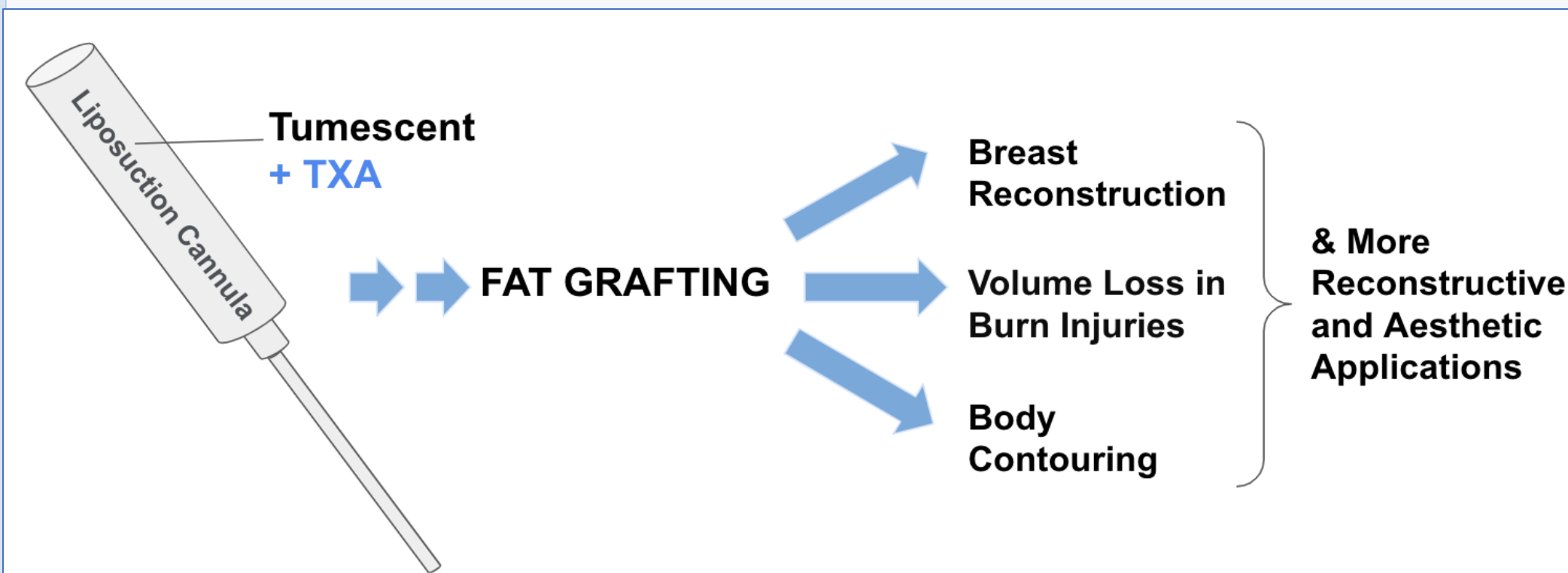
# Investigating the Influence of Tranexamic Acid on Adipocyte Differentiation in an In Vitro Model

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## INTRODUCTION:



Tranexamic acid (TXA) is gaining momentum in plastic surgery for its use in the tumescent fluid during liposuction due to reported reduction in blood loss and hematoma formation

## GAP IN KNOWLEDGE

For patients undergoing fat grafting procedures that use the TXA containing lipoaspirate, despite the surge in its application, the cellular effects of TXA on fat grafts have not been directly investigated.

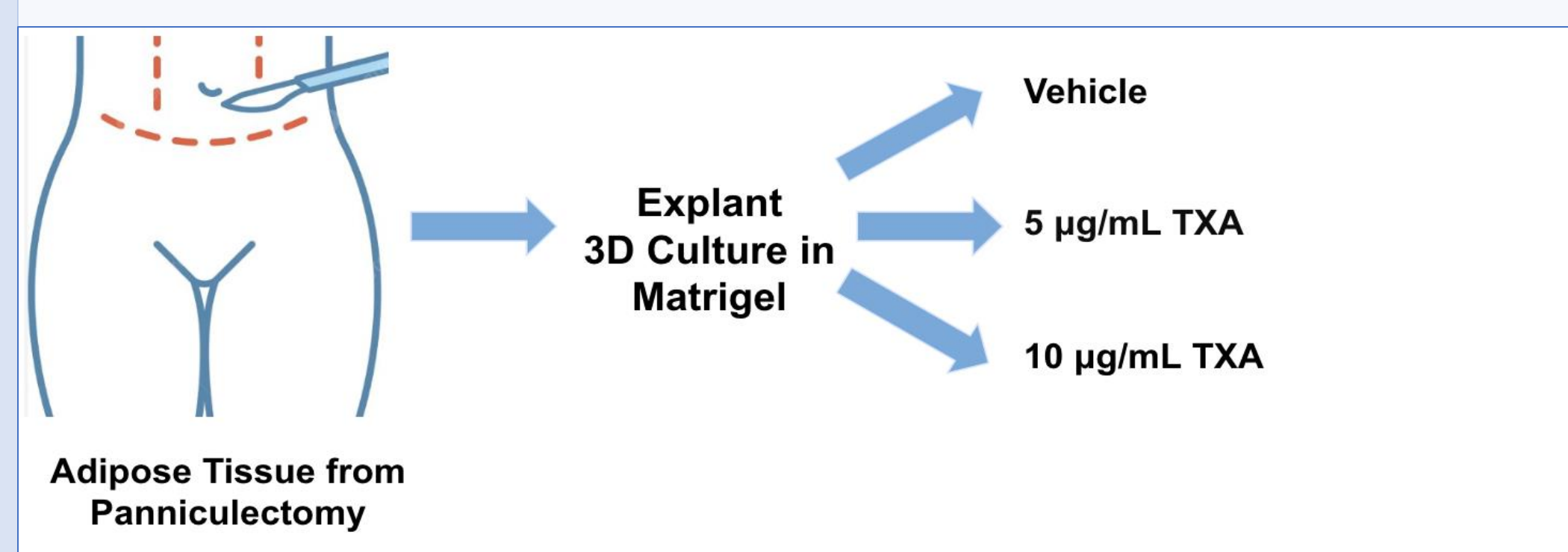
## AIMS

1. Employ an in vitro model to study the impact of TXA injections on the differentiation trajectory of progenitor cells towards adipocytes
2. Assess Adipocyte cell counts after exposure to varied concentrations of TXA
3. Quantify expression of adipogenic and thermogenic genes after TXA exposure

## REFERENCES:

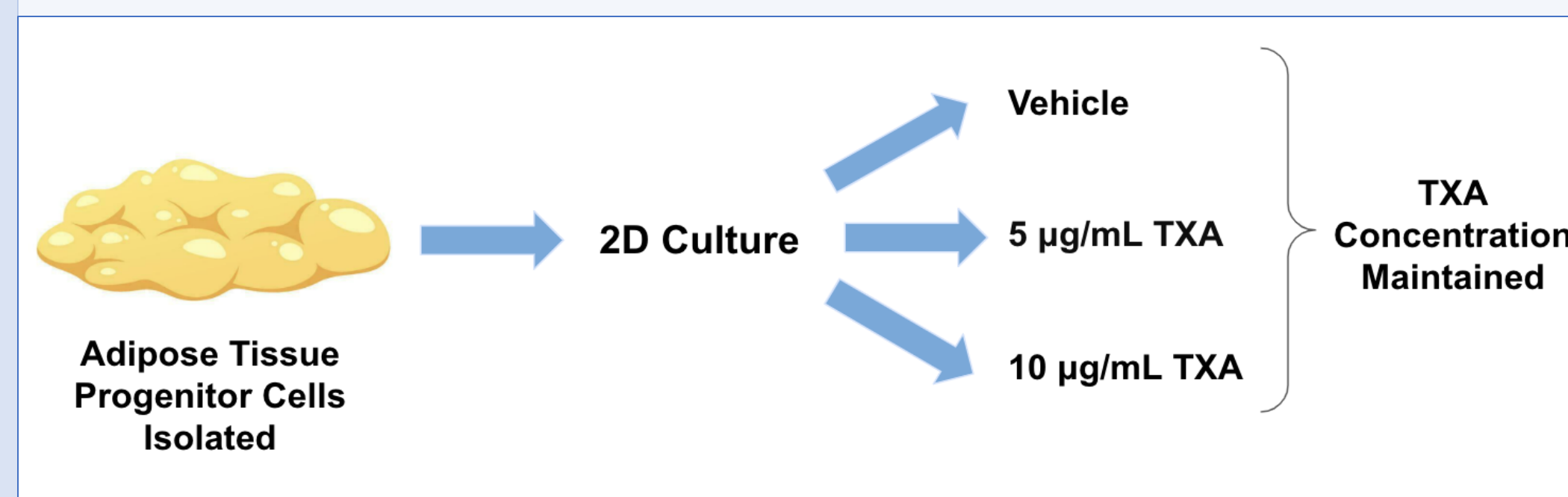
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## METHODS:



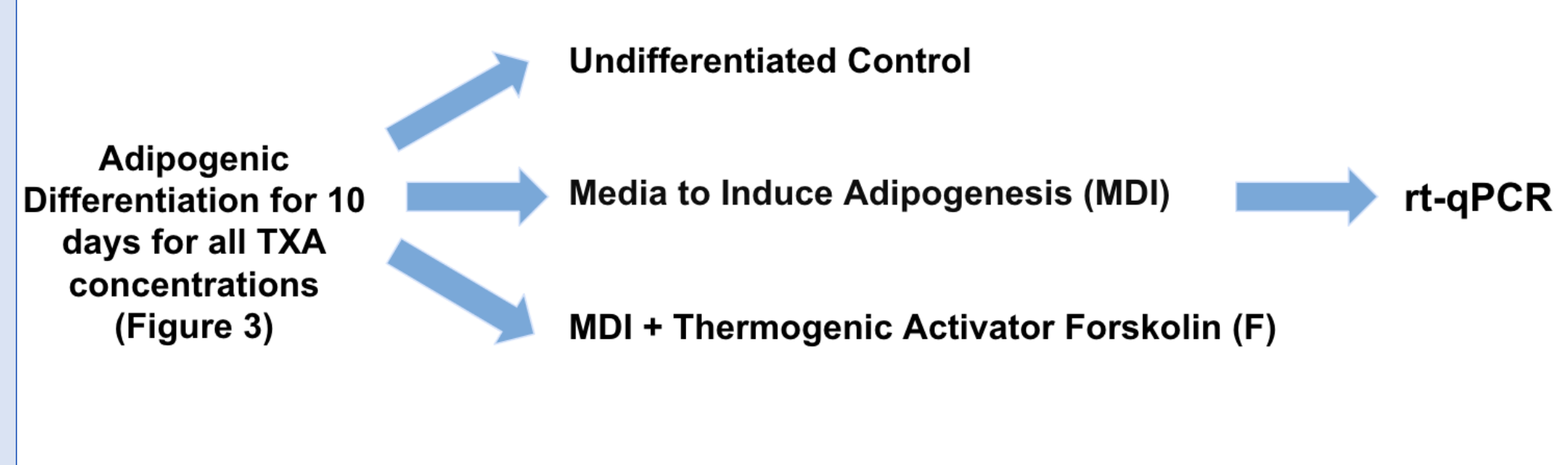
1. Adipose tissue explants from abdominal panniculectomy were cultured in a 3D system with various TXA concentrations (Vehicle, 5µg/mL, 10µg/mL)

14 Days Later (Figure 1)....



2. Human Adipose Capillary Associated Progenitor Cells (HACAPs) were isolated and cultivated in 2D cultures, maintaining the TXA concentrations. The growth rate of HACAPs was assessed through two expansions.

Growth Rate Assessed (Figure 2)

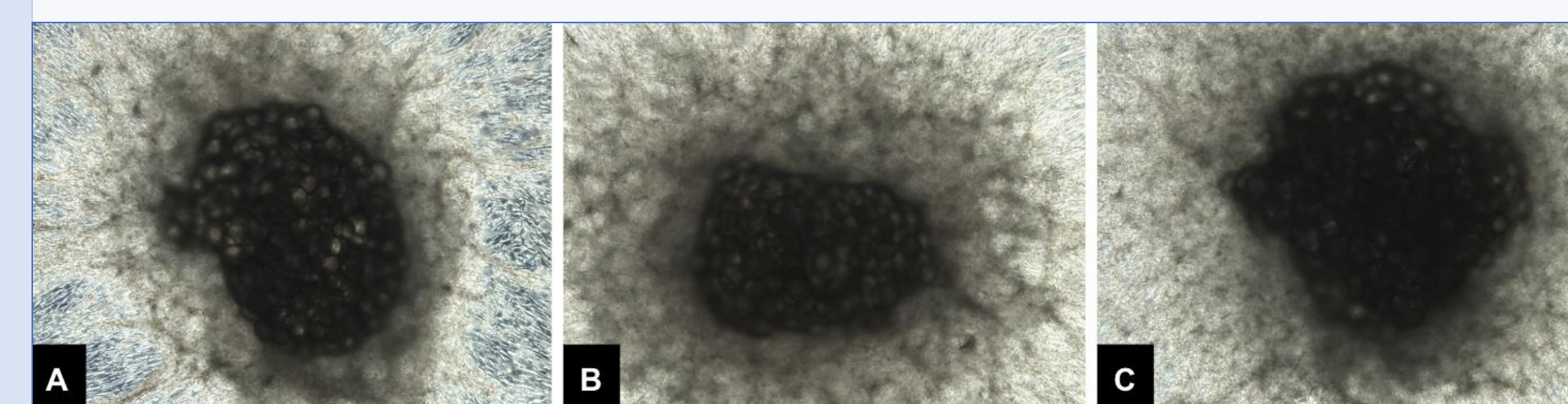


3. Cells underwent adipogenic differentiation for 10 days using MDI (Figure 3).

4. Three states were maintained: undifferentiated (C), MDI-differentiated (M), and a set exposed to MDI and Forskolin (F), an activator promoting thermogenesis. The effects of TXA on differentiation and thermogenesis were analyzed via rt-qPCR for gene expression (Figure 4).

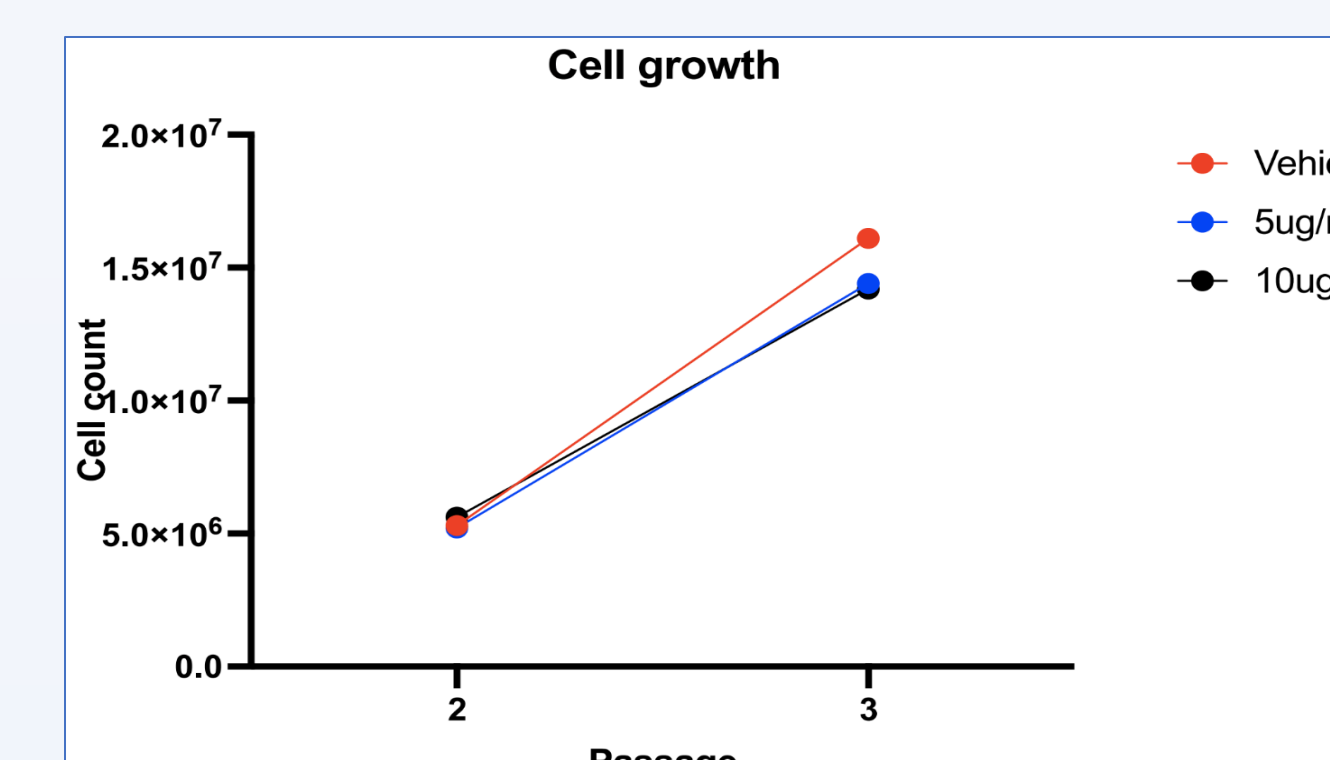
## RESULTS:

Figure 1: Capillary Sprouting in Explants



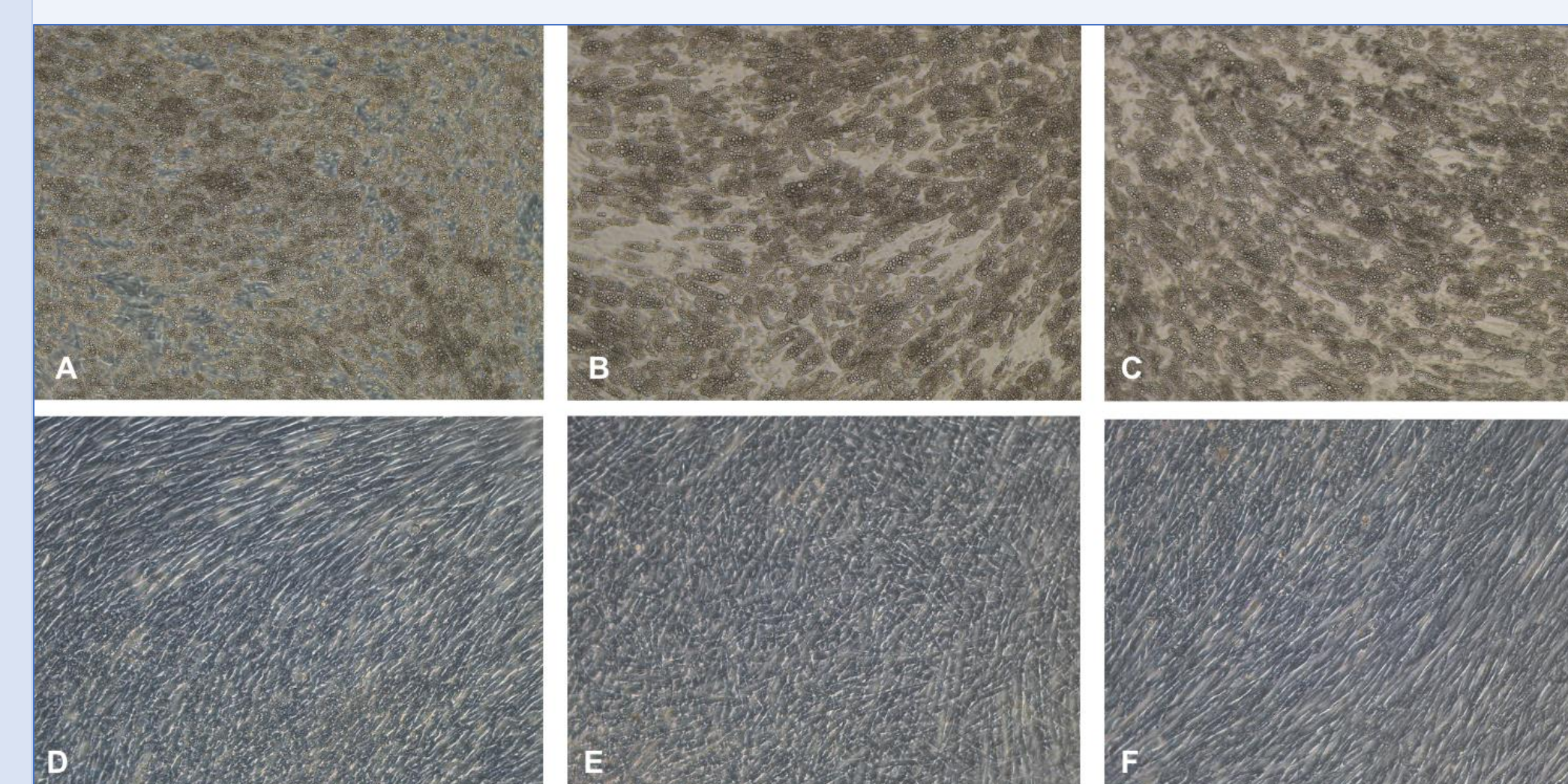
Adipose explants on day 12 cultured maintained in a medium with various concentrations of TXA: A) vehicle control (0 µg/mL), B) 5 µg/mL, and C) 10 µg/mL show no difference in capillary sprouting.

Figure 2: Growth of Cells After Plating for 2D Culture



Cells were plated and counted (passage 2) and then recounted (passage 3) after 72 hours. No differences in cell growth are notable between groups.

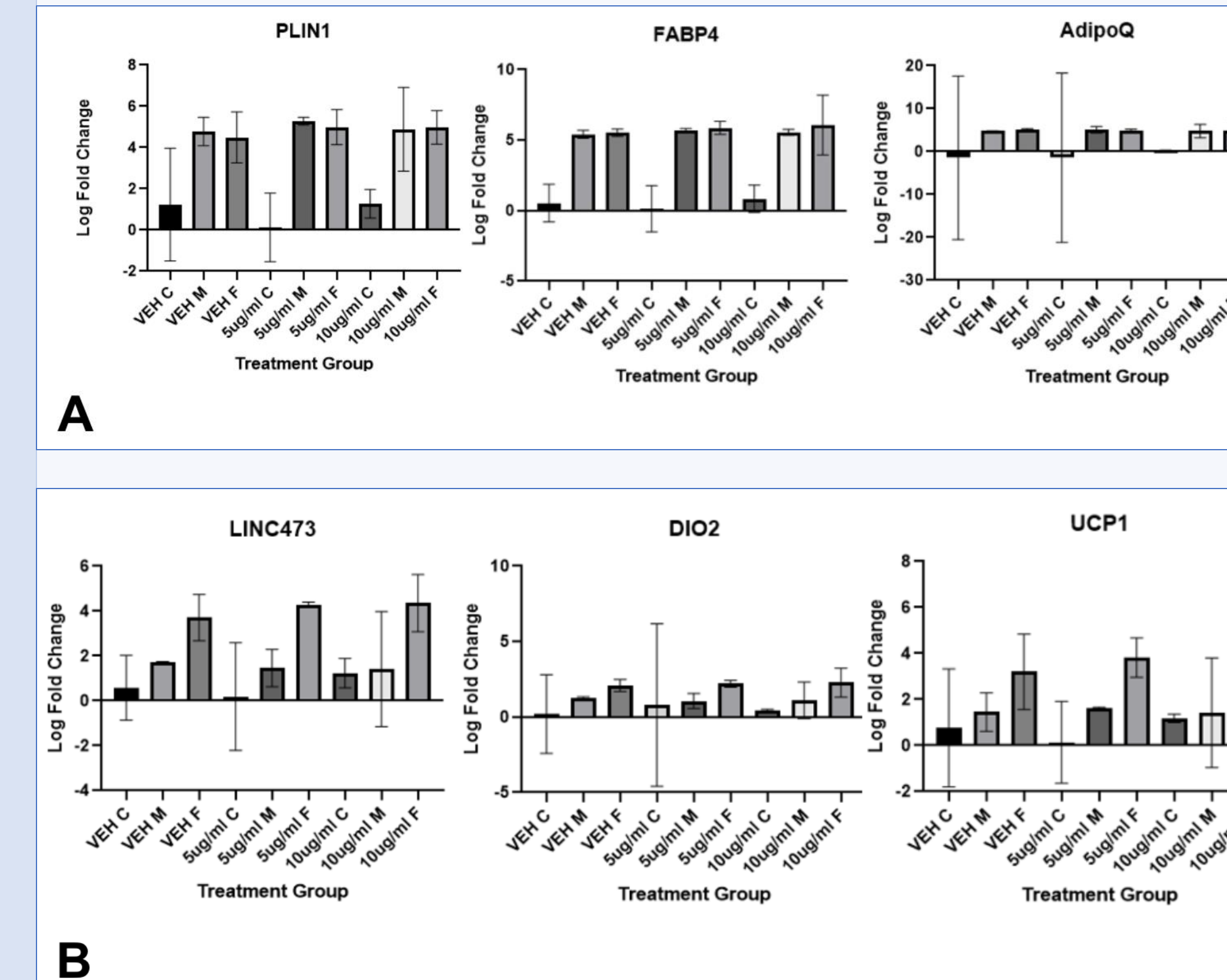
Figure 3: Day 10 of Adipocyte Differentiation



Adipocyte differentiation on Day 10 with MDI and A) vehicle control (0 µg/mL), B) 5 µg/mL, and C) 10 µg/mL of TXA show no differences in differentiation. This is compared with control media and D) vehicle control (0 µg/mL), E) 5 µg/mL, and F) 10 µg/mL TXA which show undifferentiated samples.

## RESULTS CONTINUED:

Figure 4: Gene Expression



Expression of adipogenic (A) and thermogenic genes (B) are unchanged between TXA and vehicle control treated samples.

## CONCLUSIONS:

Our study indicates that...

- TXA does not significantly alter the differentiation of mesenchymal progenitors in fat grafting
- TXA is not a detrimental additive to tumescent solutions for patients undergoing fat grafting
- Given the growing use of TXA in plastic surgery, this consistency in cellular response is reassuring