Prostaglandin E_2 and $F_{2\alpha}$ secretion is reduced by conjugated linoleic acid supplementation during *in vitro* bovine trophoblastic cells culture

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INTRODUCTION

Early embryo mortality leads to reproductive failure in animals resulting in reduced pregnancy rates. Reproductive failure and embryonic loss in cattle are some of the largest economic burdens to cattle producers. Strategies that can benefit the maternal-fetal recognition, such as decrease prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) synthesis and increase synthesis of prostaglandin E_2 (PGE_2), are fundamental to establishment of pregnancy. Conjugated linoleic acid (CLA) supplementation in cell culture medium affects the synthesis of prostaglandins however, the effect of CLA supplementation on cultured bovine trophoblast cells (CT1) has not been determined.

HYPOTHESIS

Our hypothesis is that CLA supplementation on *in vitro* culture medium of CT1 cells increase synthesis of PGE_2 and decrease synthesis of $PGF_{2\alpha}$, benefiting the establishment of pregnancy.

OBJECTIVE

The objective was to determine the effects of varying concentrations of CLA supplementation (Sigma-Aldrich, USA, Cat N°. O5507) on PGE_2 and $PGF_{2\alpha}$ synthesis by *in vitro* culture of CT1 cells.

MATERIAL AND METHODS

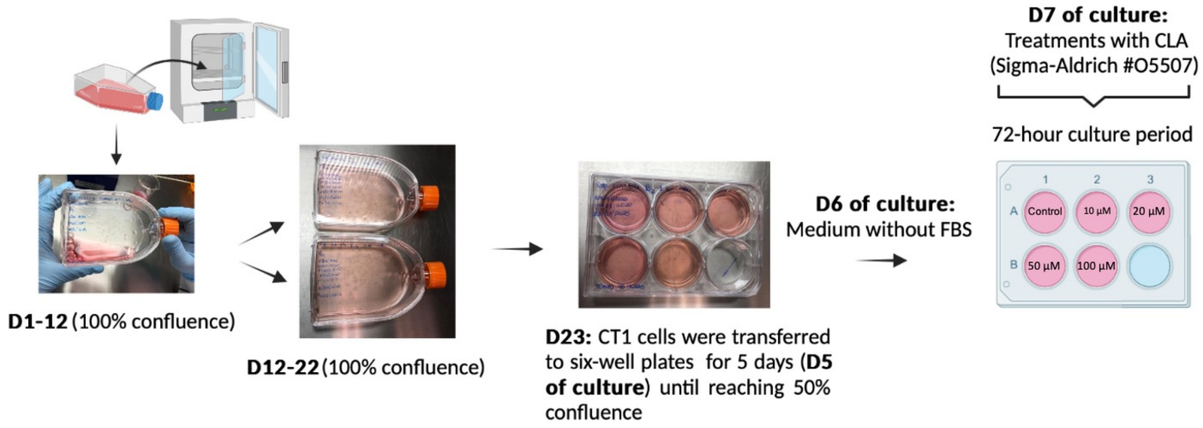

Figure 1. ***Culture of bovine trophoblast cells:*** The CT1 cells were cultured in a humidified incubator at 38.5°C with 5% CO_2. Collected medium was stored at –20°C until analysis. A total of five culture replicates were performed.

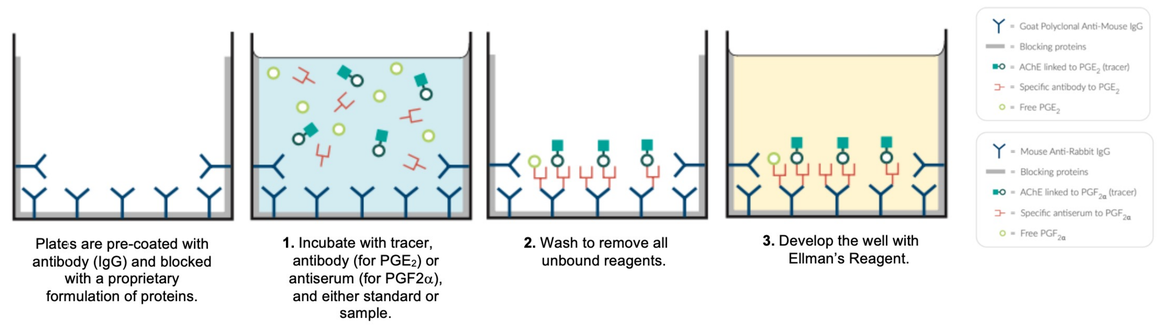

Figure 2. Schematic of the AChE ELISA.

* Booklet image available at: https://www.caymanchem.com

Statistical analyzes were performed using the PROC MIXED of SAS program (version 9.2, SAS Institute Inc., Cary, NC, USA) considering the main effect of treatment group and the random effect of culture replicate.

RESULTS

Table 1. Effect of conjugated linoleic acid (CLA) supplementation on *in vitro* culture medium of bovine trophoblast cells on prostaglandin synthesis (ng/mL)

	72 h[#]					
	CLA[‡] concentration (µM)					
	0	10	20	50	100	*P* value
PGE_2	78.43 ± 11.92[a]	47.67 ± 7.40[b]	54.60 ± 6.37[b]	52.43 ± 3.42[b]	56.40 ± 3.18[b]	0.02
$PGF_{2\alpha}$	67.87 ± 7.28[a]	27.15 ± 7.94[b]	21.58 ± 4.92[b]	16.58 ± 0.25[b]	20.04 ± 2.39[b]	< 0.0001
Ratio[†]	1.14 ± 0.06[c]	1.98 ± 0.29[b]	2.72 ± 0.24[a]	3.16 ± 0.18[a]	2.90 ± 0.22[a]	< 0.0001

Values are expressed as mean ± S.E.

[a, b, c] Different letters in the same row indicate that the groups differ significantly ($P < 0.05$).

[#] The CT1 cells culture medium was supplemented with varying CLA concentrations for 72 hours.

[‡] CT1 cells were exposed to a mixture of *cis*- and *trans*-9, 11- and -10, 12-octadecadienoic acid.

[†] Ratio were calculated as the concentration of PGE_2 divided by $PGF_{2\alpha}$.

CONCLUSION

We conclude that CLA treatment for 72 hours on *in vitro* culture medium of CT1 cells decreased PGE_2 and $PGF_{2\alpha}$ synthesis, but a CLA dose-dependent effect was observed on $PGE_2/PGF_{2\alpha}$ ratio.

Acknowledgement: FAPESP grants #2018/24168-1 #2019/00637-5