Effect of cis-9, trans-11 and trans-10, cis-12-conjugated linoleic acid (CLA) on bovine PBMCs apoptosis and viability

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Introduction

- CLA is a group of naturally occurring isomers of linoleic acid (LA)
- Formed during biohydrogenation of LA in rumen and endogenous synthesis
- Two main isomers: 9c, 11t and 10t,12c-CLA
- Immunomodulatory properties in cows have been reported
- Enhanced effects with the blend of both isomers
- The effects of CLA on bovine PBMCs remain undisclosed
- CLA effect on ruminant PBMCs apoptosis is yet unknown

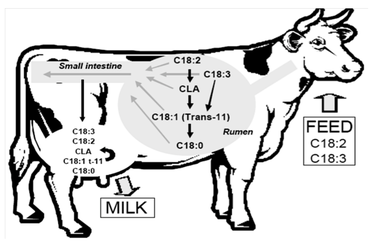

Figure 1: CLA synthesis in rumen and mammary gland in cows

Aims

1. To determine the in vitro effect of different concentrations of 9c,11t and 10t,12c-CLA isomers on the apoptosis and viability of bovine PBMCs.
2. To compare the differential effects of the blend 50:50 of both CLA isomers, as well of other unsaturated and saturated fatty acids on bovine PBMCs apoptosis and viability.

Materials and Methods

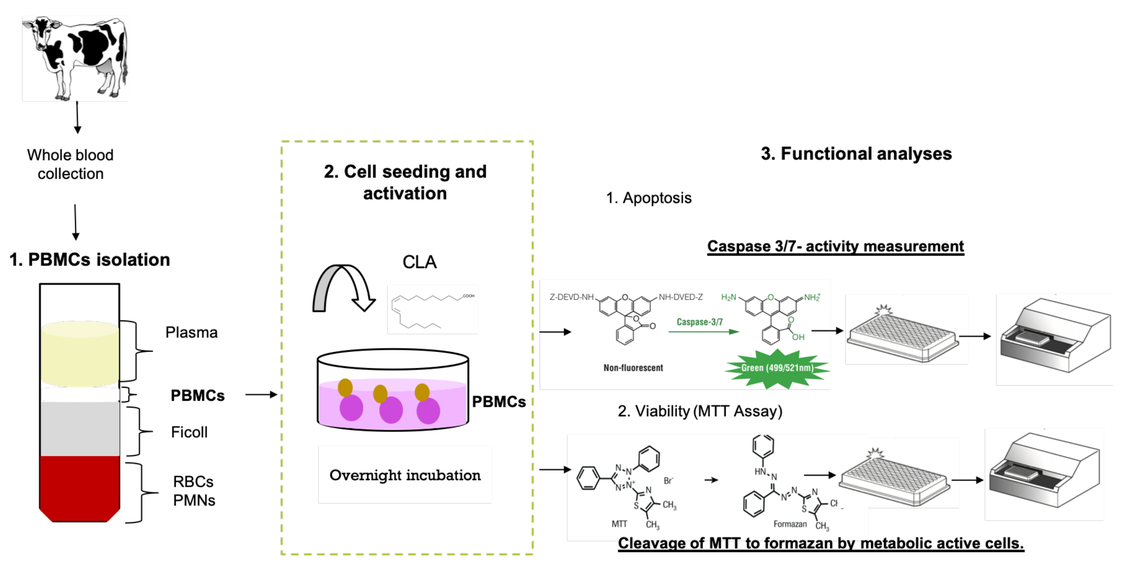

Figure 2: Experimental design. Bovine PBMCs purification, CLA activation and lifespan assessment

Results

1. Effect of 9c,11t and 10t,12c-CLA isomers on bovine PBMCs apoptosis and viability

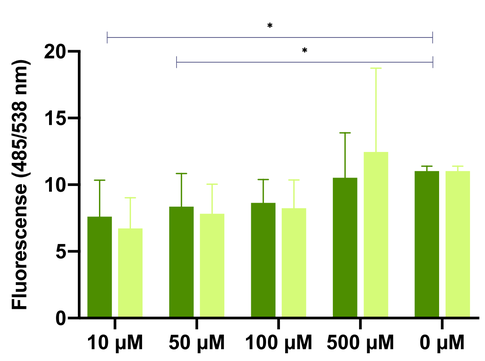

Figure 3: The caspase-3/7 enzymatic activity of bovine PBMCs after incubation with 9c,11t-CLA and 10t,12c-CLA isomers

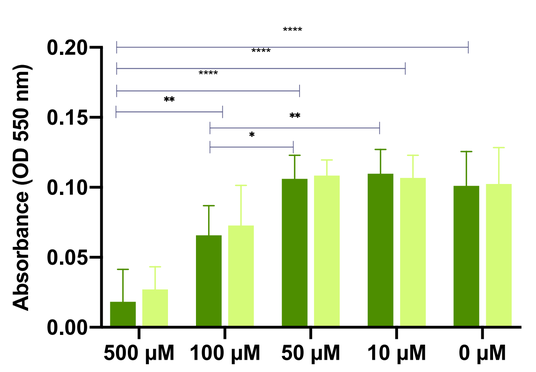

Figure 4: Viability of bovine PBMCs after incubation with 9c,11t and 10t,12c-CLA isomers

2. Effect of unsaturated and saturated fatty acids on bovine PBMCs spontaneous apoptosis

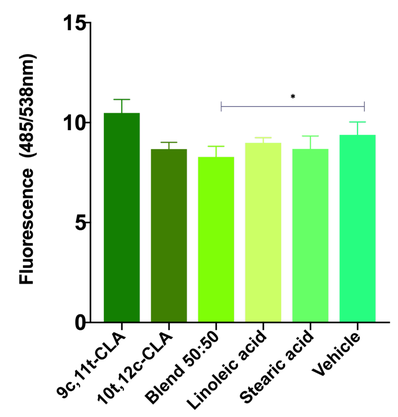

Figure 5: The caspase-3/7 enzymatic activity of bovine PBMCs after incubation with saturated and unsaturated fatty acids

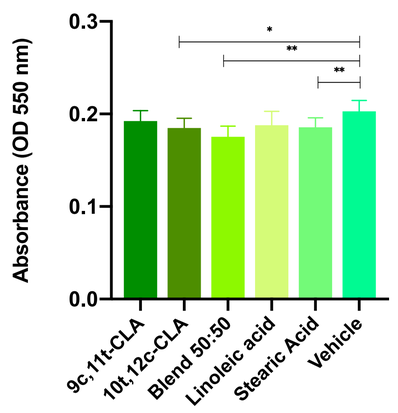

Figure 6: Viability of bovine PBMCs after incubation with saturated and unsaturated fatty acids

Conclusions

- 9c,11t-CLA reduced bovine PBMCs apotosis at lower concentrations (10 and 50 μM)
- Bovine PBMCs viability was reduced with both CLA isomers at the highest concentration (500 μM)
- A decreasing trend on bovine PBMCs viability was also observed at 100 μM of both CLA isomers
- The blend of both CLA isomers at 50 μM reduced bovine PBMCs spontaneous apoptosis, but also their viability

Future perspectives

- Assess the in vitro impact of unsaturated and saturated fatty acids on other monocytes' immune related functions such as: chemotaxis, ROS production, phagocytosis and killing capability

Acknowledgements

Our sincere thanks to MANNA–European Joint Doctorate in Molecular Animal Nutrition, Marie Skłodowska-Curie Innovative Training Networks. This project has received funding from the European Union's Horizon 2020 research and innovation programme.