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New Zealand Goat Milk Reduces Gut Damage by Indomethacin

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New Zealand goat milk reduces gut damage by indomethacin

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Introduction

Indomethacin is frequently prescribed for treatment of arthritis and muscuskeletal injury, but can induce gastric and intestinal ulceration, blood loss and increased intestinal permeability (Playford *et al.*, 2001).

Bovine colostrum prevents gastro-interstinal injury and ulceration in rats and mice (Playford *et al.*, 1999) and intestinal permeability in humans (Playford *et al.*, 2001).

We examined the effectiveness of New Zealand goat milk powder in preventing induced gut damage by indomethacin.

Treatments

Trial 1:

3 groups (n=5) of 10-12 week old female Sprague Dawley rats:

1. Control
   No supplement, no indomethacin
2. Indomethacin
   No supplement
3. Goat milk powder + indomethacin
   Rats fed 1.7 g/kg/day New Zealand goat milk powder as a single feed for seven days, then given indomethacin.

Trial 2:

6 groups (n=8) of 6-8 week old female Sprague Dawley rats:

1. Control
   No supplement, no indomethacin
2. Indomethacin
   No supplement
3. Bovine colostrum + indomethacin
4. Goat whole milk + indomethacin
5. Goat milk based formulation + indomethacin
   Supplement was given at 0.9 g/kg/day, split into two feeds, for seven days.

Indomethacin injected s.c. (75 mg/kg) once daily on the last two days in both trials.

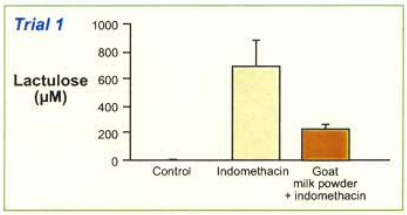
Assessment of small intestinal damage:

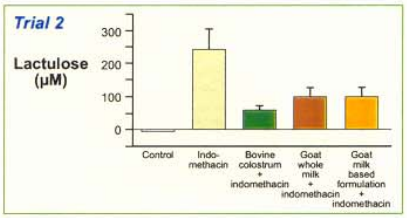
Three parameters were tested 24 hours after last indomethacin treatment.

Intestinal permeability

0.5 ml containing 66 mg lactulose + 50 mg mannitol given orally by gavage. Lactulose in plasma measured after 90 min.

Results: Plasma lactulose significantly elevated due to indomethacin, but less so in all supplemented rats. The effect is repeatable with different goat milk formulations and comparable to the effect of bovine colostrum.

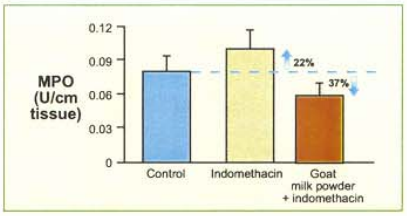




Intestinal inflammation

Myeloperoxidase (MPO) activity in tissue taken mid-way along small intestine.

Results: MPO elevated 22% by indomethacin, relative to control. MPO reduced 37% relative to control (P=0.05) in goat milk powder supplemented rats.



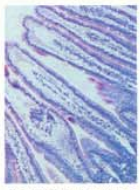
Villi damage

Tissue samples from the mid region of the small intestine were removed and fixed for 2 hours in Methacarn followed by paraffin embedding. Tissue sections were stained in H and E and alcian blue.

Results: Marked thickening and shortening of intestinal villi caused by indomethacin. Much less severe in rats receiving goat milk powder.


Control


Indomethacin


Goat milk powder + indomethacin

Conclusions

New Zealand goat milk powder reduced gut leakiness, inflammation and villi damage caused by indomethacin.

Twice daily supplementation with New Zealand goat milk almost as effective as bovine colostrum.

Effect is repeatable with different New Zealand goat milk formulations at doses as low as 0.9 g/kg/day.

Equivalent daily dose for humans would be two 250 ml servings (assuming 70 kg bodyweight and 30-40 g per 250 ml serving).

Results highlight the positive benefits on small intestinal function of taking New Zealand goat milk products.

Playford RJ, Floyd DN, MacDonald CE, Calnan DP, Adenekan RO, Johnson W, Goodlad RA, Marchbank T, (1999) *Gut* 44, 653.

Playford RJ, MacDonald CE, Calnan DP, Floyd DN, Podas T, Johnson W, Wicks AC, Bashir O, Marchbank T (2001) *Clin Sci* 100, 627.