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Bovine colostrum is a health food supplement which prevents NSAID induced gut damage.

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**Bovine colostrum could provide a novel, inexpensive approach for the prevention and treatment of the injurious effects of NSAIDs on the gut and may also be of value for the treatment of other ulcerative conditions of the bowel. (*Gut* 1999;44:653–658)**

Bovine colostrum preparations are currently available in the USA, UK, and the rest of Europe as “over the counter” health food supplements. They do, however, contain large amounts of potent growth factors which we have shown are capable of influencing cell growth and migration in vitro and reducing indomethacin induced gut injury in vivo. When an acute mucosal injury occurs, the initial phase of the repair process is the rapid migration of surviving cells over the denuded area, to reestablish a continuous epithelial layer. This begins within the first hour following injury and is termed “restitution”. It is followed by a much slower increase in cell proliferation and remodelling.

#### **Abstract**

**Background**—Non-steroidal anti-inflammatory drugs (NSAIDs) are effective for arthritis but cause gastrointestinal injury.

Bovine colostrum is a rich source of growth factors and is marketed as a health food supplement.

**Aims**—To examine whether spray dried, defatted colostrum or milk preparations could reduce gastrointestinal injury caused by indomethacin.

**Methods**—Effects of test solutions, administered orally, were examined using an indomethacin restraint rat model of gastric damage and an indomethacin mouse model of small intestinal injury. Effects on migration of the human colonic carcinoma cell line HT-29 and rat small intestinal cell line RIE-1 were assessed using a wounded monolayer assay system (used as an in vitro model of wound repair) and effects on proliferation determined using [<sup>3</sup>H]thymidine incorporation.

**Results**—Pretreatment with 0.5 or 1 ml colostrum preparation reduced gastric injury by 30% and 60% respectively in rats. A milk preparation was much less efficacious.

Colostrum increased proliferation and cell migration of RIE-1 and HT-29 cells. These effects were mainly due to constituents of the colostrum with molecular weights greater than 30 kDa.

#### **Results**

## IN VIVO STUDIES

### *Gastric injury model*

Colostrum caused a dose dependent reduction in the amount of gastric injury resulting from indomethacin and restraint (fig 1A).

### *Colostrum prevents gut damage 655 Cell migration as a model of wound repair*

Addition of colostrum to HT-29 cells or RIE-1 cells resulted in a dose dependent increase in cell migration. For the HT-29 cells, maximal stimulation was seen at 30% vol/vol, resulting in a fourfold increase in migration. Similar results were seen with the RIE-1 cell line. Size exclusion studies showed that predominant promigratory activity was present in both the 10–30 kDa (accounting for about 40% of the effect of adding whole colostrum) and the >30 kDa fractions (accounting for about 60% of the effect of adding whole colostrum; fig 4). These percentage activities were similar in both cell lines.

## **Discussion**

We have used several well validated in vivo and in vitro models to investigate the potential value of defatted milk and colostrum preparations in reducing NSAID induced gastrointestinal damage.

Animal models showed that gastric and small intestinal injury caused by indomethacin could be reduced by colostrums and that a similarly prepared milk solution was far less efficacious.

For the in vitro studies, rat small intestinal (RIE-1) and human colonic (HT-29) cells were used to show that these effects were not species specific and because administration of NSAIDs causes damage throughout the entire gastrointestinal tract. studies examining the potential beneficial effect of colostrum on gastric injury were performed using rats as we have previously validated this model for other growth factor studies (for example, Playford *et al*). Similarly, mice were used for studying the effect of colostrum on indomethacin induced small intestinal injury as we have previous experience of using this model to assess effects of other regulatory peptides.<sup>9</sup> In addition, we have found that mouse tissue is much easier to process and microdissect than the equivalent rat tissue (unpublished observation).

**Conclusions—Bovine colostrum could provide a novel, inexpensive approach for the prevention and treatment of the injurious effects of NSAIDs on the gut and may also be of value for the treatment of other ulcerative conditions of the bowel. (*Gut* 1999;**44**:653–658)**

**Bovine colostrum preparations are currently available in the USA, UK, and the rest of Europe as “over the counter” health food supplements. They do, however, contain large amounts of potent growth factors which we have shown are capable of influencing cell growth and migration in vitro and reducing indomethacin induced gut injury in vivo. When an acute mucosal injury occurs, the initial phase of the repair process is the rapid migration of surviving cells over the denuded area, to reestablish a continuous epithelial layer. This begins within the first hour following injury and is termed “restitution”. It is followed by a much slower increase in cell proliferation and remodelling.**

*Life is full of choices – Let your choice be full of Life”*