

# LOW COST COW/CALF PRODUCTION

The Bulletin For Alumni Of The School

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## Big Tummys

Recall our discussions, during the School, about growth? There are two kinds of growth. The formation of new cells is called cell proliferation or hyperplasia. The second kind of growth is cell filling, which is called cell enlargement or hypertrophy. Remember, in the case of nervous, skeletal and muscle tissues, cell proliferation almost is completed by 13 days of age. New fat cells can be formed later in life. Cell proliferation continues throughout life with hair, skin and the GI tract. Cell enlargement can continue throughout life as well. Cells are filled, emptied and refilled continually.

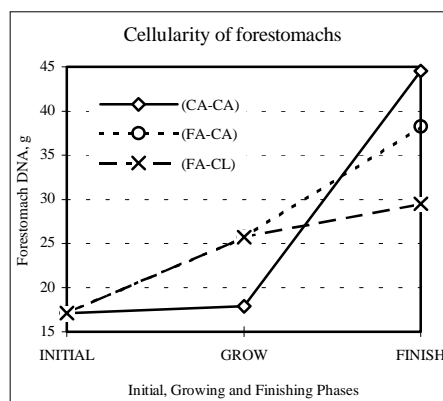
## You Are What You Eat

The disastrous effect of limiting consumption of a palatable oil meal with salt is an example of new intestinal cells developing in a high-salt environment. If diet can affect tissues negatively, can it have a positive effect? All Ranchers would like their cows to have larger rumens for more feed consumption and utilization. It would be perfectly all right if more nutrients crossed the intestinal wall. In a recent report, researchers from UC Davis<sup>1</sup> examined cell proliferation and cell enlargement in the forestomachs and intestines of growing beef steers. Since each cell has a definitive amount of DNA, the amount of DNA in any tissue is a reflection of the number of cells in that tissue. The weight of an organ and/or its protein content are indicative of how full those cells are (cell enlargement). The researchers used these measurements in their investigation. After an initial slaughter group, steers weighing 522 lb were allotted to one of two diets. The concentrate (C) diet contained 15% hay and the rest concentrate while the forage (F) diet consisted of 64% hay and 32.1% straw. Both diets were fed ad libitum (CA) and (FA) during the growing phase of the study – 522 to 796 lb. During the finishing phase (796 to 1060 lb) the CA steers continued to receive the concentrate diet ad libitum (CA-CA). The cattle that were fed the forage diet were split into

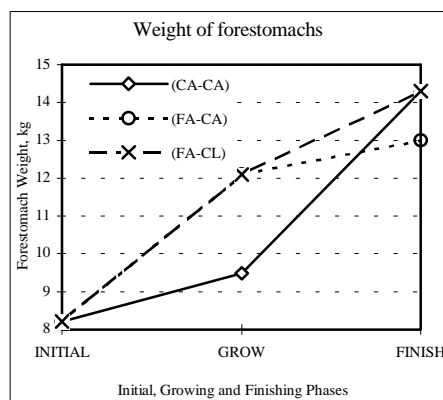
two groups. One group was fed the concentrate diet ad libitum (FA-CA). The second group also received the concentrate diet but was limited to 70% of that consumed by the free-choice group (FA-CL). Steers were slaughtered and tissues sampled at the conclusion of each phase.

## Gormandizing?

At the end of the growing phase, forestomach tissue of the forage-fed steers contained 1.4 times the amount of DNA as did tissue from CA-CA. Thus, diet had a huge

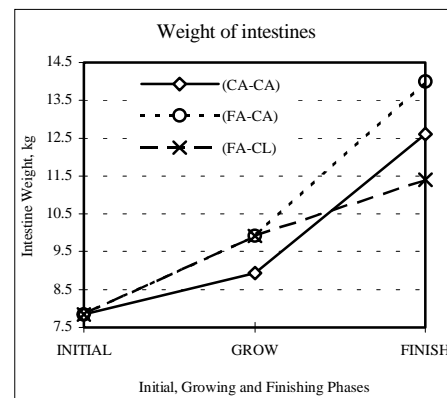


impact on cell proliferation. By the end of the finishing phase, however, (CA-CA) had produced new cells at a faster rate than did the FA-FA or FA-CL. The weight (cell enlargement) of the forestomachs of the forage-fed cattle was 28% greater than that of the concentrate-fed cattle. This dif-

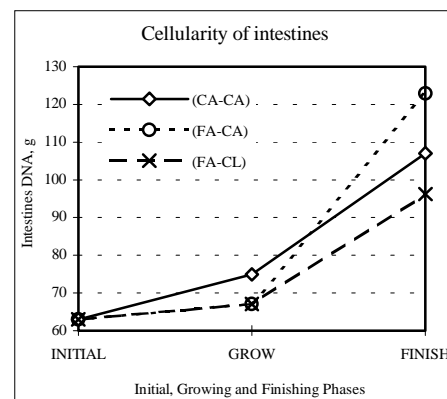


ference was lost during the finishing phase. It is obvious that diet did impact both cell proliferation and enlargement during the growing phase. The authors concluded that there was not a clear growth pattern by the end of the finishing phase. Weights of intestines were greater for FA-CA at the conclusion of the grow-

ing and finishing phases. Since the diets were the same during the last period, the differences were the result of the fiber fed



during the growing phase. Diet restriction during the finishing phase appeared to re-



duce the DNA content (cell proliferation) of the intestines. Cell proliferation, however, was the major contributor to intestinal growth. **The influence of food!**

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<sup>1</sup> Sainz, R.D. and B.E. Bentley. 1997. Visceral organ mass and cellularity in growth-restricted and refed beef steers. J. Anim. Sci. 75:1229.