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Letters to the Editor

Banning front-of-package food labels

Response to Lytton

Madam,

In his thoughtful paper about front-of-package food labels, Timothy Lytton states that a ban on such labels would violate First Amendment provisions of the US Constitution. Lytton cites case law to argue that lower courts have consistently interpreted the First Amendment as providing guarantees of free commercial speech.

Indeed they have, and in 2003, the Bush Administration Food and Drug Administration (FDA) stopped defending against misleading health claims cases on First Amendment grounds.

We are not lawyers and make no pretense of arguing case law. However, it seems obvious to us that this interpretation of the First Amendment neither follows its original intent, nor promotes the public interest. The founding fathers clearly intended the First Amendment to guarantee the right of individuals to speak freely about religious and political matters, not the right of food companies to market junk foods to children and adults.

Laws are subject to reinterpretation and change, as the history of civil rights legislation makes clear. That politics influences interpretation of the law at the highest level is evident from the US Supreme Court's decisions in *Bush v. Gore* (2000) and *Citizens United v. Federal Election Commission* (2010).

We think the time has come for major legal challenges to the right of corporations to mislead the public on the grounds of free speech. The front-of-package health claims controversy demands immediate attention. We hope that legal scholars will examine current food marketing practices in the light of the First Amendment and establish a firm legal basis for bringing this issue back to court. Lytton's arguments make the need for such reconsideration perfectly evident.

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Vitamin D content of meat

Are all steaks created equal?

Madam

In a recent analysis of plasma concentrations of 25-hydroxyvitamin D (25(OH)D) in meat eaters, fish eaters, vegetarians and vegans[1], the authors reported that the magnitude of difference of 2·4 μg/d in calculated dietary vitamin D intake between meat eaters (3·1 μg/d) and vegans (0·7 μg/d) and the overall difference in the plasma concentration of 25(OH)D of 21 nmol/l were surprising. One could even conclude that eating meat accounts for more than 25 % of the total circulating pro-hormone in this cohort, although meat eaters may also consume other good sources (fish, dairy and eggs) of vitamin D. The difference was considerably larger (by a factor of four to eight) than could be predicted by vitamin D intervention studies which relate intake of vitamin D to plasma levels of the pro-hormone. Vitamin D intake was calculated from the amount of food and the nutrient content from food composition tables. The findings are of considerable interest as meat eaters had a higher BMI than vegans and less vigorous exercise but equal summer outdoor activity, excluding cutaneous biosynthesis of vitamin D_3 via UV-B as a major factor for the difference. Furthermore, the data suggested that more meat consumption is accompanied by higher 25(OH)D levels. Considering the current debate about the relationship between vitamin D status and health, the results are new, perhaps provocative and need confirmation.

One possible explanation, in addition to other factors such as calcium intake or supplements considered by the authors, is that the calculated vitamin D content from food tables[2] does not reflect the true intake, as many data are from specimens analysed decades ago. A survey of the more recent literature on vitamin D content of animal feeds is interesting in this context. The poultry and cattle industries appear to have optimized their feeds with respect to vitamin D. For example, chicken feed is recommended to contain between 35 and 70 μg vitamin D_3/kg to optimize egg production and other parameters for health[3]. Although the vitamin D content of the optimized hen eggs[4] is reported, I could not find any recent data on meat from these chickens. A special case is beef. Because of a long standing interest of the meat industry in the tenderness of beef[5], vitamin D_3 and more recently 25(OH)D_3[6,7] have been investigated as treatments for cattle before slaughter. The hypothesis behind these supplementations is that by increasing the calcium content in muscles post mortem, myofibril proteolysis could be faster. Although one does not know for sure if as a consequence of these experiments (which suggested some but variable success with respect to tenderness) such regimens are currently implemented by the cattle industry, they offer insight into levels of vitamin D_3 and 25(OH)D_3 in tissues (muscle and liver) and serum of control (not supplemented) animals. The vitamin D_3

content of steaks obtained from seven publications between 2000 and 2008 (not shown) varied between 0.76 and 10 ng/g fresh tissue. An almost neglected constituent of meat is 25(OH)D_3[8]. In nine publications from the same time period (not shown) levels in steaks between 0.2 and 25 ng/g fresh tissue are reported. The latter, very high value deserves a special comment later. 25(OH)D_3 has some remarkable properties: in contrast to vitamin D_3 the serum increase of 25(OH)D_3 is directly proportional to oral input[9] and its biological activity, calculated as a function of serum 25(OH)D_3 increase, is between four[9] and nine times higher[10] than that of vitamin D_3. In food composition tables[2] the vitamin D level of meat is calculated as D_3 plus five times 25(OH)D_3. In addition to some debate on the exact correction factor to convert 25(OH)D_3 into vitamin D, seasonal variation and different cattle-raising practices (housed or unhoused) may contribute to error in these tables.

The much higher oral bioavailability and the shorter half-life of the pro-hormone[11] compared with vitamin D_3 are currently being explored for rapid supplementation of vitamin D-deficient intensive-care patients[12].

In contrast to the above supplementation experiments where a tendency towards lower values (plasma, meat) for animals kept in shelters compared with pasture is apparent, little is known – and controversy exists – about how cows acquire vitamin D_3.

The role of UV-B for vitamin D status in cows was recently investigated. Vitamin D-depleted dairy cows were covered with UV-protection horse blankets, udder covers or both and exposed for 28 d to natural summer (July to August) sunlight (on pasture) for 5 h daily[13]. Plasma concentrations of 25(OH)D_3 reached peak levels of 40.7 ng/ml in no-cover ('natural') cows, whereas covered cows responded in strict correlation to the average surface area exposed. The authors concluded that cows are similar to man with respect to cutaneous biosynthesis of vitamin D_3. Indeed, in Angus cows which were on pasture from the time of calving until August, the plasma concentration of the pro-hormone was 75 ng/ml and this was accompanied by the above-mentioned very high content of 25 ng 25(OH)D_3/g fresh muscle tissue[7]. On the other hand, animals housed in shelters had only between 0.5 to 1.68 ng/g in steaks[6,14]. Given that sunlight exposure is the main determinant for the pro-hormone content of beef, one must conclude that meat from cattle on pasture and slaughtered at the end of summer has a much higher content of the metabolite than meat from cows housed in shelters or slaughtered in winter. If an average meat eater consumes the equivalent of 100 g of fresh beef daily (equivalent to 2.5 μg/g) from pasture-kept cattle (slaughtered late in summer and having the above content of 25(OH)D_3), the increase in serum 25(OH)D_3 steady-state levels in nmol/l can be calculated from a formula[9] to be about 10 nmol/l or even more. One cannot exclude that many of the meat eaters analysed by Crowe *et al.*[1] consumed such 'naturally fortified' beef. The very high content of 25(OH)D_3 in muscle from unsupplemented and unhoused cattle[7] is a good argument for biological farming, e.g. considering alpine regions where cattle are kept unhoused at high altitudes with up to 50 % more UV-B compared with sea level from the end of April to October.

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