

# Processed Meats and Coronary Heart Disease: Perspective and Context

Nathan S. Bryan, Ph.D.

Brown Foundation Institute of Molecular Medicine, The University of Texas Health Science Center at Houston

I read with interest the paper by Micha *et al*<sup>1</sup> reporting a weak association between processed meats but not red meats and coronary heart disease (CHD) and diabetes mellitus. This type of systematic review of epidemiological data is very important but in my opinion, this particular report lacks the proper physiological perspective and context for accurate interpretation of the data. The authors suggests that the increased risk may be due to nitrites and nitrates used as preservatives but their Table 2 indicate minimal difference in the nitrite and nitrate content of red vs. processed meats which reflects the fact that endogenous nitrogen oxides in meat or muscle exceed that added in meat processing. Furthermore, their conclusions appear to contrast the emerging cardiovascular benefits of nitrite and nitrate<sup>2</sup>. In fact, dietary nitrite and nitrate have been shown to reduce inflammation, restore endothelial function, reduce C-reactive protein, protect from heart attack, stroke and even improve exercise performance<sup>3</sup>.

While modern epidemiology is an essential discipline in helping us identify associations between certain events and disease, a proper perspective and context is often missing. The authors report a relative risk of 1.42 for processed meat intake and CHD suggesting a 42% higher risk of developing CHD if you eat processed meats. However, the processed meat - CHD portion of this study relies on only 5 studies, two of which were not statistically significant, but most problematical is that 83% weight was given to a single study, Sinha *et al*<sup>4</sup>, which ascribes mortality to various diet/lifestyle factors. Sinha *et al* also discuss their difficulty in adjusting risk for important cardiovascular confounding factors such as smoking, diabetes, and blood pressure. Furthermore, the Micha analysis extrapolates beyond the dietary intake ranges described in the Sinha study. Thus one is left with a meta-analysis which is overweighted by a single study and has many questions concerning confounding factors.

Studies such as this and others leave scientists and consumers alike confused as to what we should or should not eat. We have been told for decades to eat our vegetables. However, the large European Prospective Investigation into Cancer and Nutrition (EPIC Oxford) study found vegetarians had increased colon cancer risk compared to non-vegetarians (relative risk in vegetarians compared with meat eaters was 1.39 (95% CI: 1.01, 1.91), raising the specter that some dietary component in vegetarians increases risk or that meat-eating conferred decreased risk of this type of cancer<sup>5</sup>. Does this mean that we should not eat our vegetables at the risk of getting colon cancer by the same argument as Micha *et al* put forward? My point is not to discredit important epidemiological data but rather to put it in proper perspective. Epidemiology is an important and critical discipline to public health protection and understanding disease associations, but it alone cannot establish causation. This extensive review by Micha *et al* is an important area of research but we clearly need more research to clarify mechanisms and/or appropriate dietary recommendations.

Conflict of Interests Disclosure: NS Bryan has a financial interest in Neogenis, Inc.

References:

1. Micha R, Wallace SK, Mozaffarian D. Red and Processed Meat Consumption and Risk of Incident Coronary Heart Disease, Stroke, and Diabetes Mellitus. A Systematic Review and Meta-Analysis. *Circulation*. 2010;121:2271-2283.
2. Lundberg JO, Gladwin MT, Ahluwalia A, Benjamin N, Bryan NS, Butler A, Cabrales P, Fago A, Feelisch M, Ford PC, Freeman BA, Frenneaux M, Friedman J, Kelm M, Kevil CG, Kim-Shapiro DB, Kozlov AV, Lancaster JR, Jr., Lefer DJ, McColl K, McCurry K, Patel RP, Petersson J, Rassaf T, Reutov VP, Richter-Addo GB, Schechter A, Shiva S, Tsuchiya K, van Faassen EE, Webb AJ, Zuckerbraun BS, Zweier JL, Weitzberg E. Nitrate and nitrite in biology, nutrition and therapeutics. *Nature chemical biology*. 2009;5:865-869.
3. Bryan NS, ed. *Food, Nutrition and the Nitric Oxide Pathway: Biochemistry and Bioactivity*. Lancaster, PA: DesTech Publishing; 2009.
4. Sinha R, Cross AJ, Graubard BI, Leitzmann MF, Schatzkin A. Meat intake and mortality: a prospective study of over half a million people. *Archives of internal medicine*. 2009;169:562-571.
5. Key TJ, Appleby PN, Spencer EA, Travis RC, Roddam AW, Allen NE. Cancer incidence in vegetarians: results from the European Prospective Investigation into Cancer and Nutrition (EPIC-Oxford). *The American journal of clinical nutrition*. 2009;89:1620S-1626S.

Address all correspondence to:

**Nathan S. Bryan, Ph.D.**

Assistant Professor of Molecular Medicine

Center for Cell Signaling

Brown Foundation Institute of Molecular Medicine

Department of Integrative Biology and Pharmacology

The University of Texas Graduate School of Biomedical Sciences at Houston

The University of Texas - Houston Health Science Center

1825 Pressler St. 530C

Houston, TX 77030

713-500-2439 office

713-500-2447 fax

[Nathan.Bryan@uth.tmc.edu](mailto:Nathan.Bryan@uth.tmc.edu)