



COMMENT ON MURAKI ET AL.

## Potato Consumption and Risk of Type 2 Diabetes: Results From Three Prospective Cohort Studies. *Diabetes Care* 2016;39:376–384

*Diabetes Care* 2016;39:e151 | DOI: 10.2337/dc16-0434

Antonio C. Bossi

In their excellent article, Muraki et al. (1) reported that a greater consumption of potatoes, especially french fries, was associated with a higher type 2 diabetes (T2D) risk, independent of BMI and other risk factors. Similarly, in another very recent interesting article, Bao et al. (2) observed that higher levels of potato consumption before pregnancy were associated with greater risk of gestational diabetes mellitus and that substitution of potatoes with other kind of vegetables, legumes, or whole-grain foods might lower the risk. Whether (or not) potatoes should be included in the vegetable food group as suggested by the 2015–2020 *Dietary Guidelines for Americans* (3) and the U.S. national food guide (called “MyPlate”) (4) is a controversial point. I consider potatoes as “cereals and tubers” as recommended by the Mediterranean diet (5) and the U.K. national food guide (the “Eatwell plate”) (6). Undeniably, french fries are considered a tasty and enjoyable food mainly by adolescents and teenagers, but, as supposed by Muraki et al. (1), they could be an indicator of a low-quality diet. Moreover, what is the authors’ point of view with respect to the acrylamide content of potato chips? Temperature heating dangerously increases acrylamide content, resulting in several harmful health effects including neurotoxicity, reproductive toxicity, carcinogenicity, genotoxicity, and mutagenicity. It is supposed that french fries and potato chips

contribute to a significant proportion of the average daily intake of acrylamide because acrylamide precursors asparagine, glucose, and fructose are present in tubers. So, acrylamide mitigation strategy focused on developing potato cultivars with low reducing sugars has been proposed to be an effective and sufficient approach for minimizing the acrylamide-forming potential of french fry potato processing (7). Another solution may be air frying, proposed as an alternative to deep fat frying. In air frying, potato sections are essentially heated in hot air containing fine oil droplets, with a substantially lower level of fat being absorbed by the french fries (8). Furthermore, their content of altered fatty acids, degradation products from the frying oil, and dietary advanced glycation end products that are generated during the frying process make me think that they maintain few potato features and acquire a similarity to unhealthy food, which has previously been implicated in the development of insulin resistance and T2D (9). So, in light of the potential clinical relevance of the published data, it would be appreciated if Muraki et al. could comment, since not only potato starch should be considered responsible for the observed higher T2D risk, as mentioned above.

**Duality of Interest.** No potential conflicts of interest relevant to this article were reported.

### References

1. Muraki I, Rimm EB, Willett WC, Manson JE, Hu FB, Sun Q. Potato consumption and risk of type 2 diabetes: results from three prospective cohort studies. *Diabetes Care* 2016;39:376–384
2. Bao W, Tobias DK, Hu FB, Chavarro JE, Zhang C. Pre-pregnancy potato consumption and risk of gestational diabetes mellitus: prospective cohort study. *BMJ* 2016;352:h6898
3. U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 *Dietary Guidelines for Americans, 8th edition* [Internet], 2015. Available from <http://health.gov/dietaryguidelines/2015/guidelines/>. Accessed 8 April 2016
4. U.S. Department of Agriculture. ChooseMyPlate.gov [Internet]. Available from <http://www.choosemyplate.gov/>. Accessed 8 April 2016
5. *Piramide Alimentare Italiana: Guida Settimanale Per Uno Stile Di Vita Salutare* [Internet]. Available from [http://www.piramidealimentare.it/files\\_allegati/piramide.pdf](http://www.piramidealimentare.it/files_allegati/piramide.pdf). Accessed 8 April 2016
6. National Health Service. NHS choices. The eatwell plate. Last reviewed 12 June 2015. Available from <http://www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx>. Accessed 8 April 2016
7. Zhu X, Gong H, He Q, et al. Silencing of vacuolar invertase and asparagine synthetase genes and its impact on acrylamide formation of fried potato products. *Plant Biotechnol J* 2016;14:709–718
8. Teruel MdelR, Gordon M, Linares MB, Garrido MD, Ahromrit A, Niranjana K. A comparative study of the characteristics of French fries produced by deep fat frying and air frying. *J Food Sci* 2015;80:E349–E358
9. Cahill LE, Pan A, Chiuve SE. Fried-food consumption and risk of type 2 diabetes and coronary artery disease: a prospective study in 2 cohorts of US women and men. *Am J Clin Nutr* 2014;100:667–675

Endocrine Unit, Diabetes Regional Center, ASST Bergamo Ovest, Treviglio, Bergamo, Italy

Corresponding author: Antonio C. Bossi, [antonio\\_bossi@asst-bgovest.it](mailto:antonio_bossi@asst-bgovest.it) or [acbossi@gmail.com](mailto:acbossi@gmail.com).

© 2016 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. More information is available at <http://diabetesjournals.org/site/license>.