

Abstract

# ONCODAILY MEDICAL JOURNAL

## From Plate to Polyps: Dietary N-Nitrosamines and Biomarkers of DNA Damage

Authors: Rebeka Jirsáková<sup>1</sup>,✉

Affiliation: <sup>1</sup>University of Manchester

Corresponding Author: rebeka.jirsakova@gmail.com

DOI:10.69690/ODMJ-018-0826-7959



2nd Annual National Undergraduate Oncology Conference  
Northwest (NUOC Northwest 2026)

Published: August 25, 2026

## Abstract

# From Plate to Polyps: Dietary N-Nitrosamines and Biomarkers of DNA Damage

Authors: Rebeka Jirsáková<sup>1</sup>,✉

Affiliation: <sup>1</sup>University of Manchester

Corresponding Author: rebeka.jirsakova@gmail.com

## ABSTRACT

**Introduction:** Dietary factors may influence colorectal cancer risk through exposure to N-nitrosamines, a class of DNA-damaging alkylating agents and probable carcinogens. This study investigated whether higher dietary N-nitrosamine intake is associated with DNA damage, measured by N7-methylguanine (N7-MeG), and O6-alkylguanine DNA-alkyltransferase (MGMT) activity, a key DNA repair protein.

**Methodology:** Colorectal mucosal samples were obtained from cases with (n = 38) and controls without (n = 35) adenoma. N7-MeG levels and MGMT activity were measured in collected samples. Dietary N-nitrosamine intake was assessed using a food frequency questionnaire, focusing on 28 food items with high reported N-nitrosamine content. Estimated intakes of total N-nitrosamines and N-nitrosodimethylamine (NDMA), a common dietary N-nitrosamine, were calculated. Due to small sample size, cases and controls were analysed together and stratified into tertiles according to N7-MeG levels and MGMT activity.

**Results:** Participants in the highest N7-MeG tertile had higher mean total N-nitrosamine intake compared to those in the lowest tertile, although this difference was not statistically significant. In contrast, mean total N-nitrosamine intake was significantly higher in the lowest

MGMT activity group compared to the highest ( $2.45 \pm 1.46$  vs  $1.58 \pm 0.83$   $\mu\text{g/day}$ ,  $p < 0.05$ ). Additionally, NDMA intake was inversely correlated with MGMT activity ( $r_s = -0.26$ ,  $p = 0.03$ ).

**Conclusion:** These findings suggest that higher dietary exposure to N-nitrosamines, particularly NDMA, may be associated with reduced MGMT activity, potentially increasing susceptibility to DNA damage and colorectal carcinogenesis. However, given the small sample size and limitations in dietary assessment, further studies are required to confirm these associations.

## License

© Author(s) 2026.

This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, and unrestricted adaptation and reuse, including for commercial purposes, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/>