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Birth Weight, Head Circumference, and Prenatal Exposure to Acrylamide from Maternal Diet: The European Prospective Mother-Child Study (NewGeneris)

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Marie Pedersen,^{1,2,3,4,*} Hans von Stedingk,^{5,*} Maria Botsivali,⁶ Silvia Agramunt,^{1,2} Jan Alexander,⁷ Gunnar Brunborg,⁸ Leda Chatzi,⁹ Sarah Fleming,¹⁰ Eleni Fthenou,⁹ Berit Granum,¹¹ Kristine B Gutzkow,⁸ Laura J Hardie,¹⁰ Lisbeth E Knudsen,¹² Soterios A Kyrtopoulos,⁶ Michelle A Mendez,¹ Domenico F Merlo,¹³ Jeanette K Nielsen,¹² Per Rydberg,⁵ Dan Segerbäck,¹⁴ Jordi Sunyer,^{1,2,3,15} John Wright,¹⁶ Margareta Törnqvist,⁵ Jos C Kleinjans,¹⁷ Manolis Kogevinas,^{1,2,3,18,#} and the NewGeneris Consortium

¹Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain, ²IMIM (Hospital del Mar Research Institute), Barcelona, Spain, ³CIBER Epidemiología y Salud Pública (CIBERESP), Barcelona, Spain, ⁴INSERM (National Institute of Health and Medical Research), Team of Environmental Epidemiology Applied to Reproduction and Respiratory Health, Institute Albert Bonniot, Grenoble, France, ⁵Department of Materials and Environmental Chemistry, Environmental Chemistry Unit, Stockholm University, Stockholm, Sweden, ⁶National Hellenic Research Foundation, Institute of Biological Research and Biotechnology, Athens, Greece, ⁷Department of Food Safety and Nutrition, Division of Environmental Medicine, Norwegian Institute of Public Health, Oslo, Norway, ⁸Department of Chemical Toxicology, Division of Environmental Medicine, Norwegian Institute of Public Health, Oslo, Norway, ⁹Department of Social Medicine, Faculty of Medicine, University of Crete, Heraklion, Greece, ¹⁰Centre for Epidemiology and Biostatistics, Leeds Institute of Genetics, Health and Therapeutics, University of Leeds, Leeds, the United Kingdom, ¹¹Department of Environmental Immunology, Norwegian Institute of Public Health, Oslo, Norway, ¹²Section of Environmental Health, Department of Public Health, University of Copenhagen, Copenhagen, Denmark, ¹³Epidemiology, Biostatistics, and Clinical Trials, National Cancer Research Institute, Genoa, Italy, ¹⁴Department of Biosciences and Nutrition, Karolinska Institute, Novum, Huddinge, Sweden, ¹⁵University Pompeu Fabra, Barcelona, Spain, ¹⁶Bradford Institute for Health Research, Bradford, the United Kingdom, ¹⁷Department of Toxicogenomics, Maastricht University, Maastricht, the Netherlands, ¹⁸National School of Public Health, Athens, Greece.

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Abstract

Background: Acrylamide is a common dietary exposure that crosses the human placenta. It is classified as a probable human carcinogen, and developmental toxicity has been observed in rodents.

Objectives: We examined the associations between prenatal exposure to acrylamide and birth outcomes in a prospective European mother-child study.

Methods: Hemoglobin (Hb) adducts of acrylamide and its metabolite glycidamide were measured in cord blood (reflecting cumulated exposure in the last months of pregnancy) from 1101 singleton pregnant women recruited in Denmark, England, Greece, Norway and Spain, 2006-2010. Maternal diet was estimated through food-frequency questionnaires.

Results: Both acrylamide and glycidamide Hb adducts were associated with a statistically significant reduction in birth weight and head circumference. The estimated difference in birth

weight for infants in the highest versus lowest quartile of acrylamide Hb adduct levels after adjusting for gestational age and country was -132 grams (95% confidence interval (CI): -207, -56); the corresponding difference for head circumference was -0.33 cm (95%CI: -0.61, -0.06). Findings were similar in infants of non-smokers, were consistent across countries, and remained after adjustment for factors associated with reduced birth weight. Maternal consumption of foods rich in acrylamide, such as fried potatoes, was associated with cord blood acrylamide adduct levels and with reduced birth weight.

Conclusions: Dietary exposure to acrylamide was associated with reduced birth weight and head circumference. Consumption of specific foods during pregnancy was associated with higher acrylamide exposure *in utero*. If confirmed, these findings suggest that dietary intake of acrylamide should be reduced among pregnant women.

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