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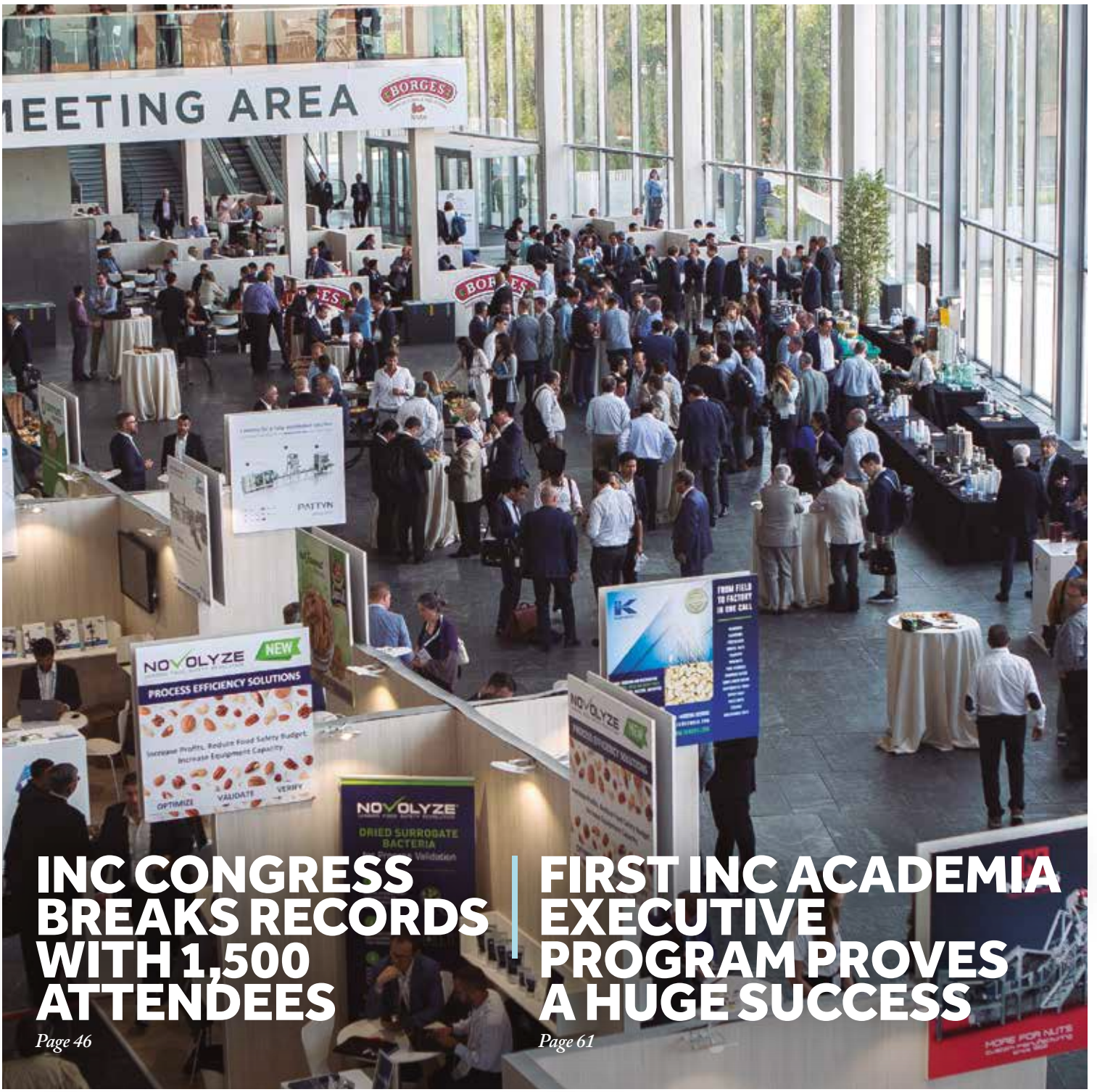

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NUTS AS PART OF CANCER RECURRENCE PREVENTION

PROF. JORDI SALAS-SALVADÓ

PhD Students Indira Paz-Graniel and Nuria Rosique-Esteban, and Prof. Jordi Salas-Salvadó.

Human Nutrition Unit from the Department of Biochemistry and Biotechnology, Hospital Universitari de Sant Joan de Reus, Faculty of Medicine and Health Sciences, IISPV, Institut d'Investigació Sanitària Pere Virgili, Universitat Rovira i Virgili, Reus (Spain). CIBER, Centro de Investigación Biomédica en Red Fisiopatología de la Obesidad y Nutrición, Institute of Health Carlos III, Madrid (Spain).

Cancer has been known to be the second leading cause of mortality worldwide, since in 2012 the International Agency for Research on Cancer (IARC) reported around 14 million new cancer cases and approximately 8,201,600 cancer deaths[1]. As a result, interest in developing effective preventive strategies has increased dramatically.

Cancer refers to a group of diseases affecting various organs, the development of which is determined by different factors. Therefore, their prognoses may vary across different cancer subtypes. Cancer is characterized by a loss of genetic control over cell growth and proliferation[2]. For years this loss was attributed to genetic and hereditary factors, whereas nowadays environmental and, in particular, lifestyle factors, such as diet, smoking, alcohol consumption, physical activity and obesity are known to play an important role in the development of the disease[3]. In the context of diet, a large number of dietary and nutritional components, including vegetable protein, monounsaturated fatty acids, vitamin E, phenolic compounds, selenium, vegetable fiber, folic acid and phytoestrogens, can modulate specific cancer-related processes e.g. regulation of cell differentiation and proliferation, reduction of tumor initiation and promotion, DNA protection, and regulation of immunologic and inflammatory responses[4]. Nuts are particularly rich in these and other interesting nutrients with the ability to provide beneficial effects on health. In fact, the regular consumption of nuts in the context of a healthy diet has been observed to reduce the risk of type-2 diabetes and metabolic syndrome, as well as to improve insulin resistance, both of which are factors associated with an increased risk of cancer and cancer recurrence[5]. Therefore, nut consumption could play an important role in primary cancer prevention.

However, current evidence about nutrition in cancer survivors is rather limited compared to that of primary cancer prevention. Studies among these patients have mostly shown that adherence to healthy dietary patterns seem to be beneficial for cancer survival rates, all-cause and cancer-specific mortality[6-8]. Such healthy dietary patterns, like the Mediterranean or prudent diet, are characterized by frequent consumption of fruits, vegetables, nuts, whole grains, lean meat and pulses. They do not include high-fat, high sugar foods, red and processed meat, while alcohol and certain nutrients (i.e., fiber and fat) are consumed in moderation. These observations have been found particularly in certain subtypes of cancer, such as breast, prostate and bowel/colon cancer[8]. Although this evidence is included in the American Cancer Society dietary recommendations for cancer survivors[9], released in 2012, specific information about nut intake and the prevention of cancer recurrence is currently lacking in these guidelines. In fact, very few studies have evaluated the association between cancer recurrence and mortality, with the frequency of nut intake in cancer patients[10-12]. In 2016, Wang and coworkers examined 4,346 healthcare professionals from the Health Professionals Follow-up Study who were diagnosed with prostate cancer and the associations between frequency of nut intake and cancer recurrence and mortality. The authors observed that those prostate cancer patients who, after the diagnosis, consumed 5 or more servings a week (28g/serving) of nuts had a 34% lower overall risk of death, compared with those consuming less than once per month. Importantly, these benefits were observed for both peanuts and other nut types, and regardless of the initial nut intake before the prostate cancer diagnosis. This evidence is consistent with that from another study in the same cohort of patients, where the consumption of 1 serving a day of nuts after a prostate cancer diagnosis showed a suggestive 18% lower risk of lethal prostate cancer[10]. Likewise, another study recently published in 2018[12], which included 826 colon-cancer patients in advanced stage following coadjutant chemotherapy, has reported beneficial effects between nut intake (in tree nuts, but not in peanuts) and cancer survival and recurrence. After controlling for many other factors, the authors showed that participants consuming

2 or more nut servings a week after a cancer diagnosis vs. non-consumers had 42% lower risk of cancer recurrence or death, as well as a 57% lower risk of dying from any cause.

Overall, current scientific evidence associating nut consumption and cancer survival or mortality is limited and mostly focused on very few cancer types. However, the beneficial effects of frequent consumption of nuts are plausible among cancer patients for a better prognosis of the disease. Future studies into this topic should focus on evaluating the potential role of nut intake after diagnosis in patients with other cancer subtypes, who may benefit from this nutritious and complete food. Moreover, it is necessary to investigate the potential beneficial effects of the different types of nuts in cancer patients across different countries in order to be able to translate this scientific information into clinical guidelines for oncology patients.

Frequent nut consumption seems to be a promising preventive nutritional strategy for cancer recurrence deserving in-depth investigation in future studies.

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