77th GLOBAL BREAD CONGRESS

Mérida, Yucatán (MExico)

2-7 October 2017

Cereals, bread and health

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Cereals and Bread in our Nutrition

- Represent the basic foods in a balanced diet, like the mediterranean diet
- In recent years, consumption has decreased in developed societies
- They are valuable foods both from a nutritional point of view and for health maintenance

What role do cereals play in the diet?

The role of cereals in the diet

- Essential foods to balance the diet
- Contribute to meet the needs of fiber, vitamins and minerals
- Consumption of whole grains is associated with health benefits

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Distribution of macronutrients in a balanced diet

Acceptable ranges of macronutrients distribution

(% energy)

Reference	Proteins	Fat	Carbohydrates
FAO/OMS (2008)	10-15	20-35	≥50
DRI (2005)	10-35	20-35	45-65
EFSA (2017)	10-15	20-35	45-60
SENC (2011)	10-15	30-35	50-55

Free carbohydrates <10% energy

"Free sugars": monosaccharides and disaccharides added to food by manufacturers, chefs or consumers, as well as sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates .

WHO (2015)

Essential foods to balance the diet

- Composition in macronutrients:
  - Rich in complex carbohydrates (starch)
  - Considerable protein content (7-10%)
  - Little fat (especially unsaturated)

Essential foods to balance the diet

Reduced consumption can produce important imbalances in the diet, increasing the proportion of proteins and fat.

Evaluation of a menu with and without bread

Menu

Breakfast

Coffee with milk
Orange Juice

Lunch

Superfood salmon tartar with pea gel
Guinea fowl stuffed with mushroom stew
Raspberry puff pastry made

Cena

Light minestrone and basil pesto soup
Hake glazed with vegetables
Pineapple carpaccio with pistachio syrup

Nutritional evaluation of the proposed menu

RECIPES

Ingredients

Foods(g/day)

→ **Food Composition Tables**

↓

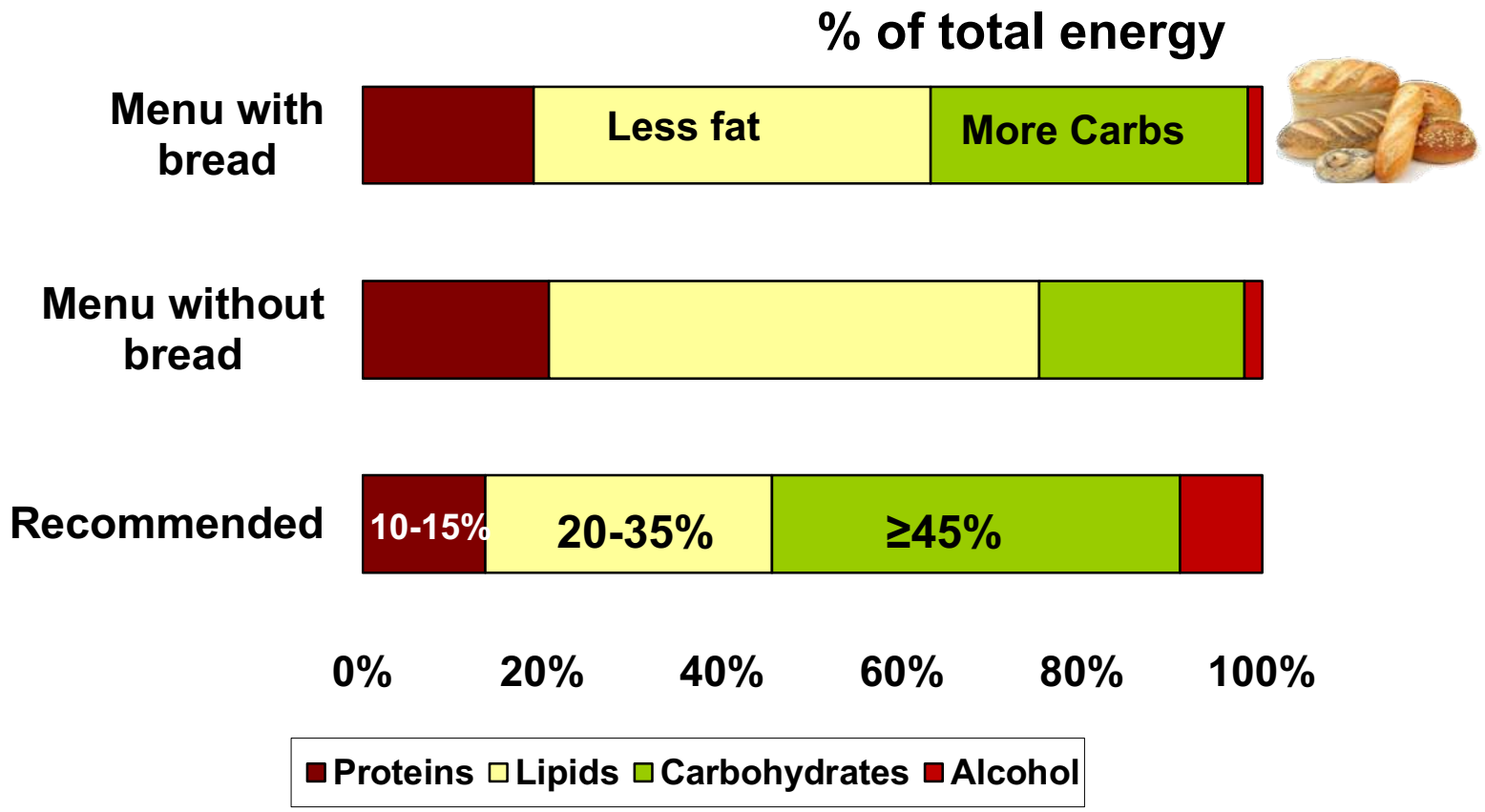
ENERGY AND NUTRIENTS

← **Balanced diet standards**

← **ADEQUATE DIET?**

+ 4 bread rations

Caloric profile of the proposed menu with and without bread



The role of cereals in the diet

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Contribute to meet the needs of fiber, vitamins and minerals

- Cereals and bread have a variable amount of:

Vitamins
(B_1, B_2, niacin, pyridoxine, folates)

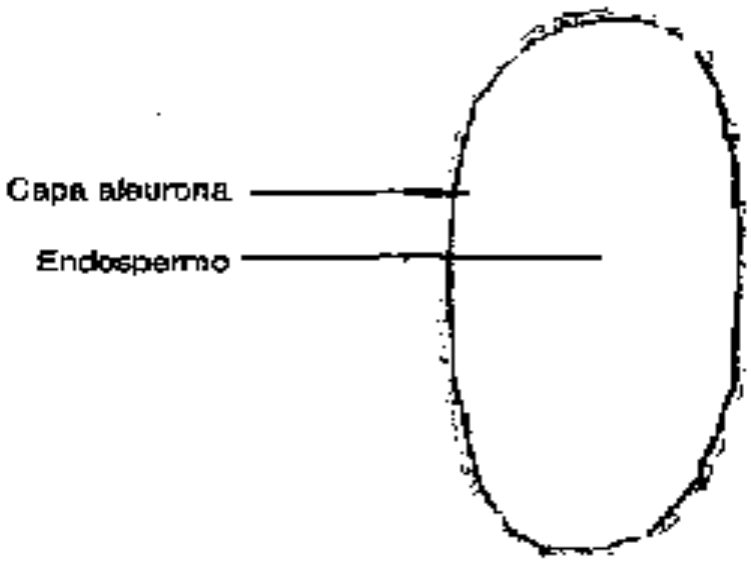
Minerals
(magnesium, selenium, zinc, calcium, iron)

Fiber

- Amounts depend on the degree of flour extraction

Nutritional value of full cereals

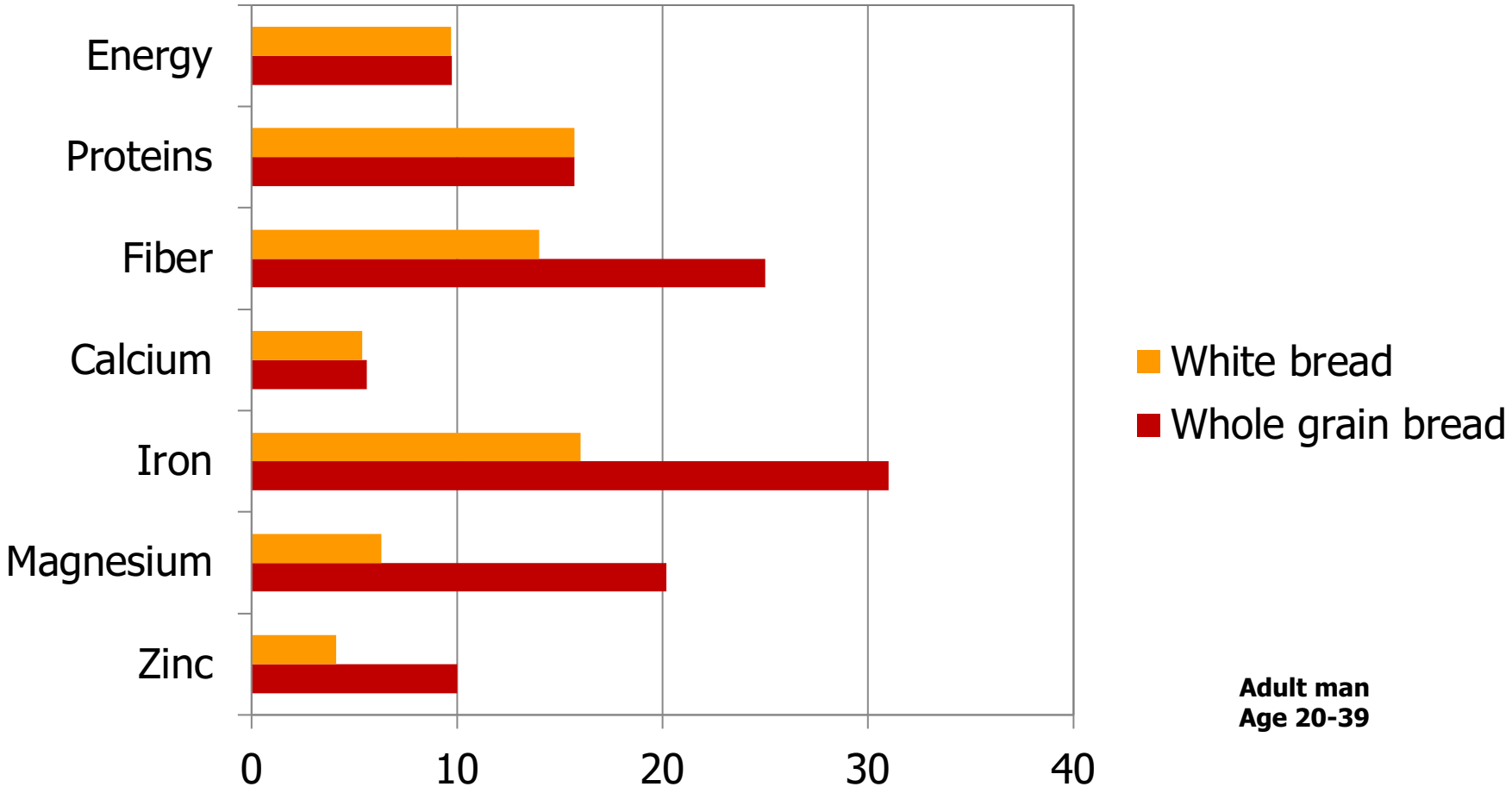
- The bran and germ provide:



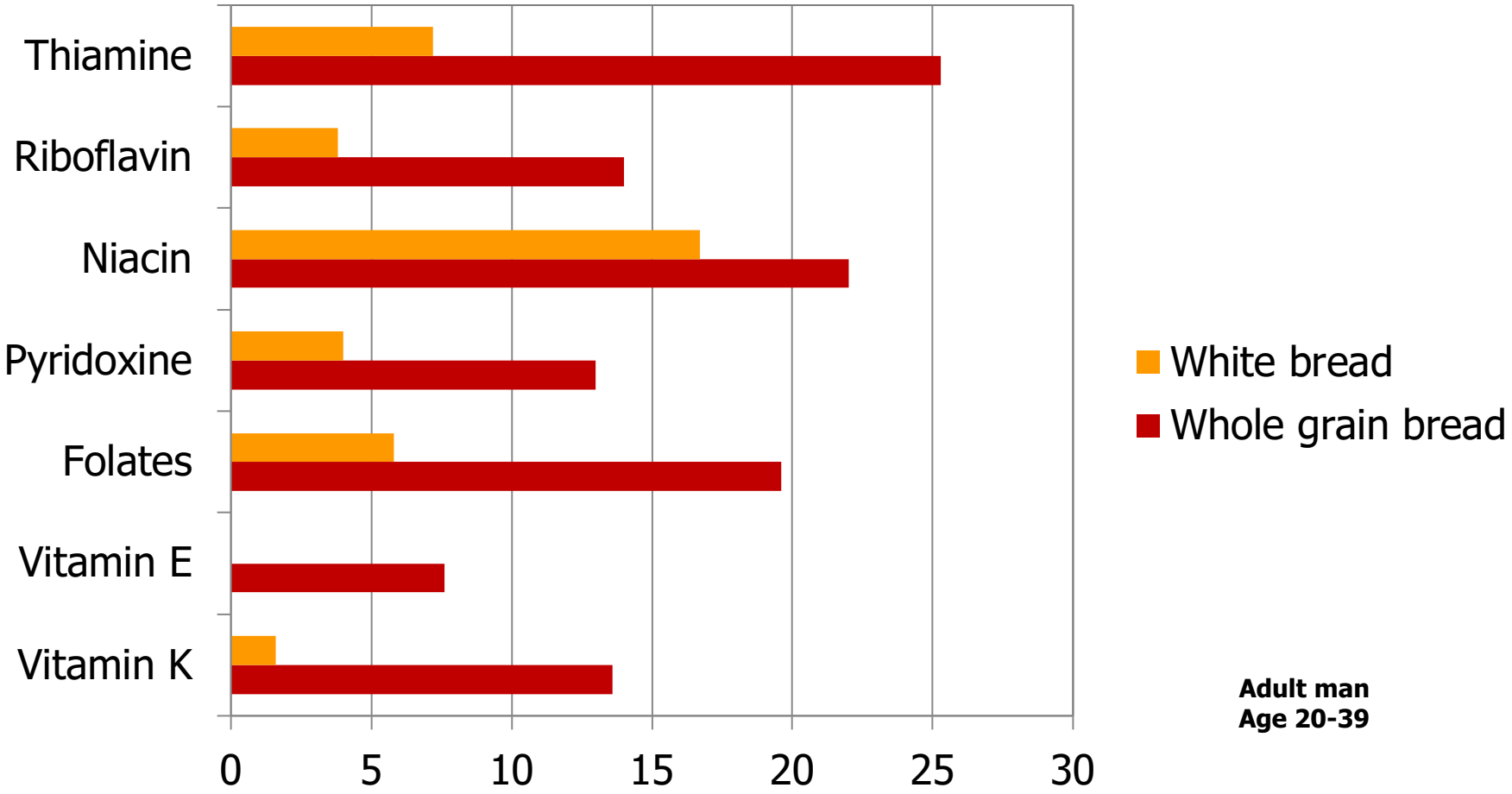
- Fiber
- Vitamins
- Minerals

The nutritional value of whole grains is higher than of refined grains

Nutritional contribution of 100 g of bread to cover the recommended intakes of energy, proteins, fiber and minerals



Nutritional contribution of 100 g of bread to cover the recommended intakes of vitamins



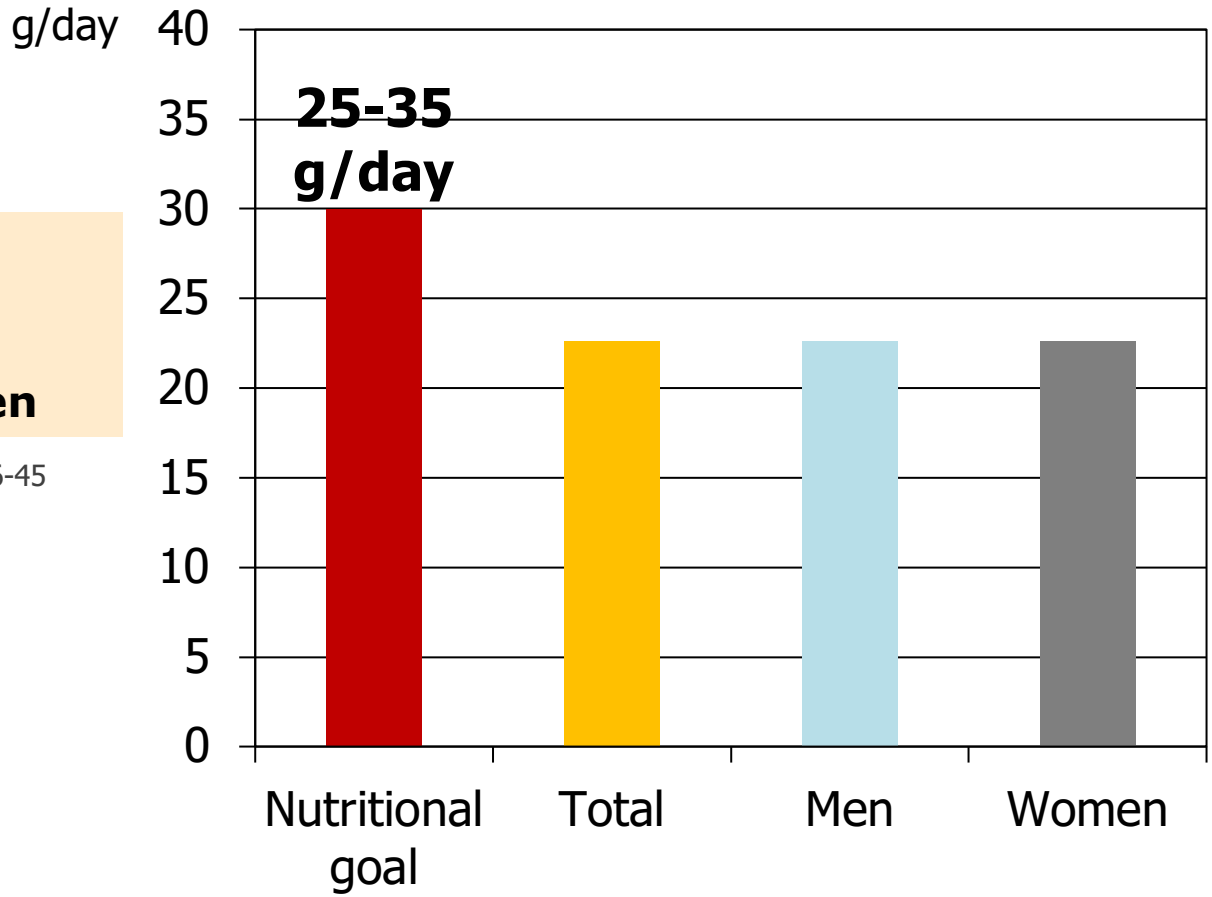
Fiber intake of adults in Spain

1068 adults

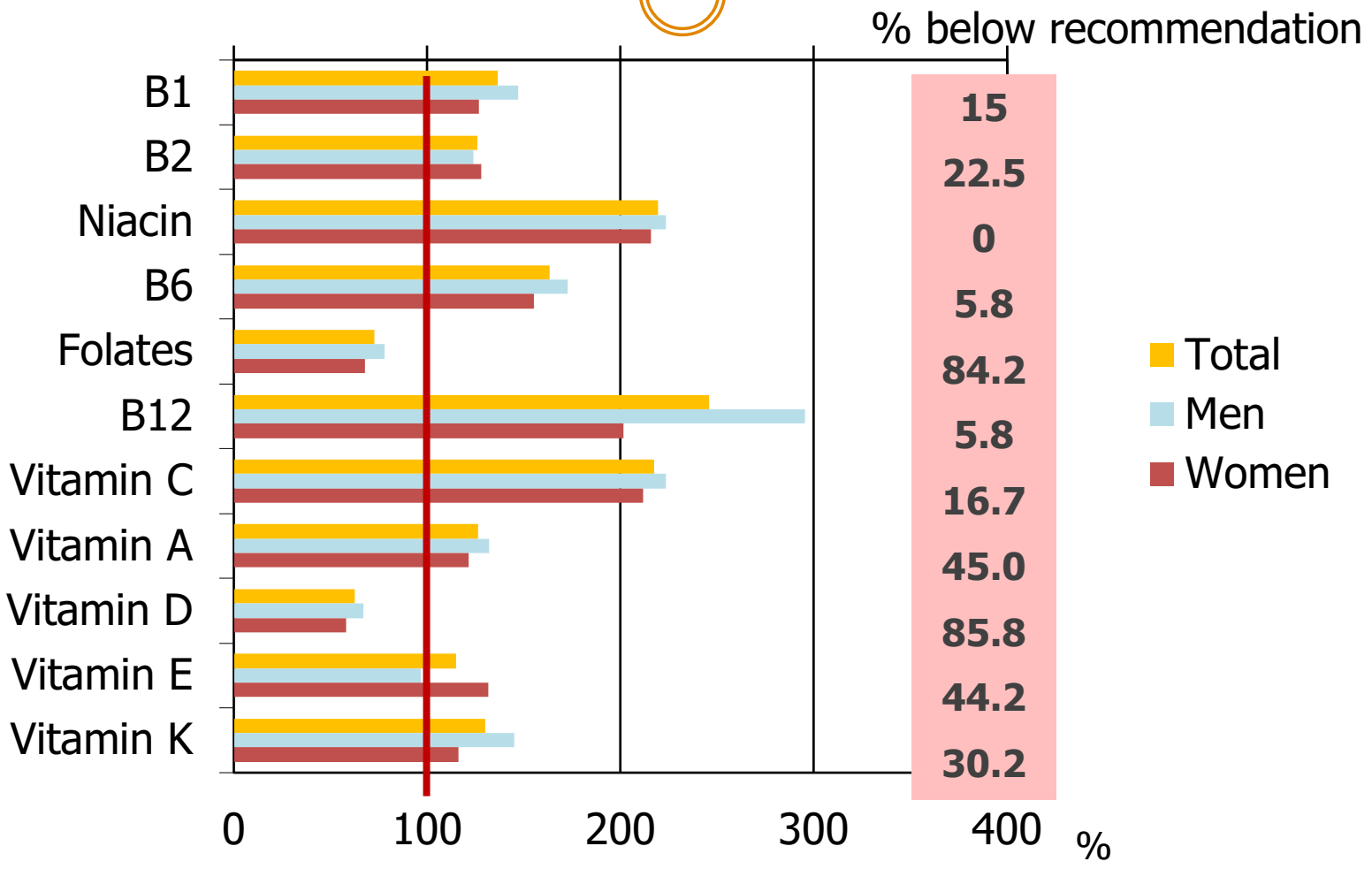
Age 17-60

521 men, 547 women

Ortega y col. Nutr Hosp 2013; 28 (6): 2236-45

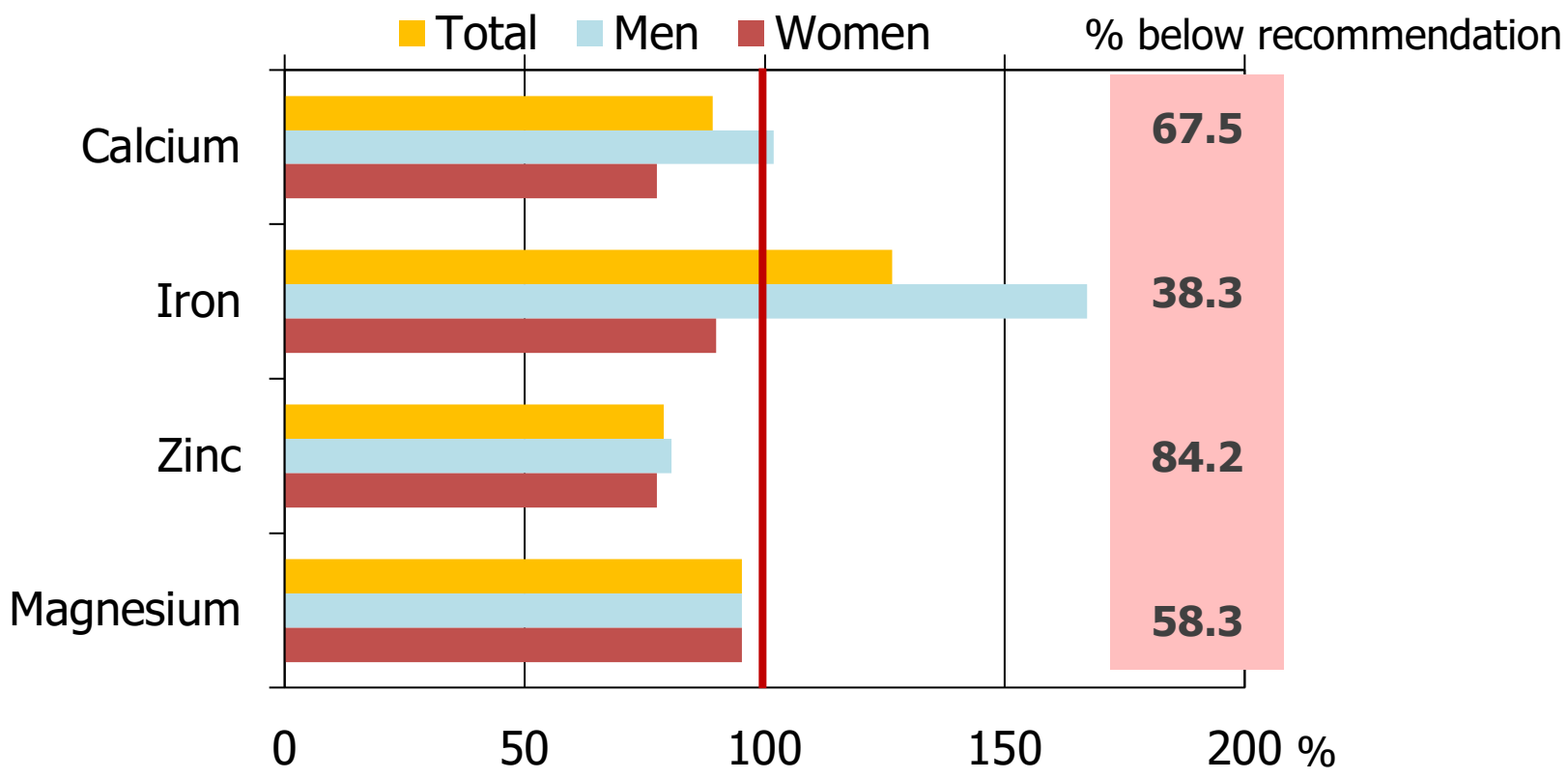


Contribution to the recommended vitamin intake and percentage of Spanish adults with intakes below the recommendation



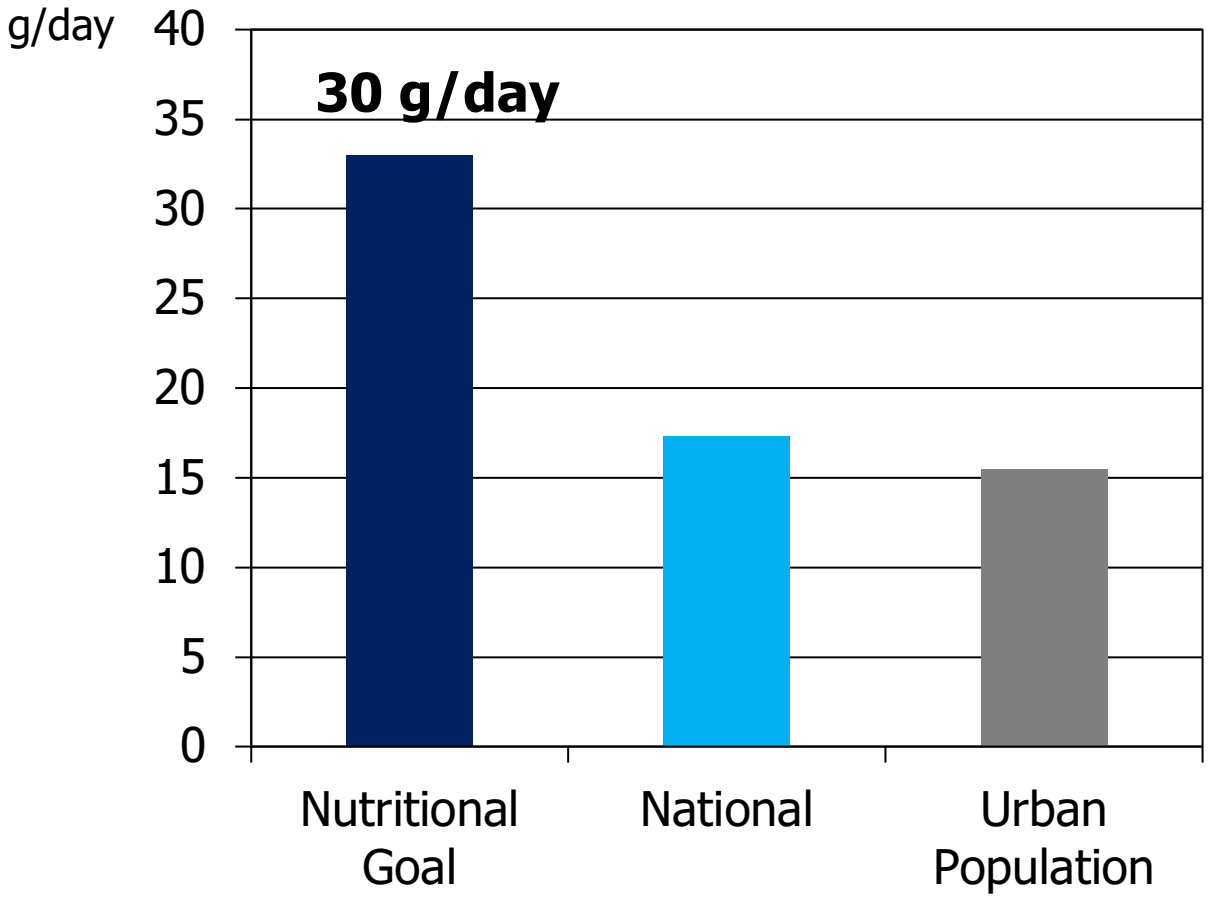
Ortega y col. Nutr Hosp 2013; 28 (6): 2236-45

Contribution to the recommended minerals intake and percentage of Spanish adults with intakes below the recommendation



Ortega y col. Nutr Hosp 2013; 28 (6): 2236-45

Fiber intake of women in Mexico



[1] Barquera S, Rivera-Dommarco J, Campos I, Espinoza J, Monterrubio E. Consumo de Fibra y sobrepeso en mujeres mexicanas en edad adulta. Nutrición Clínica 2002; 5(4):206-12

Contributes to meet the needs of fiber, vitamins and minerals

An increased consumption of these foods could improve the nutritional situation.

The role of cereals in the diet

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Health benefits associated with the consumption of whole cereals

- Mortality
- Cardiovascular disease
- Cancer
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Health benefits associated with the consumption of whole cereals

BJN
BRITISH JOURNAL OF NUTRITION

Whole-grain consumption and the risk of all-cause, CVD and cancer mortality: a meta-analysis of prospective cohort studies

Wei H, Gao Z, Liang R, Li Z, Hao H, Liu X. Br J Nutr. 2016 Sep;116(5):952.

11 studies
816.599 test subjects

Conclusions

Among the highest and lowest category of consumption, whole grain cereals were associated with a **lower risk of mortality from all causes, cardiovascular disease and cancer.** By increasing consumption to 3 servings/day, there was a mortality reduction of 19% for all causes, of 26% for cardiovascular diseases and of 9% for cancer.

Health benefits associated with the consumption of whole cereals

PHN PUBLIC HEALTH NUTRITION

Wholegrain and bread: a duet of the Mediterranean diet for the prevention of chronic diseases

Gil A, Ortega RM, Maldonado J. Public Health Nutr. 2011 Dec;14(12A):2316-22.

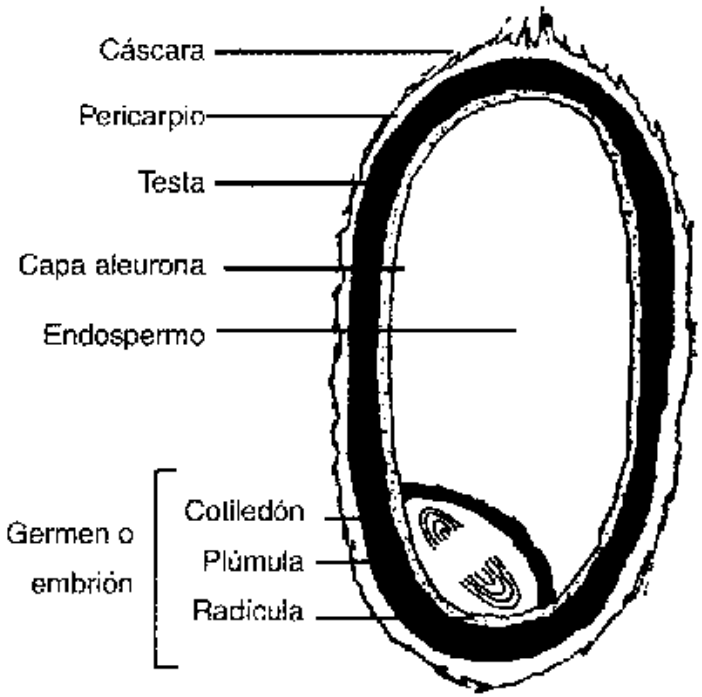
Conclusions

People who eat **3 or more servings/day** of whole grains have a **20-30% lower risk of suffering from cardiovascular diseases and a 20% lower risk of suffering from type 2 diabetes,** compared to individuals with a lower consumption, this being a higher benefit than the one observed by increasing the consumption of fruits and vegetables.

Added Value For These Foods

Nutritional Value of Whole Grains

- The bran and germ provide:



- Fiber
- Vitamins
- Minerals
- Phytochemicals

Phytochemicals in Cereals

Phenolic compounds

Phenolic acids, flavonoids, alkilresorcinols

Carotenoids

Lutein, zeaxanthin, ß-cryptoxanthin, ß-carotene, α-carotene

Phytosterols

Sterols, Stanols

Tocopherols

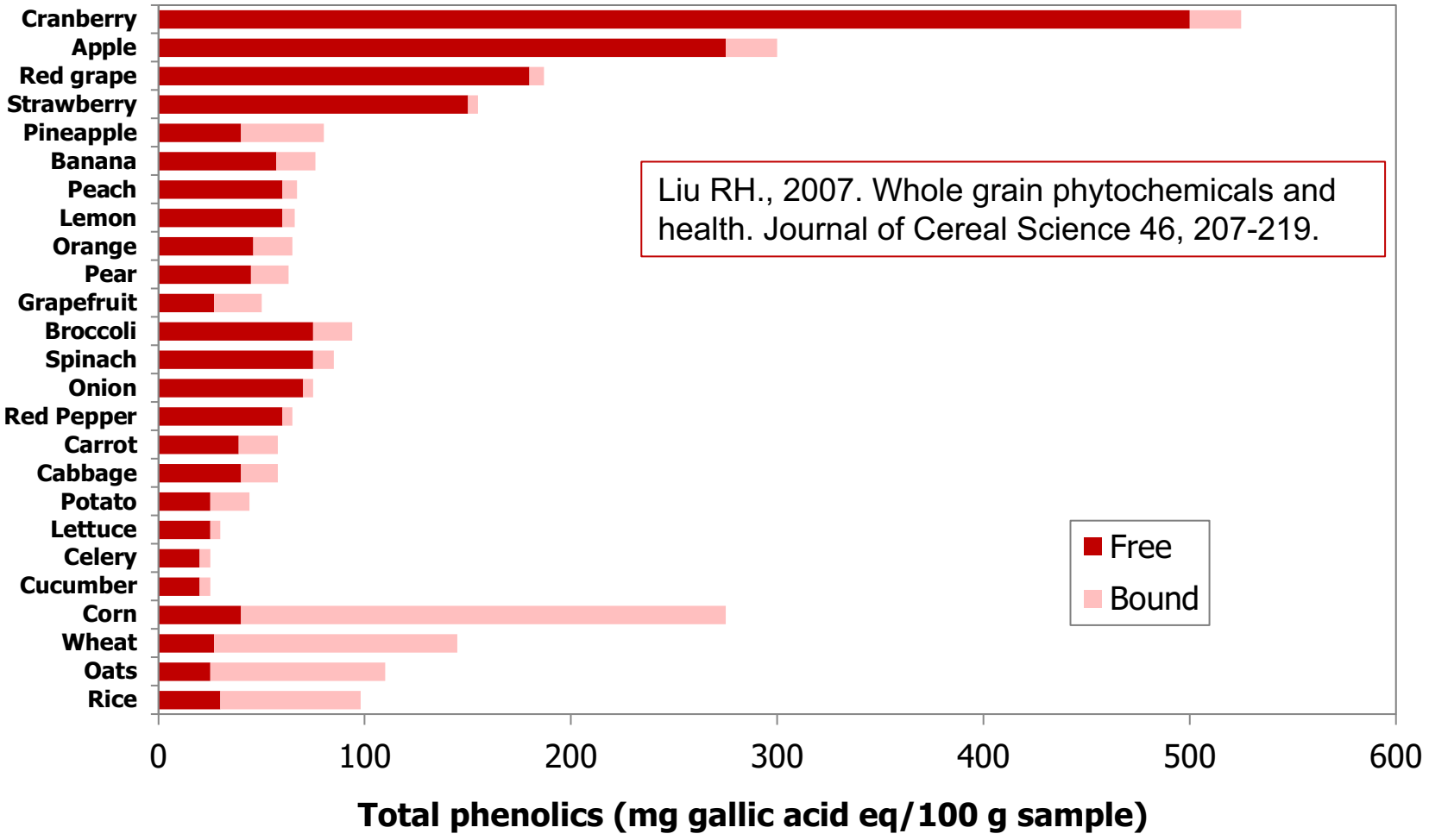
Phytase

Beta-Glucans

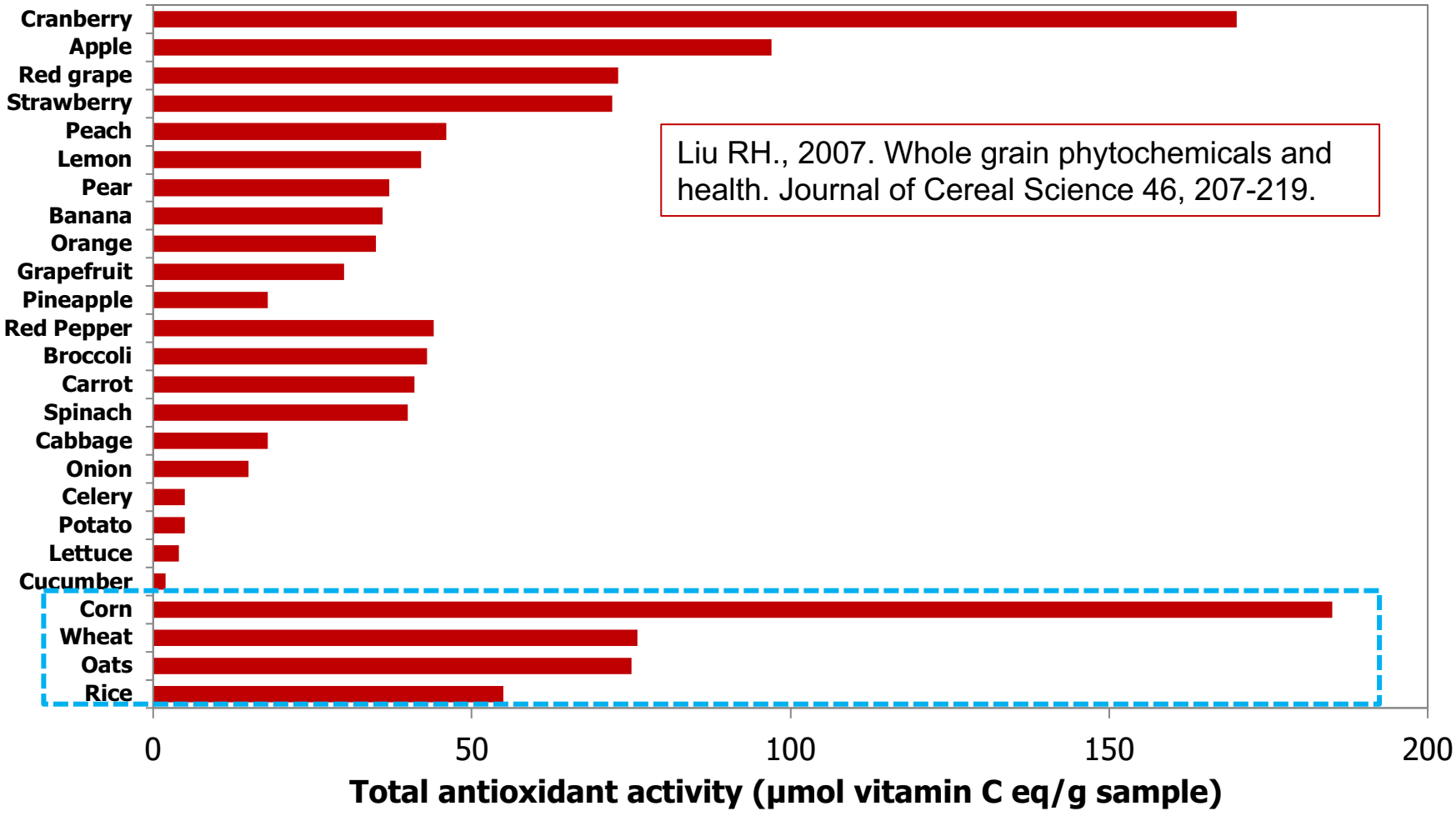
Lignans

Sterols, Stanols

Phenolic content of fruits, vegetables and whole grains



Antioxidant activity of fruits, vegetables and whole grains



Other activities of phytochemicals

Synergistic effect

Their joint intake as part of the food and not in isolation is of great importance.

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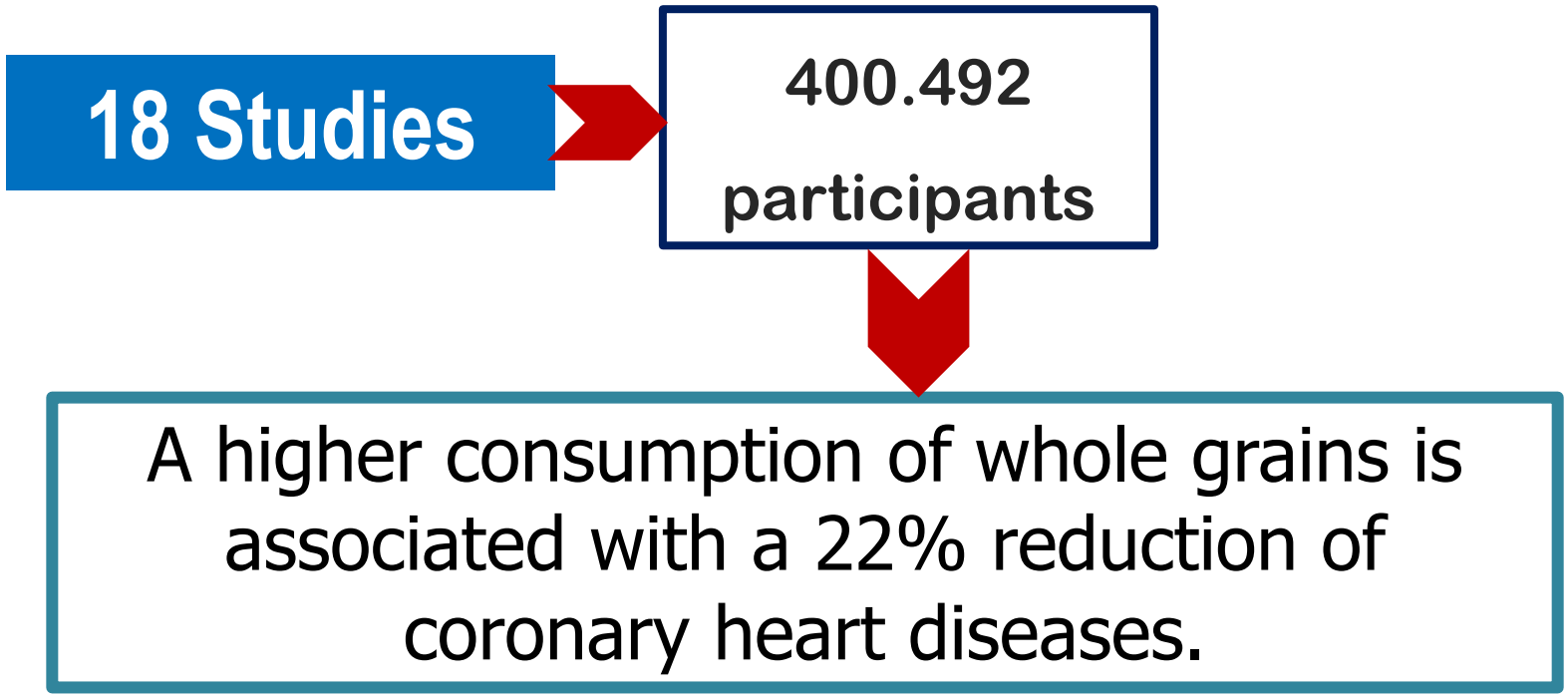
Cardiovascular Disease



Cardiovascular Disease

The American Journal of Cardiology

Meta-Analysis of the Association Between Whole Grain Intake and Coronary Heart Disease Risk

Gang Tang, MD, Duan Wang, BS, Jun Long, BS, Fan Yang, BS, and Liangyi Si, PhD*

Inverse associations were also found in the United States and Europe.

Conclusion

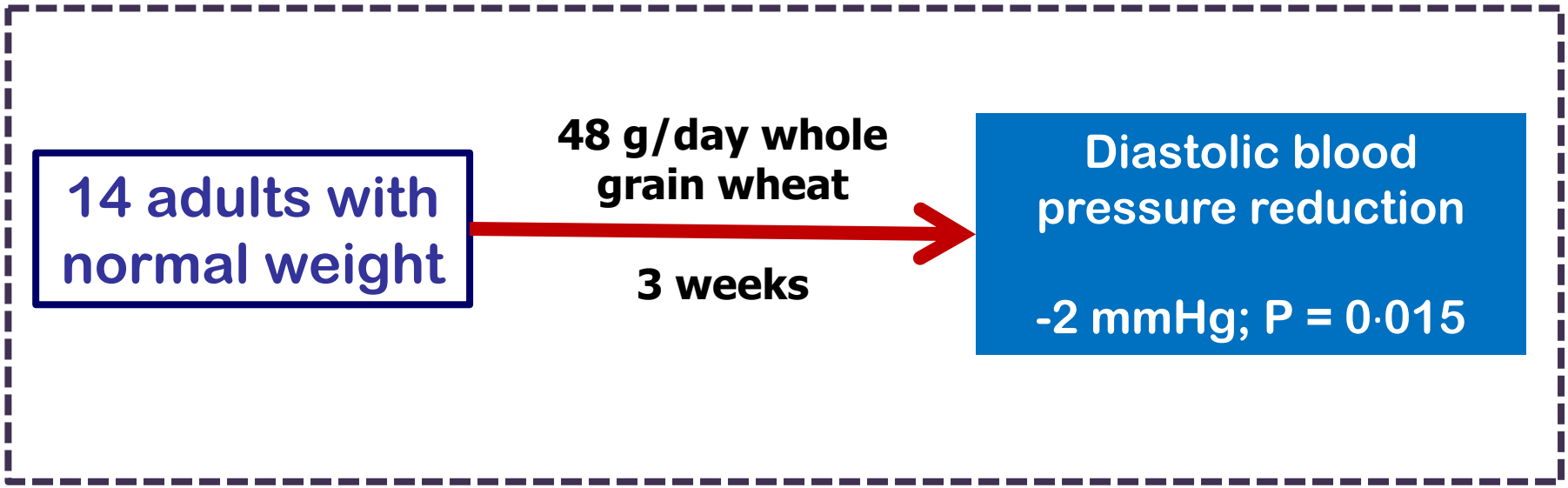
Increased consumption of whole grains has a protective effect against coronary heart diseases.

Consumption of Whole Grains and Blood Pressure

BJN
BRITISH JOURNAL OF NUTRITION

Short-term effects of whole-grain wheat on appetite and food intake in healthy adults: a pilot study

Bodinham CL, Hitchen KL, Youngman PJ, Frost GS, Robertson MD. Br J Nutr. 2011 Aug;106(3):327-30.



Consumption of whole grains and cholesterol levels and other indicators of cardiovascular risk

The American Journal of CLINICAL NUTRITION
Official Journal of The American Society for Clinical Nutrition, Inc

Intake of whole grains, refined grains, and cereal fiber measured with 7-d diet records and associations with risk factors for chronic disease[1–3]

PK Newby, Janice Maras, Peter Bakun, Denis Muller, Luigi Ferrucci, and Katherine L Tucker

Am J Clin Nutr 2007;86:1745–53.

Inverse association between the consumption of whole grains and the figures of total cholesterol and LDL-Cholesterol

Whole grains, bran, and germ in relation to homocysteine and markers of glycemic control, lipids, and inflammation[1–3]

Majken K Jensen, Pauline Koh-Banerjee, Mary Franz, Laura Sampson, Morten Grønbæk, and Eric B Rimm

Am J Clin Nutr 2006;83:275–83.

Consumption of whole grains was inversely associated with homocysteine and C-reactive protein concentrations

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Protection Against Cancer

Health Benefits of Dietary Whole Grains: An Umbrella Review of Meta-analyses

Marc P. McRae, MSc, DC, FACN, DACBN

(J Chiropr Med 2017;16:10-18)

Review of all meta-analysis published from January 1, 1980 to May 31, 2016

Conclusions

The consumption of whole grains is associated with a **6-43% reduction in the risk of colorectal, pancreatic and gastric cancer**, and a **decrease in cancer mortality of 11%. Consumption of 2-3 servings/day of whole grains can be a justifiable public health goal.**

Protection Against Cancer

The American Journal of Clinical Nutrition

Glycemic index, glycemic load, and cancer risk: a meta-analysis[1–3]

Patrizia Gnagnarella, Sara Gandini, Carlo La Vecchia, and Patrick Maisonneuve

ABSTRACT

Background: Factors linked to glucose metabolism play an important role in the development of cancers, and both glycemic index (GI) and glycemic load (GL) have been investigated as potential etiologic factors.

Objective: A meta-analysis was performed to explore the association between GI and GL and cancer risk from published studies.

Design: A comprehensive, systematic bibliographic search of the medical literature was conducted to identify relevant studies. Case-control and cohort studies published before October 2007 that reported cancer risk estimates for GI and GL were included. Pooled relative risks (RRs) were estimated for breast, colorectal, endometrial, and pancreatic cancer.

Results: Thirty-nine studies were included in the meta-analysis. The interquantile ranges of GL were significantly wider in case-control studies, most of which were conducted in European countries, than in cohort studies. Cohort studies that presented lower ranges of GL also reported lower risk estimates. Overall, both GL and GI were significantly associated with a greater risk of colorectal (summary RR = 1.26; 95% CI: 1.11, 1.44 and RR = 1.18; 95% CI: 1.05, 1.34, respectively) and endometrial (RR = 1.36; 95% CI: 1.14, 1.62 and RR = 1.22; 95% CI: 1.01, 1.49) cancer than of breast and pancreatic cancer. There was, however, a significant between-study heterogeneity for colorectal cancer ($P < 0.0001$). The association between GL and breast cancer disappeared when publication bias was taken

The consumption of foods with **low glycemic load and index**, including cereals with a high fiber content, is associated with a **lower risk of colorectal, pancreatic, endometrial and breast cancer.**

MATERIALS AND METHODS

Data sources and search strategy

Published reports were identified from electronic databases [ie, PubMed, ISI Web of Science (Science Citation Index Ex-

Protection Against Cancer

The Journal of Nutrition
Nutrition and Disease

Rye Whole Grain and Bran Intake Compared with Refined Wheat Decreases Urinary C-Peptide, Plasma Insulin, and Prostate Specific Antigen in Men with Prostate Cancer[1–3]

Rikard Landberg,[4]* Swen-Olof Andersson,[5] Jie-Xian Zhang,[6] Jan-Erik Johansson,[5] Ulf-Håkan Stenman,[7] Herman Adlercreutz,[8] Afaf Kamal-Eldin,[4] Per Åman,[4] and Göran Hallmans[6]

Abstract

Rye whole grain and bran intake has shown beneficial effects on prostate car
lower tumor take rates, smaller tumor volumes, and reduced prostate specific
study showed increased apoptosis after consumption of rye bran bread. In this st
of rye whole grain and bran on prostate cancer progression as assessed by PSA c
cancer. Seventeen participants were provided with 485 g rye whole grain and b
with added cellulose (WP), corresponding to ~50% of daily energy intake, in a ran
samples were taken from fasting men before and after 2, 4, and 6 wk of treatm
before the first intervention period and after treatment. Plasma total PSA conce
compared with WP, with a mean treatment effect of −14% ($P = 0.04$). Addition
peptide excretion were lower after treatment with RP compared with WP ($P < 0.$
of 5 lignans was higher after the RP treatment than after the WP treatment ($P < 0$
from rye resulted in significantly lower plasma PSA compared with a cellulose-supplemented refined wheat diet in patients with prostate cancer. The effect may be related to inhibition of prostate cancer progression caused by decreased exposure to insulin, as indicated by plasma insulin and urinary C-peptide excretion. J. Nutr. 140: 2180–2186, 2010.

A high consumption of **whole grain rye products** was associated with a reduction in plasma levels of **prostate-specific antigen**

Protection Against Cancer

The Journal of Nutrition
Nutrition and Disease

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A high consumption of **whole grain rye products** was associated with a reduction in plasma levels of **prostate-specific antigen,** **prostate cancer.**

Health benefits associated with the consumption of whole cereals

- Mortality
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Weight Control

European Journal of Clinical Nutrition (2009) 63, 31–38

0954-3007/09 $32.00
www.nature.com/ejcn

Whole-grain consumption, dietary fibre intake and body mass index in the Netherlands cohort study

LPL van de Vijver[1,3], LMC van den Bosch[1], PA van den Brandt[2] and RA Goldbohm[1,4]

Objectives: To assess the association of whole-grain and (cereal) fibre intake with body mass index (BMI) and with the risk of being overweight (BMI $\geq$ 25) or obese (BMI $\geq$ 30 kg m^{-2}).
Subjects: A total of 2078 men and 2159 women, aged 55–69 years, were included in the analysis, after exclusion of subjects with diagnosed cancer or deceased within 1 year after baseline or with missing dietary information.
Results: We found an inverse association between whole-grain consumption and BMI and risk of overweight and obesity in men as well as women. The association in men was stronger than in women; the risk of being obese as compared to normal weight was 10% (95% CI: 2–16%) and 4% (95% CI: 1–7%) lower for each additional gram of (dry) grain consumption in men and women, respectively. Fibre and cereal fibre intake were inversely associated with BMI in men only. Associations were similar after exclusion of likely under- and overreporters of energy. A retrospective analysis of baseline fibre intake and weight gain after the age of 20 years also showed a slight inverse association.
Conclusions: Whole-grain consumption may protect against becoming overweight or obese; however, the cross-sectional design of the study does not allow conclusions about the causality of the association.

Weight Control

Albertson et al. Nutrition Journal (2016) 15:8
DOI 10.1186/s12937-016-0126-4

Nutrition Journal

RESEARCH Open Access

Whole grain consumption trends and associations with body weight measures in the United States: results from the cross sectional National Health and Nutrition Examination Survey 2001–2012

Ann M. Albertson[1], Marla Reicks[2*], Nandan Joshi[3] and Carolyn K. Gugger[1]

Goal

Analyze whole grain consumption and determine their association with adiposity measures in children and adults

Results

Children and adults consuming at least 1 serving/day of whole grains had lower numbers of BMI and waist circumference than those who never or rarely eat whole grains.

The percentage of overweight / obese persons was also lower in this group.

Weight Control

Overweight and obesity are a growing health problem.

Its increase has been parallel to a decline in cereal consumption and little/no consumption of whole grains.

It would be advisable to try to increase consumption.

Recommendations for Cereal Consumption

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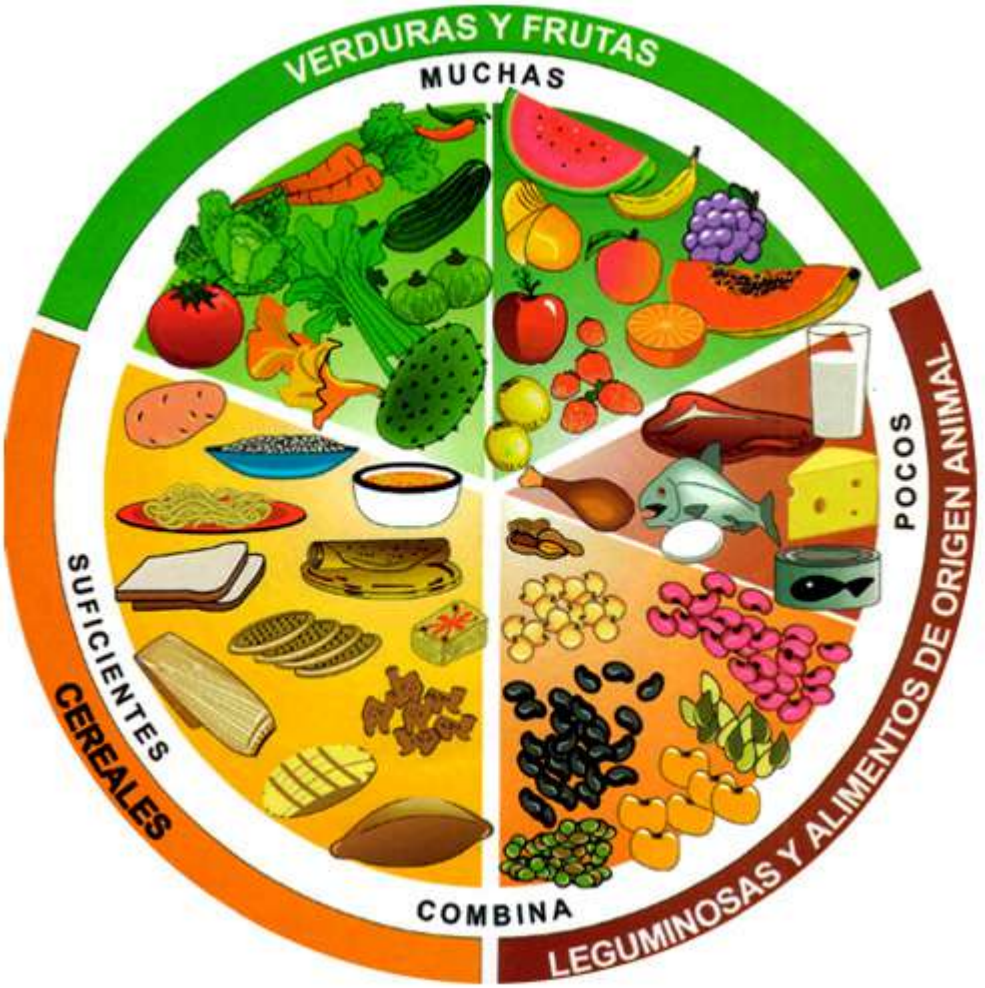
Pyramid of Healthy Eating(Spain)

SENC 2015

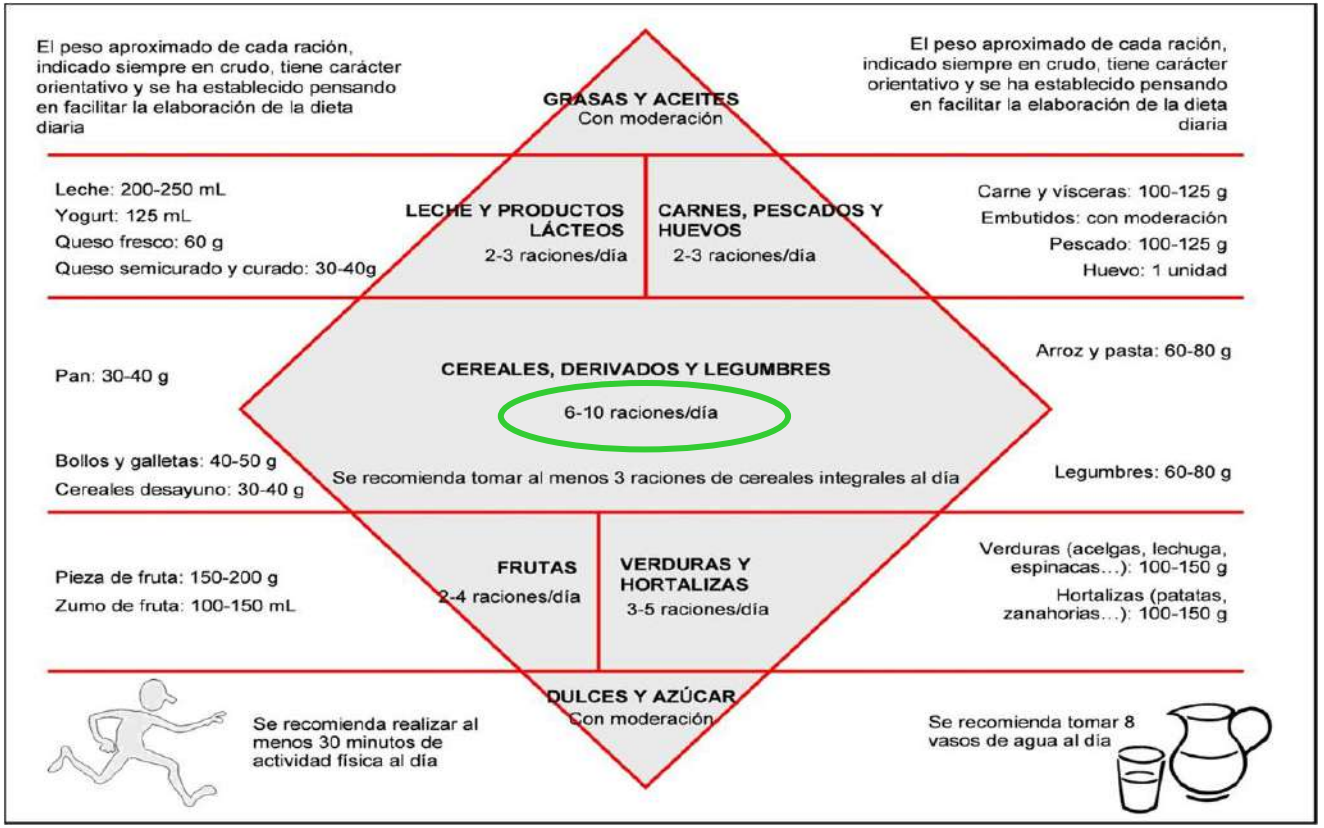
Recommendations for Cereal Consumption



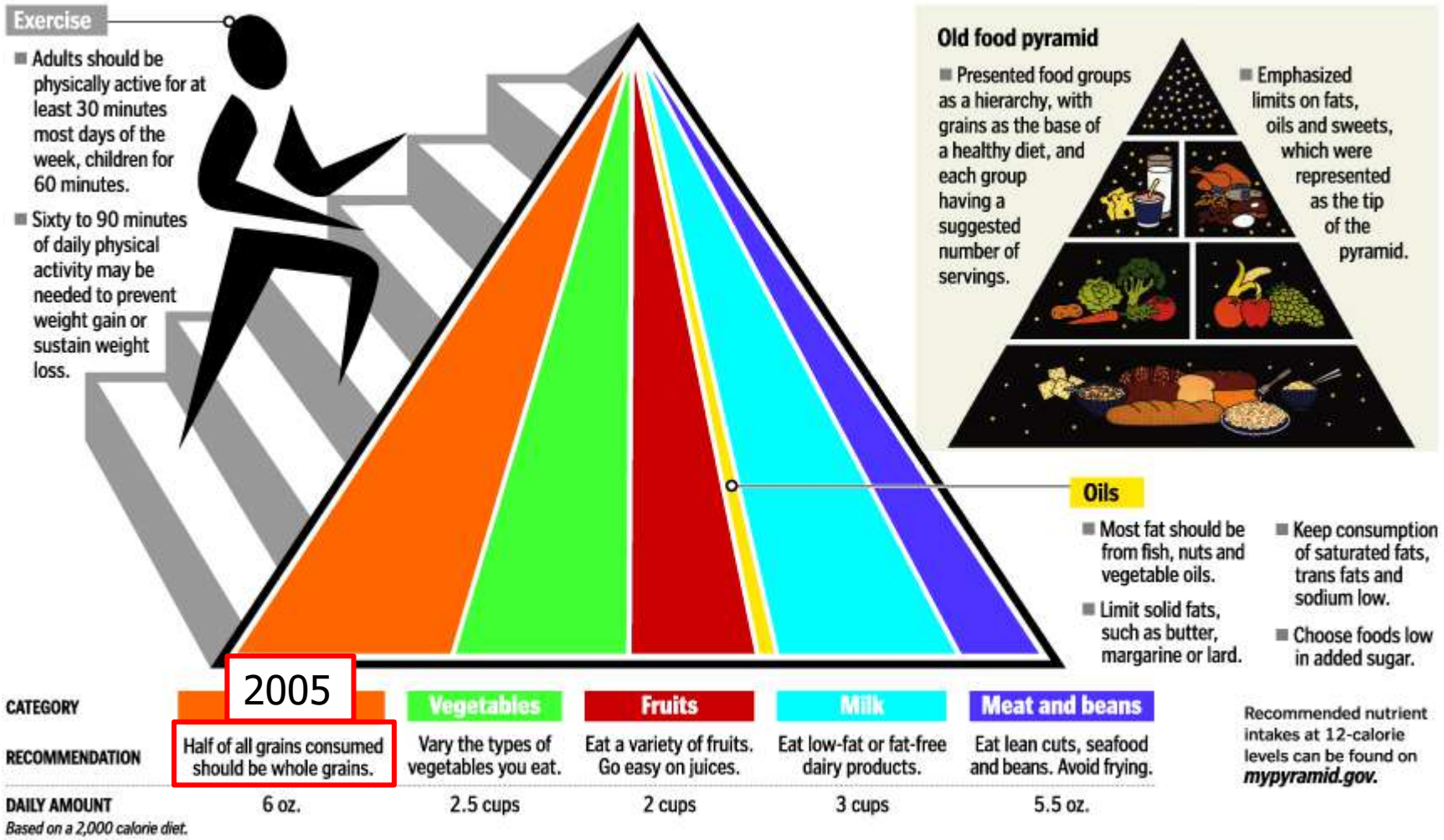
“El plato del bien comer” (Mexico)

Recommendations for Cereal Consumption

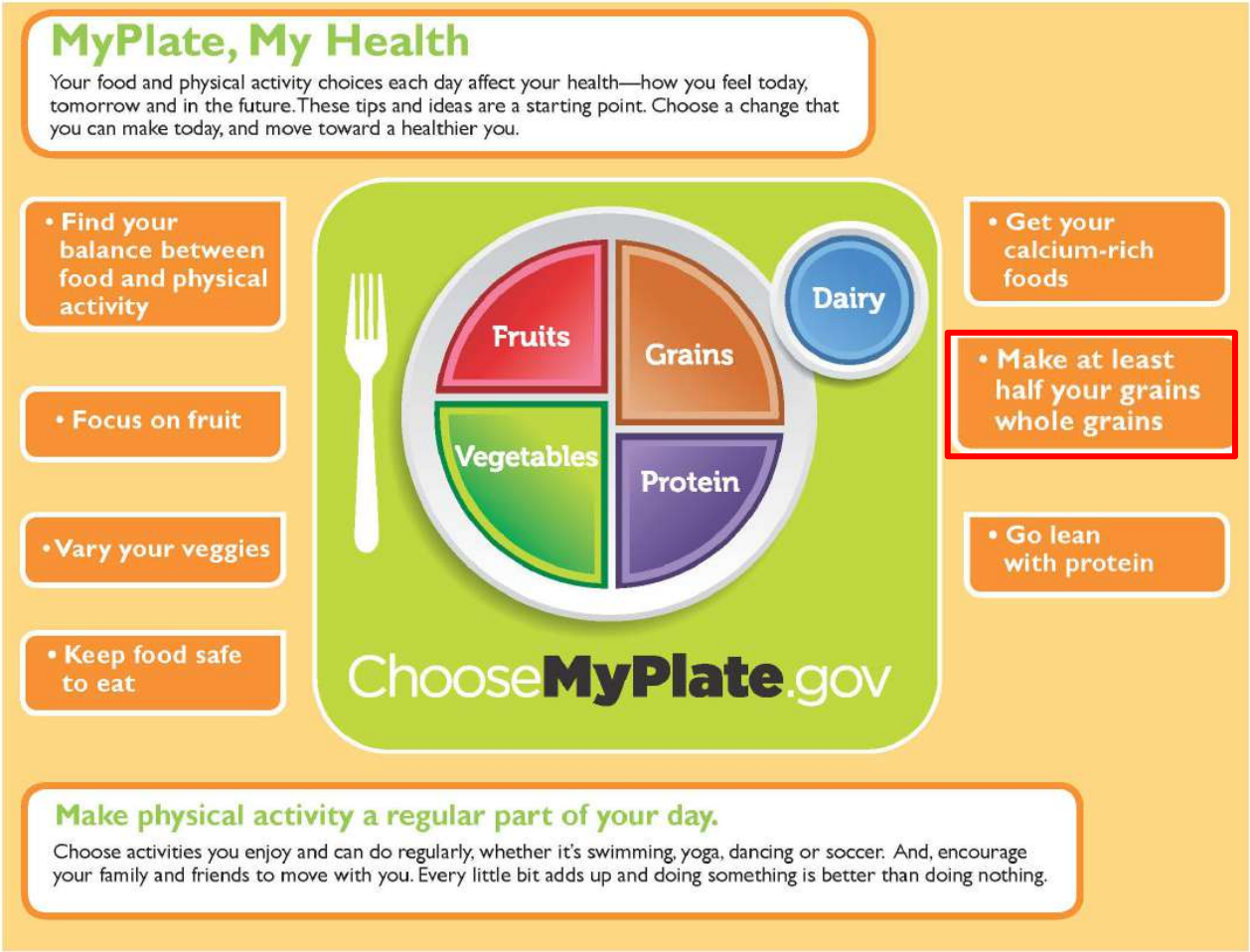
The Food Rhombus (Spain)



Recommendations for Cereal Consumption

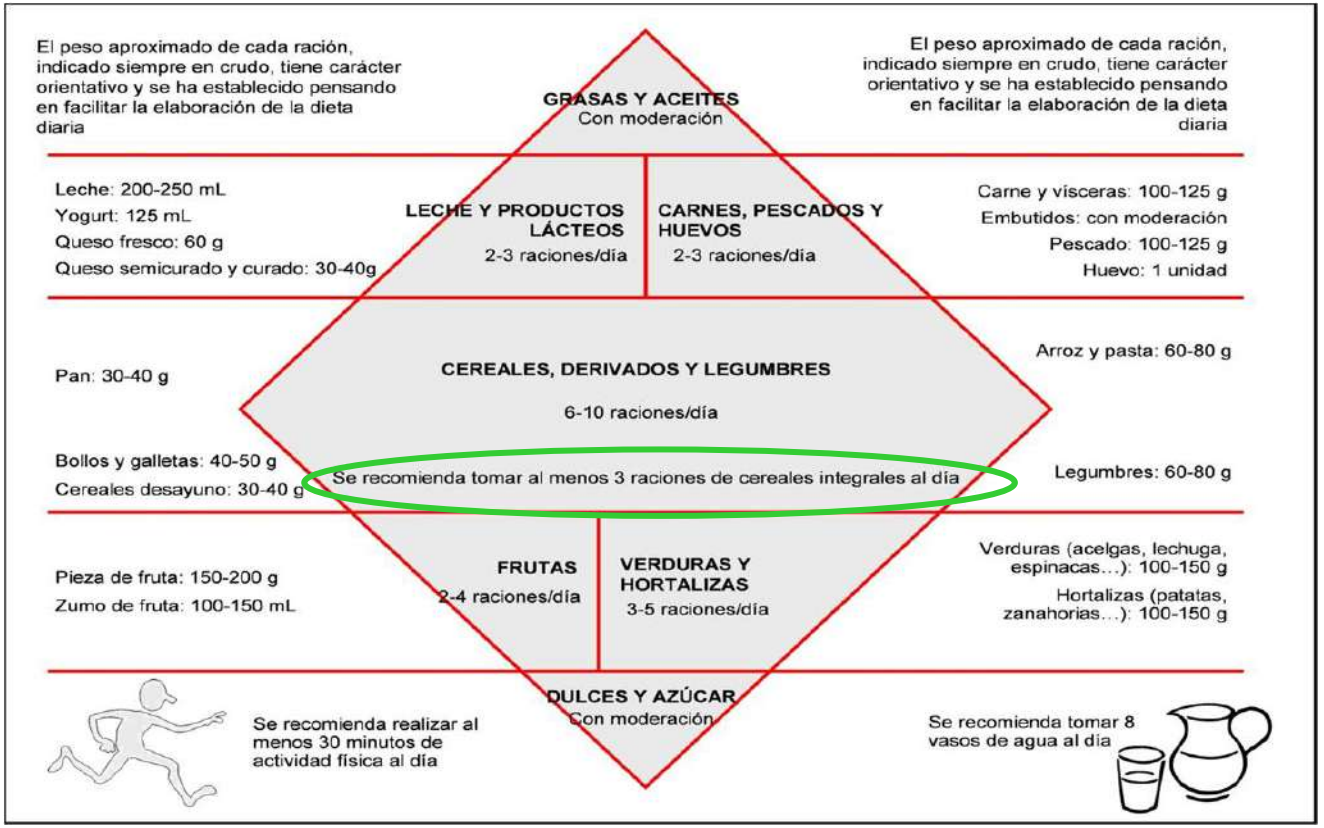


Recommendations for Cereal Consumption



Recommendations for Cereal Consumption

The Food Rhombus (Spain)



Cereal Consumption

Cereal Consumption in Spain

The American Journal of CLINICAL NUTRITION
Official Journal of The American Society for Clinical Nutrition, Inc

Fiber intake and all-cause mortality in the Prevención con Dieta Mediterránea (PREDIMED) study[1–3]

Pilar Buil-Cosiales, Itziar Zazpe, Estefanía Toledo, Dolores Corella, Jordi Salas-Salvadó, Javier Diez-Espino, Emilio Ros, Joaquin Fernandez-Creuet Navajas, José Manuel Santos-Lozano, Fernando Arós, Miquel Fiol, Olga Castañer, Lluis Serra-Majem, Xavier Pintó, Rosa M Lamuela-Raventós, Amelia Martí, F Javier Basterra-Gortari, José V Sorlí, Jose M[a] Verdú-Rotellar, Josep Basora, Valentina Ruiz-Gutierrez, Ramón Estruch, and Miguel A Martínez-González

Am J Clin Nutr 2014;100:1498–507.

Demographic and lifestyle characteristics and daily nutrient intakes according to baseline quintiles of dietary fiber intake among participants in the PREDIMED study[1]

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Dietary fiber intake,[2] g/d	17	21	24	28	35
n	1444	1443	1443	1443	1443
Age, y	67 ± 6.3[3]	67 ± 6.4	67 ± 6.1	67 ± 6.2	67 ± 6.0
Male sex, %	43	43	43	43	43
BMI,[4] kg/m^2	30 ± 3.9	30 ± 3.8	30 ± 3.8	30 ± 4.0	30 ± 3.8
Energy intake, kcal/d	2392 ± 539	2184 ± 534	2152 ± 526	2154 ± 523	2299 ± 557
Carbohydrate, % of energy	39 ± 7	40 ± 6	41 ± 7	43 ± 7	45 ± 7
Protein, % of energy	16 ± 3	16 ± 3	17 ± 3	17 ± 3	17 ± 3
Fat, % of energy	42 ± 7	40 ± 6	40 ± 7	38 ± 7	36 ± 6
SFAs, % of energy	11 ± 2	10 ± 2	10 ± 2	10 ± 2	9 ± 2
MUFAs, % of energy	21 ± 4	20 ± 4	20 ± 5	19 ± 4	17 ± 4
PUFAs, % of energy	6 ± 2	6 ± 2	6 ± 2	6 ± 2	6 ± 2
Refined grains, g/d	141 ± 88	132 ± 90	119 ± 91	103 ± 87	71 ± 78
Whole grains, g/d	4 ± 14	7 ± 21	17 ± 32	31 ± 45	89 ± 93

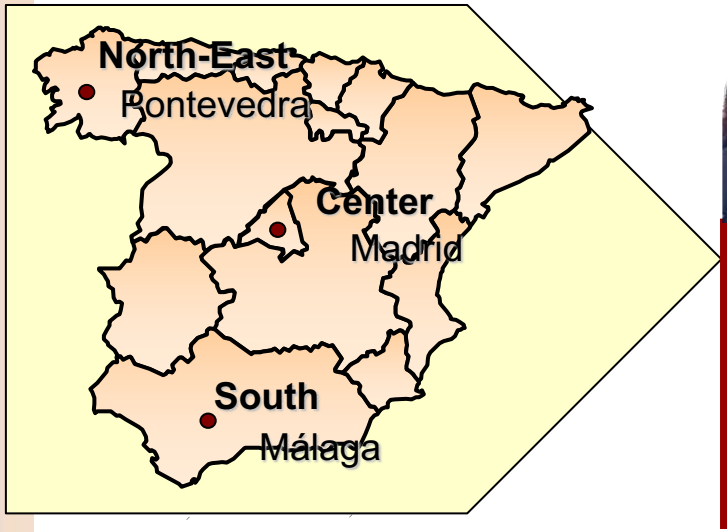
"Influencia del consumo de pan en la calidad de la dieta y hábitos alimentarios de adultos españoles. Percepciones y conocimientos existentes en torno a este alimento"

El trabajo ha sido realizado por:

Profa. Dra. Beatriz Navia Lombán
Profa. Dra. Rosa María Ortega Anta
Prof. Dr. José Miguel Perea Sánchez
Profa. Dra. Aránzazu Aparicio Vizuete
Profa. Dra. Ana M. López Sobaler
Prof. Dr. Pedro Andrés Carvajales
Profa. Dra. Liliana González Rodríguez
Prof. D. Miguel Cons Ferreiro

Equipo investigador del Departamento de Nutrición de la Facultad de Farmacia de la Universidad Complutense de Madrid

Abril, 2016

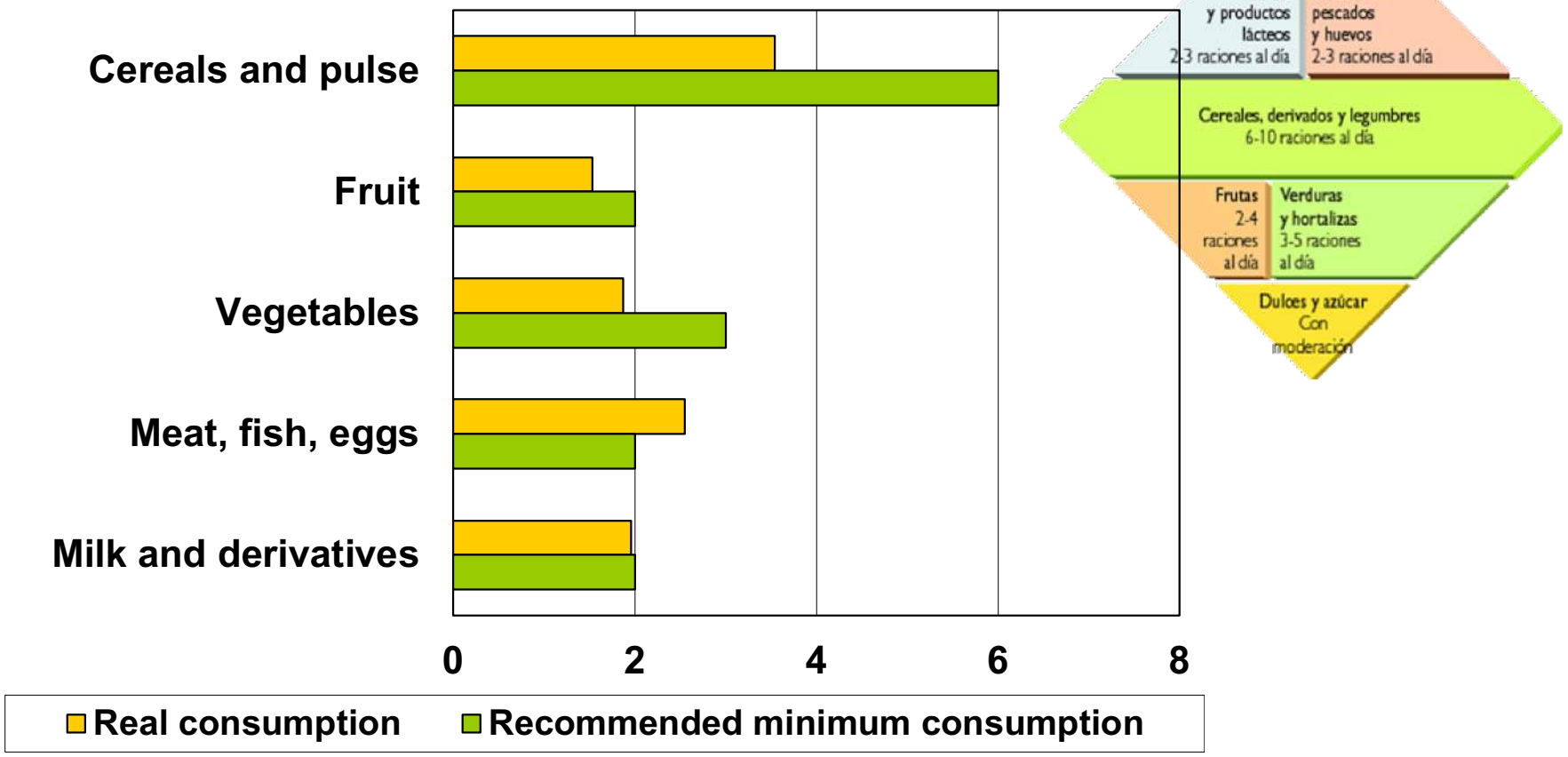


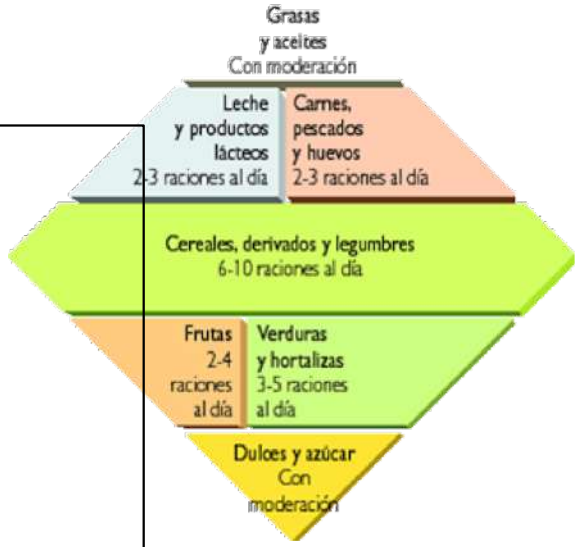
Population
311 adults
Age 18-50

134 men

177 women

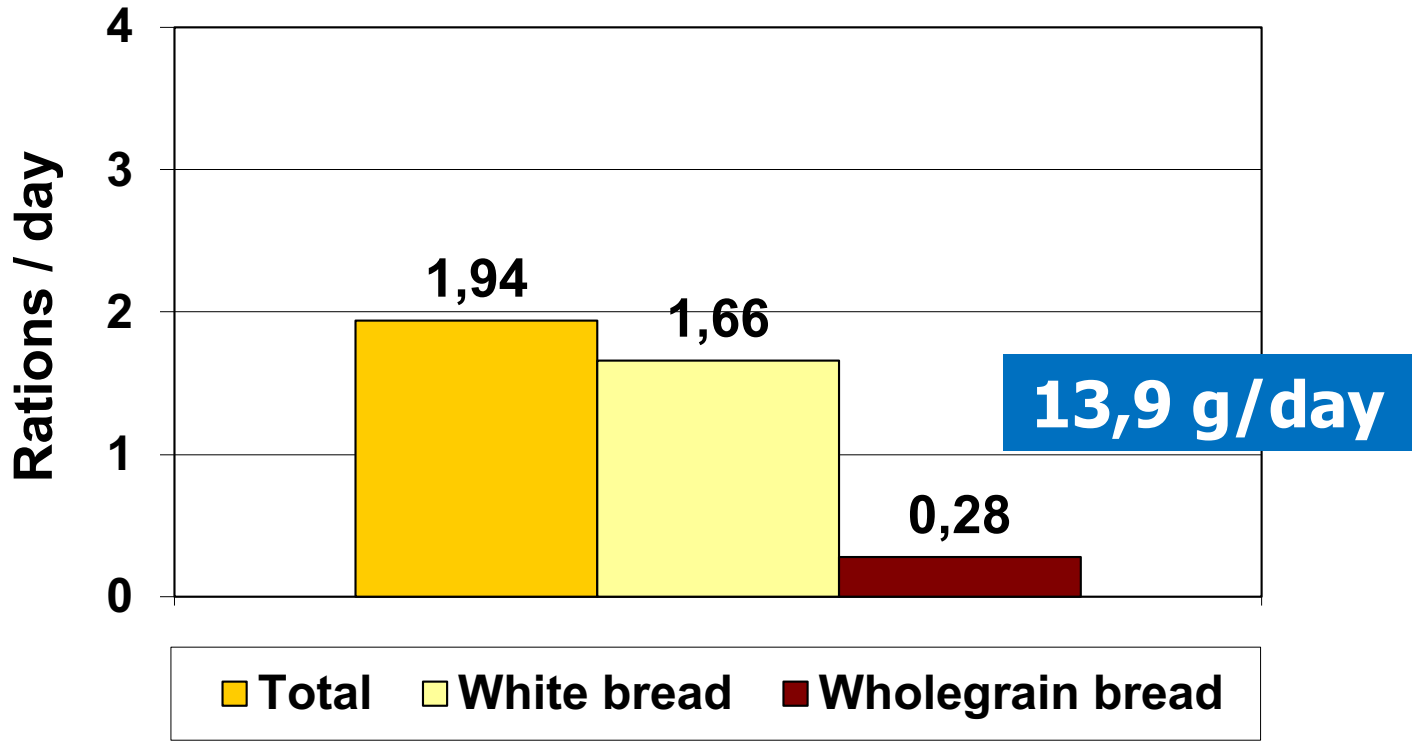
Food consumption (rations / day) of the studied population





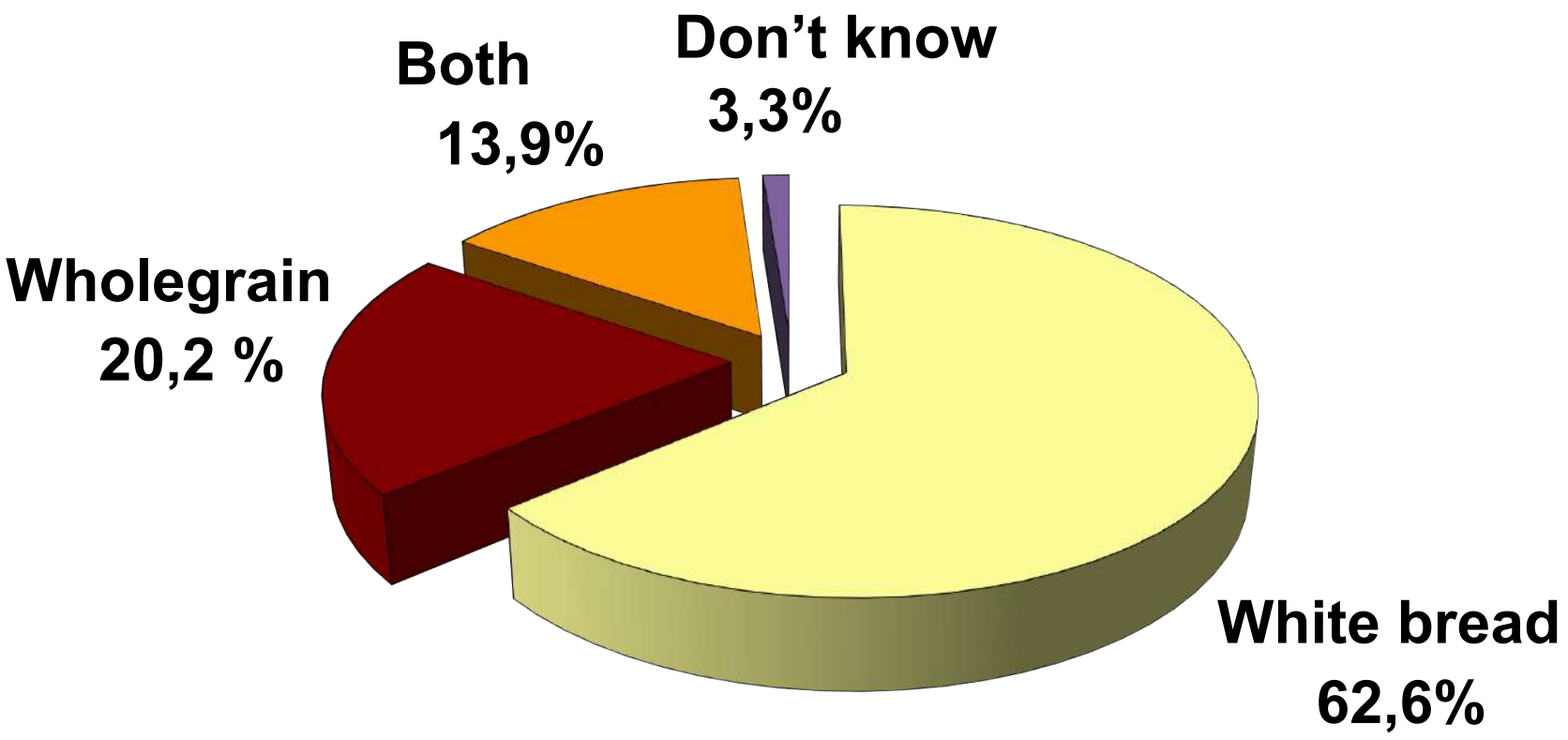
Navia y col., 2016

Bread consumption (rations / day) of the studied population



Navia y col., 2016

Type of bread consumed (% consumers) in the studied population



Navia y col., 2016

Possible causes of low cereal consumption

- Lack of knowledge of existing guidelines
- Misperceptions

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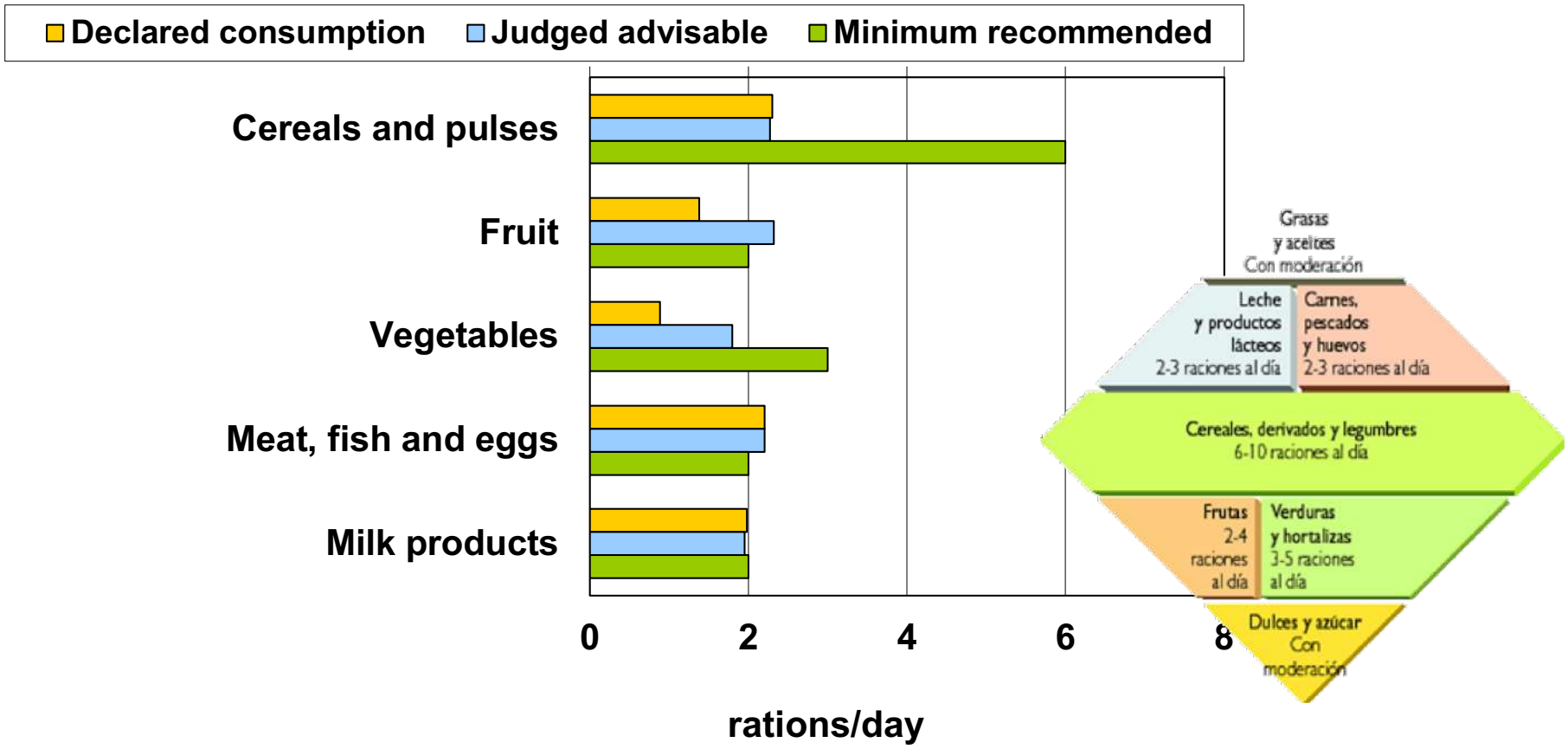
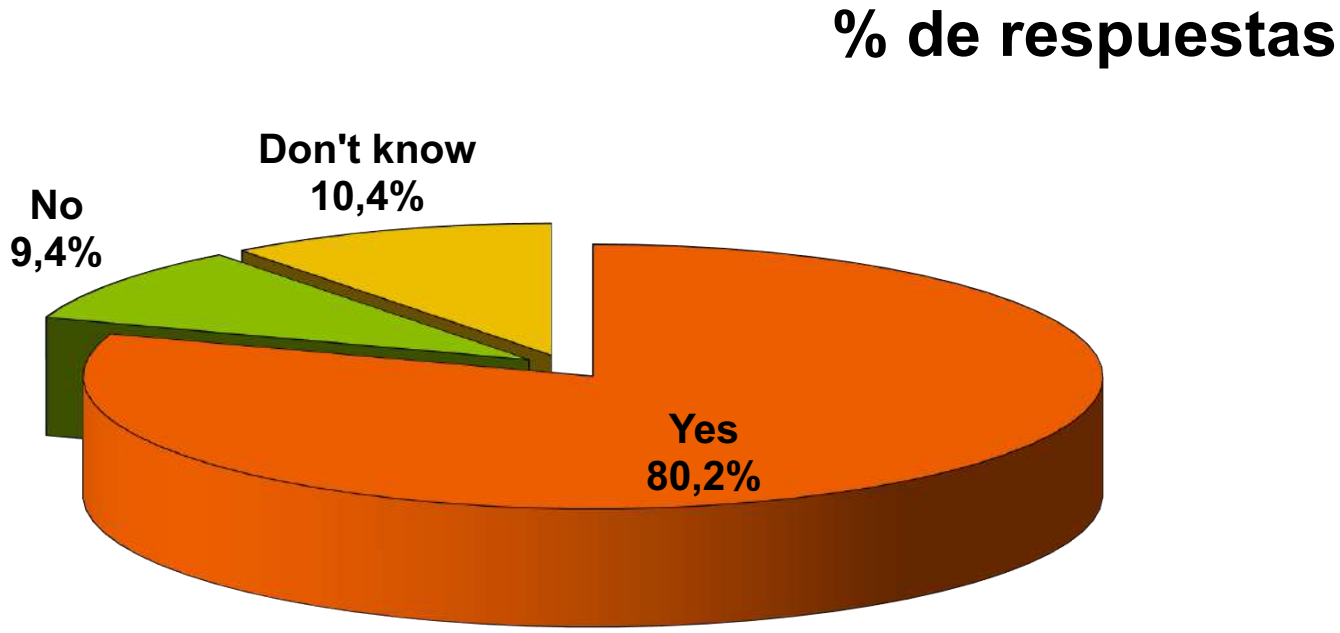
Frequency of actual and judged advisable food consumption compared to the real guidelines



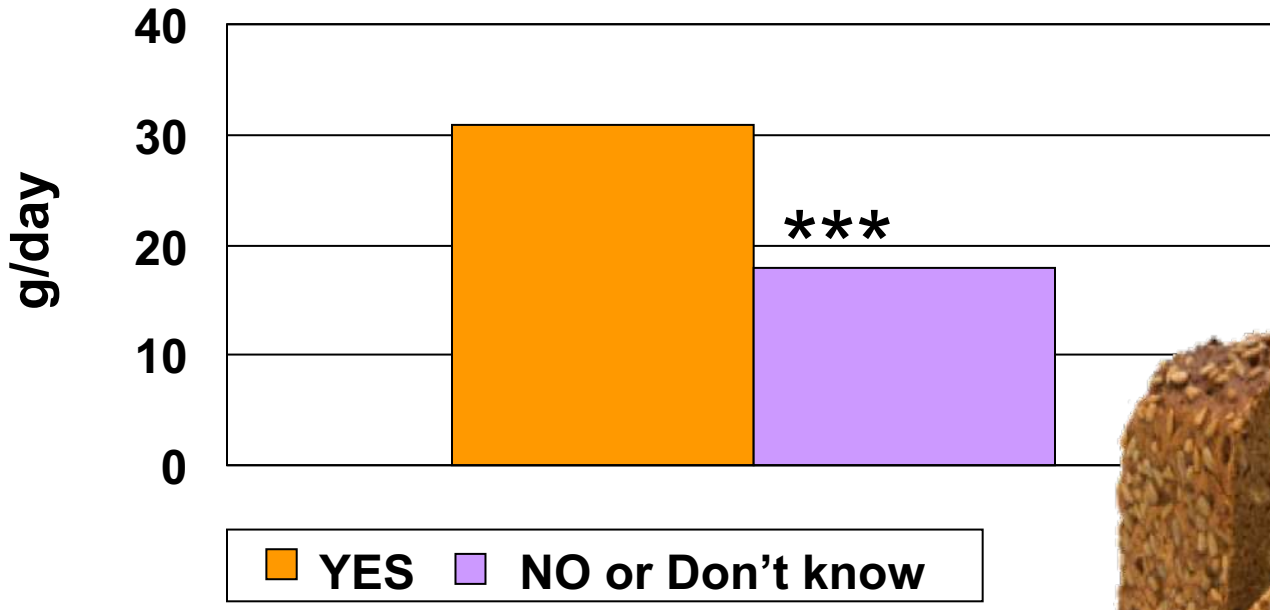
Navia y col., 2016

Answer to the question: Do you think it is important to include whole grains in the diet?



Navia y col., 2016

Consumption of whole grain bread (g/day) based on the answer to the question Do you think it is important to include whole grains in the diet?

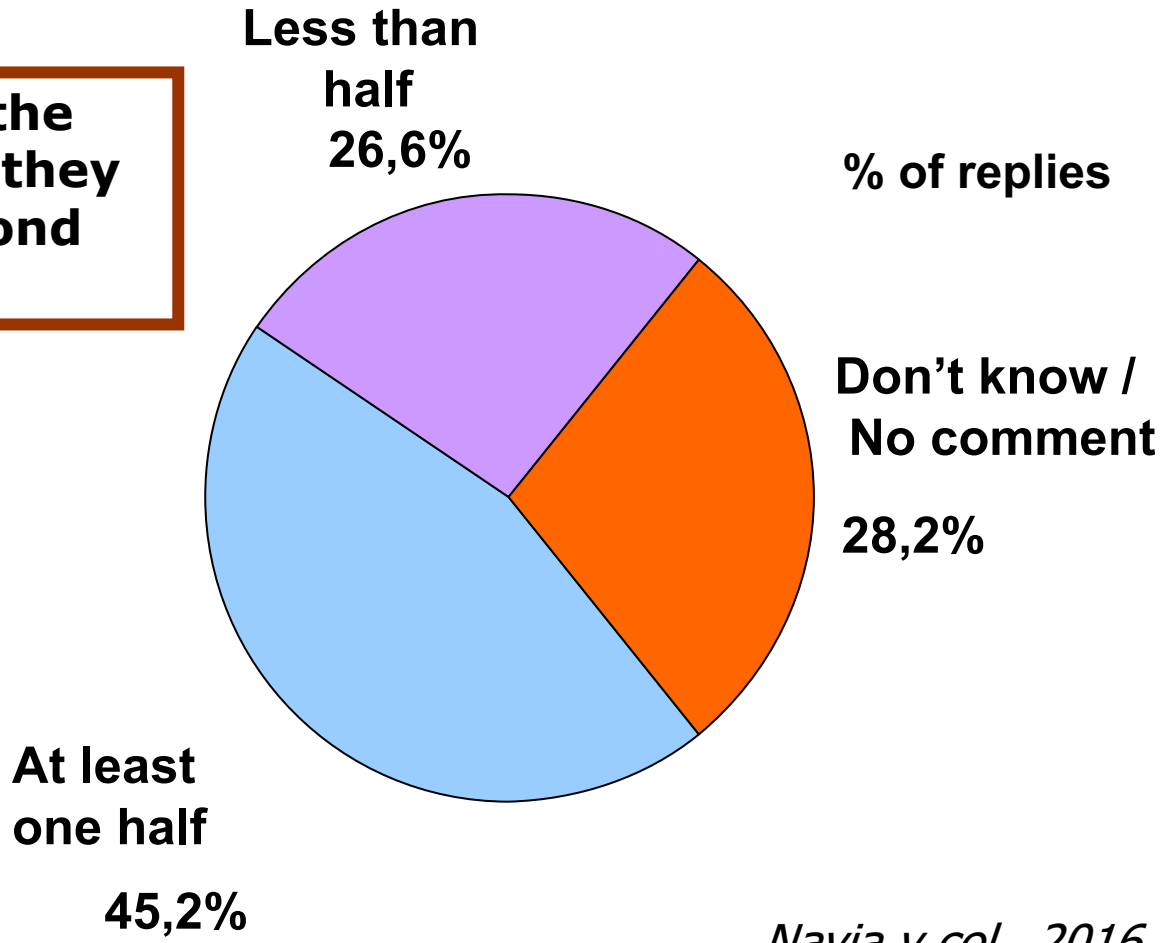


*** P<0,001

Navia y col., 2016

Answer to the question: In what proportion to the total of cereals?

More than 50% of the studied subjects say they don't know or respond inaccurately.



Navia y col., 2016

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”Gluten-Free” Trend

- Currently there is a trend that encourages the elimination of gluten from the diet of healthy people:
  - Lose weight
  - Feel better
  - Healthier alternative

Answer: "Gluten is harmful to health ..."

Population

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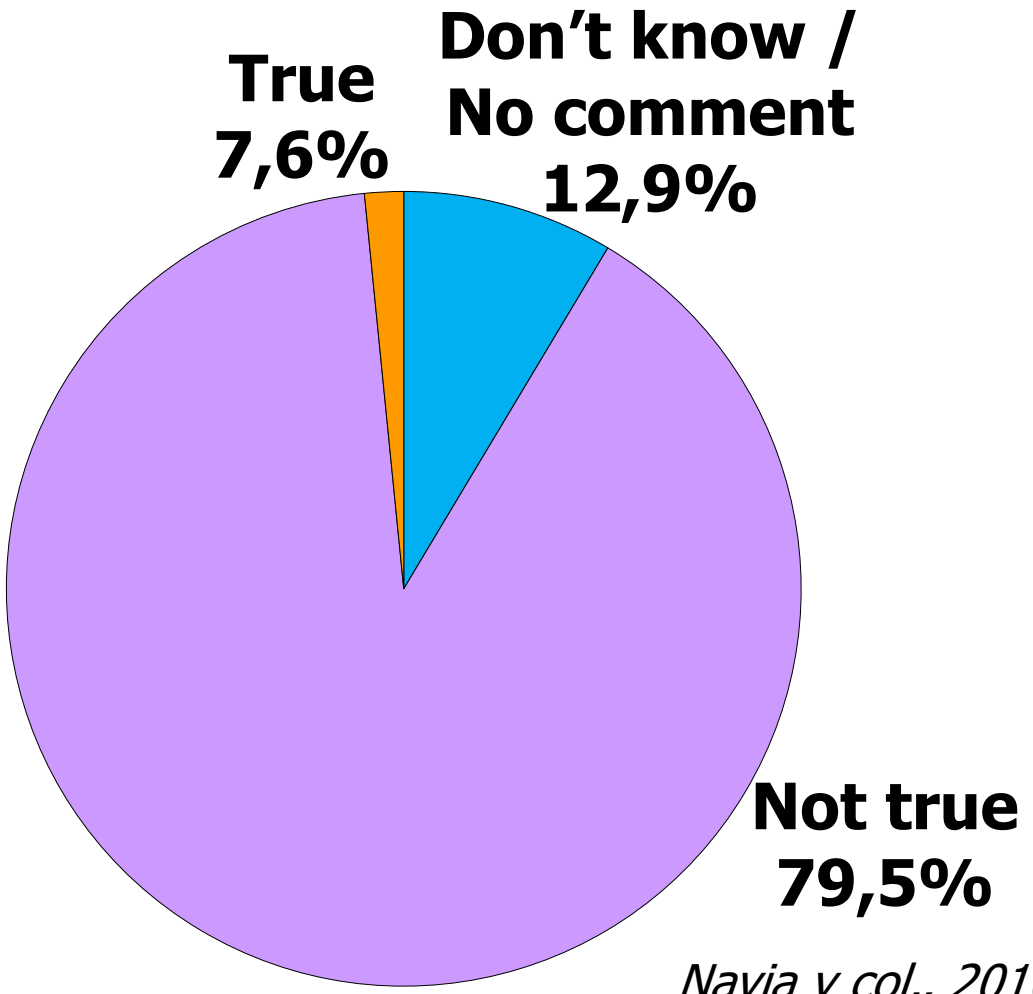

Navia y col., 2016

Risks and disadvantages of gluten-free diets

- Decreased palatability
- Price
- Social consequences
- Risk of eating disorders
- Interference with medical care
- Inadequacy of the diet

Possible causes of inadequate diet in gluten-free diets

Plant Foods Hum Nutr (2014) 69:182–187

Nutritional Differences Between a Gluten-free Diet and a Diet Containing Equivalent Products with Gluten

J. Miranda · A. Lasa · M. A. Bustamante · I. Churruca · E. Simon

GF products provide less protein, more fat (especially saturated), more sodium and less fiber, than their gluten counterparts

British Journal of Nutrition (2015), **114**, 448–454
doi:10.1017/S0007114515002056

Are gluten-free foods healthier than non-gluten-free foods? An evaluation of supermarket products in Australia

Jason H. Y. Wu[1*], Bruce Neal[1,2,3], Helen Trevena[1], Michelle Crino[1], Wendy Stuart-Smith[4], Kim Faulkner-Hogg[5], Jimmy Chun Yu Louie[4,6] and Elizabeth Dunford[1]

GF products provide less protein

Possible causes of inadequate diet in gluten-free diets

Not having alternatives: Grain reduction / exclusion

Decreased intake of fiber, vitamins and minerals

Elimination of the benefits of the consumption of whole cereals

British Journal of Nutrition (2015), **114**, 1539–1541

Possible causes of inadequate diet in gluten-free diets

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British Journal of Nutrition (2015), **114**, 1539–1541

Long term gluten consumption in adults without celiac disease and risk of coronary heart disease: prospective cohort study

Benjamin Lebwohl,[1,2] Yin Cao,[3,4,5] Geng Zong,[5] Frank B Hu,[5,6] Peter H R Green,[1] Alfred I Neugut,[1,2] Eric B Rimm,[5,6,7] Laura Sampson,[5] Lauren W Dougherty,[5] Edward Giovannucci,[5,6,7] Walter C Willett,[5,6,7] Qi Sun,[5,6] Andrew T Chan[3,4,6]

the bmj | *BMJ* 2017;357:j1892 | doi: 10.1136/bmj.j1892

SETTING AND PARTICIPANTS

64 714 women in the Nurses' Health Study and 45 303 men in the Health Professionals Follow-up Study without a history of coronary completed a 131 item semiqu questionnaire in 1986 that wa years through 2010.

EL PAÍS

CELIACOS 3 MAY 2017

El gluten solo es malo para los celíacos

Una dieta prolongada sin esta proteína puede perjudicar a la salud de los que no tienen celiaquía

Long term gluten consumption in adults without celiac disease and risk of coronary heart disease: prospective cohort study

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thebmj | *BMJ* 2017;357:j1892 | doi: 10.1136/bmj.j1892

CONCLUSION

Long term dietary intake of gluten was not associated with risk of coronary heart disease. However, the

Gluten-free diets should NOT be encouraged in people without celiac disease

be encouraged.

The improvement may be due to ...

Improvements in the quality of the diet:

Decreased consumption of processed foods

Increased consumption of fruits, vegetables and whole grains without gluten

British Journal of Nutrition (2015), **114**, 1539–1541

Conclusions

- Cereals and bread are essential nutrients to balance the diet
- The nutritional and health benefits associated with the consumption of whole grains provide an added value to these foods
- The dietary guidelines recommend a consumption of 6 servings/day of cereals including a minimum of 3 servings/day of whole cereals
- It is desirable to spread the message and clarify misconceptions in the population