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Choose whole grains instead of refined grains. Whole grains offer a complete package of health benefits, unlike refining process. All whole grains which are stripped of valuable nutrients in the refining process. All whole grains which are stripped of valuable nutrients in the refining process.
layer that supplies B vitamins, iron, copper, zinc, magnesium, antioxidants, and phytochemicals. Phytochemicals are natural chemical compounds in plants that have been researched for their role in disease prevention. The germ is the core of the seed where growth occurs; it is rich in healthy fats, vitamin E, B vitamins, phytochemicals, and
antioxidants. The endosperm is the interior layer that holds carbohydrates, protein, and small amounts of some B vitamins and minerals. These components have various effects on our bodies: Bran and fiber slow the breakdown of starch into glucosethus maintaining a steady blood sugar rather than causing sharp spikes. Fiber helps lower cholesterol
as well as move waste through the digestive tract. Fiber may also help prevent the formation of small blood clots that can trigger heart attacks or strokes. Phytochemicals and essential minerals such as magnesium, selenium and copper found in whole grains may protect against some cancers. The invention of industrialized roller mills in the late 19th
century changed the way we process grains. Milling strips away the bran and germ and leaves only the soft, easy-to-digest endosperm. Without the fibrous bran, the grain is easier to chew. The germ is removed because of its fat content, which can limit the shelf life of processed wheat products. The resulting highly processed grains are much lower in
nutritional quality. Refining wheat creates fluffy flour that makes light, airy breads and pastries, but the process strips away more than half of wheats B vitamins, 90 percent of the vitamin E, and virtually all of the fiber. Although some nutrients may be added back by fortification, other health-promoting components of whole grains such as
phytochemicals cannot be replaced. A growing body of research shows that choosing whole grains and other less-processed, higher-quality sources of carbohydrates, and cutting back on refined grains, improves health in many ways. For a closer look at carbohydrates, check out our Carbohydrate Guide. The 2015-2020 Dietary Guidelines for
Americans recommends eating 6 ounces of grain foods daily (based on a 2000-calorie diet) and getting at least half or 3 ounces of that grain intake from 100% whole grains, and even a possible detrimental effect when eating mostly
refined grains, it is recommended to choose mostly whole grains instead of refined grains. An easy way to tell if a food product is high in 100% whole grains: Be careful when choosing foods labeled as whole grains: Whole grain doesnt
always mean healthy. One study revealed that inconsistent food labeling means that foods identified as whole grain are not always healthy.[2] The study assessed five USDA criteria that identify whole grain as the first ingredient, and added sugars not being one of the
first three ingredients in the ingredient list, 3) the word whole before any grain ingredient, 4) a carbohydrate-to-fiber ratio of less than 10:1, and 5) the industry-sponsored Whole Grain Stamp. The Whole Grain Stamp is a widely used marker on food products. The stamp, while designed to steer consumers towards healthy whole grains, identified
products with more fiber and less sodium and trans fat but that were higher in sugar and calories than whole grain products, but (criterion 4) the carbohydrate-to-fiber ratio of less than 10:1 proved to be the most effective measure of
 healthfulness. However, it is unclear whether this ratio is more predictive of chronic disease risk than other measures of carbohydrate qualitysuch as the amount/type of fiber or overall dietary glycemic index/load. Foods that met this criterion were higher in fiber and less likely to contain trans fats, sodium, and sugar. Because calculating the
carbohydrate-to-fiberratio may be difficult and not readily available for a consumer should steer towards whole grain foods that are high in fiber and that have few ingredients in addition to whole grain. Moreover, eating whole
grains in theirwholeformssuch as brown rice, barley, oats, corn, and ryeare healthy choices because they pack in the nutritional benefits of whole grains without any additional ingredients. As researchers have begun to look more closely at carbohydrates and health, they are learning thatthe quality of the carbohydratesyou eat is at least as important
as the quantity. Most studies, including some from several different Harvard teams, show a connection between whole grain consumption with fewer deaths from inflammatory and infectious causes, excluding cardiac and cancer causes. Examples are rheumatoid
arthritis, gout, asthma, ulcerative colitis, Crohns disease, and neurodegenerative diseases. Compared with women who rarely or never ate whole-grain foods, those who had at least two or more servings a day were 30% less likely to have died from an inflammation-related condition over a 17-year period.[4] A meta-analysis combining results from
studies conducted in the U.S., the United Kingdom, and Scandinavian countries (which included health information from over 786,000 individuals), found that people who ate 70 grams/day of whole grainscompared with those who ate little or no whole grainscompared with those who ate little or no whole grainshad a 22%lower risk of cardiovascular disease mortality,
and a 20% lower risk of cancer mortality.[5] Cardiovascular disease Eating whole instead of refined grains substantially lowers total cholesterol, low-density lipoprotein (LDL, or bad) cholesterol, triglycerides, and insulin levels. In the Harvard-based Nurses Health Study, women who ate 2 to 3 servings of whole-grain products each day were 30% less
likely to have a heart attack or die from heart disease over a 10-year period than women who ate less than 1 serving per week.[6] A meta-analysis of seven major studies showed that cardiovascular disease (heart attack, stroke, or the need for a procedure to bypass or open a clogged artery) was 21% less likely in people who ate 2.5 or more servings
of whole-grain foods a day compared with those who ate less than 2 servings a week. [7] Type 2 diabetes Replacing refined grains with whole grains and phytochemicals in whole grains may improve insulin sensitivity and glucose
metabolism and slow the absorption of food, preventing blood sugar spikes. [8]In contrast, refined grains tend to have a high glycemic index and glycemic load with less fiber and nutrients. In a study of more than 160,000 women whose health and dietary habits were followed for up to 18 years, those who averaged 2 to 3 servings of whole grains a
day were 30% less likely to have developed type 2 diabetes than those who rarely ate whole grains. [9]When the researchers combined these results with those of several other large studies, they found that eating an extra 2 servings of whole grains a day decreased the risk of type 2 diabetes by 21%. A follow-up to that study including men and women
from the Nurses Health Studies I and II and the Health Professionals Follow-Up Study found that swapping white rice for whole grains could help lower diabetes risk. Those who ate the most white rice for whole grains could help lower diabetes risk of diabetes than those who ate white rice less than one time a month. Those who ate the most
brown ricetwo or more servings a weekhad an 11% lower risk of diabetes than those who rarely ate brown rice. Researchers estimate that swapping whole grains in place of even some white rice could lower diabetes at the start of the study found that the
higher the intake of whole grains, the greater the risk reduction of type 2 diabetes. A 43% reduced risk was found in women eating the highest amount of whole grains (2 or more servings daily) as compared with those who ate no whole grains (11] Cancer The data on cancer are mixed, with some studies showing a protective effect of whole grains.
and others showing none. [12,13] A large five-year study among nearly 500,000 men and women suggests that eating whole grains, but not dietary fiber, offers modest protective effect of whole grains from colorectal cancer, with a cumulative risk
reduction of 21%.[16] Digestive health By keeping the stool soft and bulky, the fiber in whole grains helps prevent constipation, a common, costly, and aggravating problem. It also helps prevent diverticular disease (diverticulosis) by decreasing pressure in the intestines.[17] A study of 170,776 women followed for more than 26 years looked at the
effect of different dietary fibers, including that from whole grains, on Crohns disease and ulcerative colitis. Though a reduced risk of either disease found from eating whole grains.[18] Some grains contain the naturally-occurring protein, gluten. While
gluten can cause side effects in certain individuals, such as those with celiac disease, most people can and have eaten gluten most of their liveswithout any adverse reaction. However, negative media attention on wheat and gluten has caused some people to doubt its place in a healthful diet, though there is little published research to support such
claims. For further information on gluten and health, see: Gluten: A Benefit or Harm to the Body? U.S. Department of Agriculture. 2015 2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at Mozaffarian RS, Lee RM, Kennedy MA, Ludwig DS, Mozaffarian D, Gortmaker
SL. Identifying whole grain foods: a comparison of different approaches for selecting more healthful whole grain intake and risk of mortality: two large prospective studies in US men and women. JAMA Intern Med. 2015;175:373-84.
Jacobs DR, Jr., Andersen LF, Blomhoff R. Whole-grain consumption is associated with a reduced risk of noncardiovascular, noncancer death attributed to inflammatory diseases in the Iowa Womens Health Study. Am J Clin Nutr. 2007;85:1606-14. Zong G, Gao A, Hu FB, Sun Q. Whole Grain Intake and Mortality From All Causes, Cardiovascular Disease
and Cancer: A Meta-Analysis of Prospective Cohort Studies. Circulation. 2016;133:2370-80. Liu S, Stampfer MJ, Hu FB, et al. Whole-grain consumption and risk of coronary heart disease: results from the Nurses Health Study. Am J Clin Nutr. 1999;70:412-9. Mellen PB, Walsh TF, Herrington DM. Whole grain intake and cardiovascular disease: a meta-
analysis. Nutr Metab Cardiovasc Dis. 2008;18:283-90. Aune D, Norat T, Romundstad P, Vatten LJ. Whole grain and refined grain consumption and the risk of type 2 diabetes: a systematic review and dose-response meta-analysis of cohort studies. Eur J Epidemiol. 2013;28:845-58. de Munter JS, Hu FB, Spiegelman D, Franz M, van Dam RM. Whole
grain, bran, and germ intake and risk of type 2 diabetes: a prospective cohort study and systematic review. PLoS Med. 2007;4:e261. Sun Q, Spiegelman D, van Dam RM, et al. White rice, brown rice, and risk of type 2 diabetes in US men and women. Arch Intern Med. 2010;170:961-9. Parker ED, Liu S, Van Horn L, et al. The association of whole grain
consumption with incident type 2 diabetes: the Womens Health Initiative Observational Study. Ann Epidemiol. 2013;23:321-7. Aune D, Keum N, Giovannucci E, et al. Whole grain consumption and risk of cardiovascular disease, cancer, and all cause and cause specific mortality: systematic review and dose-response meta-analysis of prospective studies.
BMJ. 2016;353:i2716. Jacobs DR, Jr., Marquart L, Slavin J, Kushi LH. Whole-grain intake and cancer: an expanded review and meta-analysis. Nutr Cancer in the NIH-AARP Diet and Health Study. Am J Clin Nutr.
2007;85:1353-60. Strayer L, Jacobs DR, Jr., Schairer C, Schatzkin A, Flood A. Dietary carbohydrate, glycemic index, and glycemic load and the risk of colorectal cancer in the BCDDP cohort. Cancer Causes Control. 2007;18:853-63. Aune D, Chan DS, Lau R, et al. Dietary fibre, whole grains, and risk of colorectal cancer: systematic review and dose-
response meta-analysis of prospective studies. BMJ. 2011;343:d6617. Strate LL, Keeley BR, Cao Y, Wu K, Giovannucci EL, Chan AT. Western Dietary Pattern Increases, and Prudent Dietary Pattern Increases, and Prudent Dietary Pattern Increases, Risk of Incident Diverticulitis in a Prospective Cohort Study. Gastroenterology. 2017;152:1023-30 e2. Ananthakrishnan AN, Khalili H, Konijeti
GG, et al. A prospective study of long-term intake of dietary fiber and risk of Crohns disease and ulcerative colitis. Gastroenterology. 2013;145:970-7. All grains are the entire seed of a plant. This seed (which industry calls a kernel) is made up of three key edible parts the
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removing some or all of the germ and bran for different uses in baking, but the nutritional value of the germ and bran are also lost. Thank you to Justin Young of Design Chef for this illustration! Whole grain Kernel Its pretty straightforward, really. A whole grain Kernel or seed is composed of three parts: the bran, the endosperm, and the germ. The bran
is the outer shell that protects the seed. It provides fiber, B vitamins, and trace minerals. The germ provides nourishment for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants, vitamin E, B vitamins, and oils. The endosperm provides energy for the seed (and you), containing antioxidants (and you), containing antioxidants (and you) and you are also are also and you are also a
and whole flours include the entire kernel. Refined flours are just the starchy endosperm the nutrient-rich bran and germ have been removed. Image courtesy of the European Food Information Council. Welcome to Eating Rules! Hi! My name is Andrew Wilder, and I think healthy eating doesnt have to suck. With just three simple eating rules, we'll
kickstart your journey into the delicious and vibrant world of unprocessed food. All grains are the entire seed (which industry calls a kernel) is made up of three key edible parts the bran, the germ, and the endosperm protected by an inedible husk
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time when health professionals urge consumers to eat at least half of their grains as whole grains, our Whole Grain Product Finder can make nding whole grains a snap.Low-carb diets have risen in popularity, but there are plenty of ways to eat for a healthy heart. Our review of the latest evidence shows that its the quality of carbohydrate that is most
important. Whole grains are best eaten in place of refined grains alongside plenty of vegetables and fruit. What are intact whole grains? Intact whole grains? Intact whole grains are unrefined and close to how they are found in nature such as oats, barley and brown rice. They contain a wide range of nutrients including fibre, vitamins, minerals and antioxidants, which are intact whole grains? Intact whole
good for our hearts. Examples of intact whole grains to eat most of: Whole oatsBrown riceBarleyBulgar (cracked wheat) Quinoa MilletBuckwheat. What are processed and are much less like they are found in nature, such as white bread, pasta and crackers. They contain fewer nutrients and less
fibre and often contain added sugar, saturated fat and sodium. Examples of refined grains -eat least of theseWhite bread, rolls, wraps, flat breads etc. Crackers or crispbreadWhite rice, pasta, couscous Puffed rice cereals white flour (and products i.e. bagels, pikelets, cakes, biscuits, donuts). What are whole grain products?
Whole grain products have been through some processing but most of the nutritional benefits still remain, like whole grain bread and wholemeal flour. Examples of whole grain products have been through some processing but most of the nutritional benefits still remain, like whole grain breads, rolls, wrapsWhole grain breads and wholemeal flour. Examples of whole grain breads, rolls, wrapsWhole grain breads, rolls
wheat germFlours (i.e. wholemeal). Are whole grains good for my heart? Based on the findings from ourWhole grains and the heart review, eating whole grains can help to:reduce cholesterol (total and low-density lipoprotein) reduce blood
 pressurereduce weightlower the risk of developing type 2 diabetes by up to 32%. Whole grains may be most useful for people who need to lower their cholesterol or control their blood sugar levels. On average, three servings of whole grains per day can help your heart to stay healthy and eating more than that is likely to be even better for your
 heart.Read our fullwhole grainsposition statement.How can I eat more whole grains?Here are our six easy tips on how to eat more whole grains.Are all whole grains healthy?Not all whole grains are equal, unrefined grains from bread and
breakfast cereals so its important to look for intact whole grains when choosing these foods. Refined grains and some whole grains and some whole grains and some whole grains to the original grain, the better. Should I follow a low-carb diet? Low-carb diets have increased
in popularity. People on these diets usually dont eat processed foods, sugar, refined grains and starchy foods (like bread, pasta, rice and potato). They may not eat legumes (like chickpeas and lentils) and certain fruit too. There are plenty of ways to eat for a healthy heart, including eating carbohydrates. Whats most important is the quality of
carbohydrate and food sources. Whole grains, fruit, starchy vegetables (like potato and taro) and legumes (like chickpeas and lentils), regardless of their carbohydrate content, can all be a part of a heart-healthy diet. Most of us would be better off eating less refined and processed foods like white bread, biscuits and white pasta and eating more
vegetables. What does the Heart Foundation recommend? The Heart Foundation recommends that all people in New Zealand, including those at risk of heart disease, replace refined grains with whole grains and high-fibre whole grains that are close to how they are found in nature. If you choose to
eat grains, focus on simple, affordable swaps from refined grains to whole grain products. Aim for at least three servings of whole grain foods per day for a healthy heart. Adult serving size examples: cup cooked porridge 1/3 cup natural muesli 1/3 cup brown rice (cooked) 2 whole wheat biscuits 3 whole meal crispbreads 1 slice
whole grain bread whole grain bread roll. Focus on the quality of whole grains, plenty of vegetables (half of the plate), legumes, nuts, seeds, oily fish and reduced-fat dairy, the nutrients will look after themselves. Read our fullwhole grainsposition
statement. Still have questions about whole grains? We've compiled somefrequently asked questions. Read our whole grains FAQsFind out how to eat more whole grains for eat more whole grains? We've compiled somefrequently asked questions. Read our whole grains for eat more whole 
retain only the endosperm.[1][2][3]As part of a general healthy diet, consumption of whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber. Whole grains are a source of carbohydrates, multiple nutrients and dietary fiber.
red, and other colored rice varieties) Barley (hulled and dehulled but not pearl) Maize or cornRyeOats (including hull-less or naked oats) Processing rice; from seed to whole grain frice, can sprout) The same rice, dehusked (whole grain frice). The same rice, with almost all bran frice in its inedible husk (seed rice, can sprout).
and germ removed to make white rice Minor cerealsMilletsSorghumTeffTriticaleCanary grassJob's tearsFonio, black fonio, Asian milletWild ricePseudocerealsAmaranthBuckwheat, Tartary buckwheatQuinoaBecause whole grain foods are more healthful than the equivalent with refined flours, organizations such as the Danish Whole Grain Partnership
promote the consumption of whole grain foods as a public health measure.[7]Whole grains are a source of multiple nutrients and dietary fiber, recommended for children and adults in several daily servings containing a variety of foods that meet whole grains are associated with
improved micronutrient intake and lower risk of several diseases.[11] Their effects on gastrointestinal health, risk of obesity and cognition need further evaluation.[12]Cereal proteins from other food sources (mainly legumes)
is commonly used to compensate for this deficiency,[14] since the limitation of a single essential amino acid causes the others to break down and become excreted, which is especially important during the period of growth.[15] In contrast, the proteins of the pseudocereals have a high nutritional value, close to those of casein (the main protein in
milk).[6] Quinoa and amaranth are the most nutritious grains due to their high content and quality of proteins, with high levels of lysine and other essential amino acids.[6][16]Manufacturers of foods containing whole grains in specified amounts are allowed a health claim for marketing purposes in the United States, stating: "low fat diets rich in fiber
containing grain products, fruits, and vegetables may reduce the risk of some types of cancer, a disease associated with many factors" and grain products that contain some types of dietary fiber, particularly soluble fiber, may reduce the risk of heart disease, a disease
associated with many factors".[17][18][19] The scientific opinion of the European Food Safety Authority related to health claims on gut health or bowel function, weight control, blood glucose and insulin levels, weight management, blood cholesterol, satiety, glycemic index, digestive function and cardiovascular health is "that the food constituent
whole grain, (...) is not sufficiently characterised in relation to the claimed health effects" and "that a cause and effect consumption of whole grains are the consumption of whole grains and the claimed health effects considered in this opinion."[20]By supplying high dietary fiber content, as part of a general healthy diet, consumption of whole grains
may lower risk of several diseases, including coronary heart diseases, including coron
[23]In 2012, Health Canada stated that "the evidence to date from clinical trials and prospective cohort studies was not sufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials found insufficient to support a whole grain consumption and lowered risk of clinical trials for the clinical 
cardiovascular diseases.[25]The American Institute for Cancer Research and World Cancer Research Fund International have stated that there is strong evidence that whole grains decrease risk of colorectal cancer.[5][26][27]In genetically susceptible people, gluten (proteins found in wheat, barley, rye, oat, and related species and hybrids)[28] can
trigger coeliac disease.[29] Coeliac disease affects about 1% of the general population in developed countries.[29] The only known effective treatment is a strict lifelong gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] The only known effective treatment is a strict lifelong gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] The only known effective treatment is a strict lifelong gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] The only known effective treatment is a strict lifelong gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] The only known effective treatment is a strict lifelong gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] The only known effective treatment is a strict lifelong gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals and pseudocereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals may be a reasonable alternative to replace gluten-free diet.[29] Minor cereals may be a reasonable alternati
containing cereals for people who need to follow a gluten-free diet.[6]While coeliac disease is caused by a reaction to wheat proteins, it is not the same as a wheat allergy.[29][30] Other diseases triggered by eating gluten are non-coeliac gluten sensitivity,[30][31] (estimated to affect 0.5% to 13% of the general population),[32] gluten ataxia and
dermatitis herpetiformis.[31]In the United States wholegrain products can be identified by the ingredients list. "Wheat flour" or "whole-wheat flour" or "wholegrain content. If two ingredients are listed as grain products but only the second is listed as
wholegrain, the entire product may contain between 1% and 49% wholegrain ingredients, but, because wholegrain ingredients are not the dominant
 ingredient, they are not wholegrain products. Contrary to popular belief, wholegrains are not indicative of fiber. The amount of fiber content. [34] According to the American Association of Cereal Chemists definition, "Whole grains are not indicative of fiber content."
shall consist of the intact, ground, cracked or flaked caryopsis, whose principal anatomical components - the starchy endosperm, germ and bran - are present in the same relative proportions as they exist in the intact caryopsis. "The following names indicate whole-grain products, in accordance with the US federal government: [35][36][37] "Whole
wheat bread""Whole millet""Whole wheat buns""Whole wheat bread")"Crushed wheat bread")"Crushed wheat flour""Graham flour" (as an ingredient, not as part of a product name like "graham crackers")"Entire
wheat flour""Bromated whole wheat flour""Whole durum flour""Whole durum flour""Bulgur (cracked wheat)" ("bulgur" by itself may or may not indicate whole grains (e.g. wheat, rice, oats, barley, corn, wild rice, and rye) as well as pseudocereals (e.g. quinoa and
buckwheat) that may be labeled whole grains. [38]When wheat is milled to make specific types of flour, and all-purpose white flour, and all-purpose white flour, such as whole grain are usually separated and then are recombined to make specific types of flour, such as whole grain, white cake and pastry flour, and all-purpose white flour. If all parts of the kernel are usually separated and then are recombined to make specific types of flour, such as whole grain, white cake and pastry flour, and all-purpose white flour. If all parts of the kernel are usually separated and then are recombined to make specific types of flour, such as whole grain are usually separated and then are recombined to make specific types of flour, such as whole grain are usually separated and then are recombined to make specific types of flour, such as whole grain are usually separated and then are recombined to make specific types of flour, such as whole grain are usually separated and then are recombined to make specific types of flour.
they exist in the original kernel, then the flour is considered whole grain.[citation needed]Under the Food and Drug Regulations, up to 5% of the kernel that is removed for this purpose contains much of the germ and some of the bran. If
this portion of the kernel has been removed, the flour would no longer be considered whole grain.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain product.[39] There are voluntary guidelines on what can be labelled a wholegrain guidelines on what can be labelled a wholegrain guidelines on the labelled a wholegrain guidelin
grain stamp a b van der Kamp, Jan Willem; Poutanen, Kaisa; Seal, Chris J.; Richardson, David P. (2014-02-04). "The HEALTHGRAIN definition of 'whole Grain'". Food & Nutrition Research. 58 (1): 22100. doi:10.3402/fnr.v58.22100. ISSN1654-6628. PMC3915794. PMID24505218.
 Initiative. 2022-01-21.^ van der Kamp, JW (2013). "Whole Grain Definition: New Perspectives for Inclusion of Grains and Processing but not for Analysis" (PDF). CFW Plexus. doi:10.1094/CPLEX-2013-1001-08B. Retrieved 3 June 2017.^ a b "Whole Grains, Refined Grains, and Dietary Fiber". American Heart Association. 2021. Retrieved 25 October
2023.^ a b "Wholegrains, vegetables and fruit and the risk of cancer". wcrf.org. Retrieved 25 October 2023.^ a b c d Saturni L, Ferretti G, Bacchetti T (2010). "The gluten-free diet: safety and nutritional quality". Nutrients (Review). 2 (1): 1634. doi:10.3390/nu2010016. PMC3257612. PMID22253989.^ Dixon, Rachel (2025-04-23). "The wholegrain
revolution! How Denmark changed the diet and health of their entire nation". The Guardian. ISSN0261-3077. Retrieved 2025-04-25.^ "Whole Grain Fact Sheet". European Food Information Council. 1 January 2009. Archived from the original on 2009-05-11. Retrieved 6 December 2016.^ "Whole Grain Resource for the National School Lunch and
School Breakfast Programs: A Guide to Meeting the Whole Grain-Rich Criteria (PDF). US Department of Agriculture, Food and Nutrition Service. January 2014. Archived from the original (PDF) on March 8, 2014. Additionally, menu planners are encouraged to serve a variety of foods that meet whole grain-rich criteria and may not serve the same
product every day to count for the HUSSC whole grain-rich criteria. "All About the Grains Group". US Department of Agriculture, MyPlate. 2016. Retrieved 6 December 2016. a b c Williams, P. G. (2014). "The benefits of breakfast cereal consumption: A systematic review of the evidence base". Advances in Nutrition. 5 (5): 636S 673S.
doi:10.3945/an.114.006247. PMC4188247. PMID25225349. Priebe, M. G.; McMonagle, J. R. (2016). "Effects of Ready-to-Eat-Cereals on Key Nutritional and Health Outcomes: A Systematic Review". PLOS ONE. 11 (10): e0164931. Bibcode:2016PLoSO..1164931P. doi:10.1371/journal.pone.0164931. PMC5066953. PMID27749919. Shewry, PR.
"Impacts of agriculture on human health and nutrition Vol. II - Improving the Protein Content and Quality of Temperate Cereals: Wheat, Barley and Rye" (PDF). UNESCO - Encyclopedia Life Support Systems (UNESCO-EOLSS). Retrieved 2 June 2017. When compared with the WHO requirements of essential amino acids for humans, wheat, barley and Rye" (PDF).
rye are seen to be deficient in lysine, with threonine being the second limiting amino acid (Table 1). a b "Nutritional quality of cereals". Food and Agriculture Organization of the United Nations. Retrieved 1 June 2017. Shewry PR, Hey SJ (2015). "Review: The contribution of wheat to human diet and health". Food and Energy Security. 4 (3):
178202. doi:10.1002/fes3.64. PMC4998136. PMID27610232.^ Robin F, Thoduloz C, Srichuwong S (2015). "Properties of extruded whole grain cereals and pseudocereals flours". International Journal of Food Science & Technology. 50 (10): 21522159. doi:10.1111/jifs.12893. Retrieved 3 June 2017.^ "Health Claim Notification for Whole Grain Foods".
Bethesda, MD: Food and Drug Administration, US Department of Health and Human Services. July 1999. Retrieved 4 December 2016. [dead link] "Guidance for Industry: A Food Labeling Guide (11. Appendix C: Health Claims)". Bethesda, MD: Food and Drug Administration, US Department of Health and Human Services. January 2013. Archived
from the original on March 26, 2013. "Food Labeling: Health Claims; Soluble Dietary Fiber From Certain Foods and Coronary Heart Disease". Federal Register. Retrieved 7 October 2020. European Food Safety Authority (EFSA), EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA) (2010). "Scientific Opinion on the substantiation of
health claims related to whole grain (ID 831, 832, 833, 1126, 1268, 1269, 1270, 1271, 1431) pursuant to Article 13(1) of Regulation (EC) No 1924/2006". EFSA Journal § (10): 1766. doi:10.2903/j.efsa.2010.1766. { cite journal } § (10): 1766. doi:10.2903/j.efsa.2010.1766. { cite journal } § (10): 1766. doi:10.2903/j.efsa.2010.1766. doi:10.2903/j.efsa.2010.1766.
Greenwood, D. C.; Tonstad, S; Vatten, L. J.; Riboli, E; Norat, T (2016). "Whole grain consumption and risk of cardiovascular disease, cancer, and all cause and cause specific mortality: Systematic review and dose-response meta-analysis of prospective studies". BMJ. 353: i2716. doi:10.1136/bmj.i2716. PMC4908315. PMID27301975.^ Ye EQ, Chacke
SA, Chou EL, Kugizaki M, Liu S. (2012). "Greater Whole-Grain Intake Is Associated with Lower Risk of Type 2 Diabetes, Cardiovascular Disease, and Weight Gain". The Journal of Nutrition. 142 (7): 13041313. doi:10.3945/jn.111.155325. PMC6498460. PMID22649266. { cite journal } }: CS1 maint: multiple names; authors list (link) Hu Y, Ding M,
Sampson L, Willett WC, Manson JE, Wang M, Rosner B, Hu FB, Sun Q. (2020). "Intake of whole grain foods and risk of type 2 diabetes: results from three prospective cohort studies". BMJ. 370: m2206. doi:10.1136/bmj.m2206. PMC7341349. PMID32641435. {{cite journal}}.
Canada's Assessment of a Health Claim about Whole Grains and Coronary Heart Disease". canada.ca. Retrieved 25 October 2023. Kelly, Sarah AM; Hartley, Louise; Loveman, Emma; Colquitt, Jill L; Jones, Helen M; Al-Khudairy, Lena; Clar, Christine; German, Roberta; Lunn, Hannah R; Frost, Gary; Rees, Karen (2017-08-24). "Whole grain cereals for
the primary or secondary prevention of cardiovascular disease". Cochrane Database of Systematic Reviews. 8 (5): CD005051. doi:10.1002/14651858.cd005051.pub3. ISSN1465-1858. PMC6484378. PMID28836672.^ "Whole Grains: Protect Against Colorectal
Cancer". aicr.org. Retrieved 25 October 2023. Biesiekierski JR (2017). "What is gluten?". J Gastroenterol Hepatol (Review). 32 (Suppl 1): 7881. doi:10.1111/jgh.13703. PMID28244676. Similar proteins to the gliadin found in wheat exist as secalin in rye, hordein in barley, and avenins in oats and are collectively referred to as "gluten." The gluten
found in all of these grains has been identified as the component capable of triggering the immune-mediated disorder, coeliac disease. a b c d e "Celiac disease". World Gastroenterology Organisation Global Guidelines. July 2016. Retrieved 7 December 2016. a b c d e "Celiac disease". The National Institute of Diabetes and
Digestive and Kidney Diseases, National Institutes of Health, US Department of Health and Human Services, Bethesda, MD. 2016. Retrieved 5 December 2016. A b Ludvigsson JF, Leffler DA, Bai JC, Biagi F, Fasano A, Green PH, Hadjivassiliou M, Kaukinen K, Kelly CP, Leonard JN, Lundin KE, Murray JA, Sanders DS, Walker MM, Zingone F, Ciacci C
(January 2013). "The Oslo definitions for coeliac disease and related terms". Gut. 62 (1): 4352. doi:10.1136/gutjnl-2011-301346. PMC3440559. PMID22345659. Molina-Infante J, Santolaria S, Sanders DS, Fernndez-Baares F (May 2015). "Systematic review: noncoeliac gluten sensitivity". Aliment Pharmacol Ther. 41 (9): 80720. doi:10.1111/apt.13155.
PMID25753138. S2CID207050854.^ "Whole Grains Council - Intro to Whole Grains Council - Intro t
02-10.^ "21 CFR 139". Archived from the original on 2007-11-02. Retrieved 2008-02-10.^ "Whole Grain Label Statements (Draft)Retrieved from BBC newsDefinition of Whole Grain U.S. FDA Guidance on Whole Grain Label Statements (Draft)Retrieved from BBC newsDefinition of Whole Grain U.S. FDA Guidance on Whole Grain Label Statements (Draft)Retrieved from BBC newsDefinition of Whole Grain U.S. FDA Guidance on Whole Grain Label Statements (Draft)Retrieved from BBC newsDefinition of Whole Grain U.S. FDA Guidance on Whole Grain Label Statements (Draft)Retrieved from BBC newsDefinition of Whole Grain U.S. FDA Guidance on Whole Gra
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necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Most grains have three parts: bran, endosperm, and germ. (Some, such as barley and oats, are built slightly differently.) The bran, the outer layer, makes up most of the grain. The middle layer is the endosperm
which is starch, and in the center sits the germ, which is rich in protein, fat, vitamins, and minerals. Important: This content reflects information from various individuals and organizations and may offer alternative or opposing points of view. It should not be used for medical advice, diagnosis or treatment. As always, you should consult with your
healthcare provider about your specific health needs. A grain is the seed of a grass-like plant, cultivated for human consumption across the globe. Each tiny grain kernel encompasses several distinct layers, each playing a unique role in the seeds development and contributing different components. Understanding these fundamental structures
provides insight into the nutritional value of various grain products. The Three Parts of a Grain KernelThe outermost layer of the grain kernel is the bran, acting as a protective shell for the delicate interior. This fibrous layer is packed with beneficial compounds, including a significant amount of dietary fiber, which aids digestive regularity. The bran
also provides various B vitamins, such as thiamine and niacin, along with minerals like magnesium, iron, and zinc, all supporting various bodily functions. Beneath the bran lies the endosperm, which makes up the largest portion of the grain kernel, often comprising around 80-85% of its weight. This section serves as the primary food source for the
developing plant embryo, providing the energy it needs to sprout. It is predominantly composed of starchy carbohydrates, which are easily digestible, along with a modest amount of protein. Nestled within the kernel is the germ, the embryo of the seed from which a new plant can sprout. Despite its small size, typically only 2-3% of the kernels weight
the germ is a powerhouse of concentrated nutrients. It contains healthy unsaturated fats, vitamin E, a range of B vitamins like folate, and various antioxidants that help protect cells from damage. How This Affects Your Food ChoicesUnderstanding these distinct anatomical parts helps clarify the difference between various grain-based foods available
in stores. Products labeled as whole grain incorporate the entire kernel. This ensures that the food retains the full spectrum of nutrients, including fiber, healthy fats, vitamins, and minerals, naturally found in the grain. Consuming whole grains therefore provides a more complete nutritional package. In contrast, refined grains undergo a milling
process that purposefully removes the bran and germ, leaving only the starchy endosperm. This refining process significantly alters the nutritional profile of the grain, making it less nutrient-rich outer layers are discarded during processing. This
removal also impacts how quickly the carbohydrates are digested and absorbed into the bloodstream. Consider brown rice, while all-purpose white flour consists primarily of the endosperm. Some refined grain products
are enriched, meaning certain B vitamins and iron are added back after processing. However, the beneficial fiber, healthy fats, and other antioxidants from the original bran and germ are typically not restored, making them nutritionally different from their whole grain counterparts. Cereals form the foundation of human nutrition worldwide, providing
essential energy and nutrients in our daily diets. These remarkable grainswheat, rice, corn, oats, barley, and othersshare a common structural architecture despite their diverse appearances and culinary applications. Understanding the structural architecture despite their diverse appearances and culinary applications.
explains their impressive nutritional profiles. Each cereal grain contains a precise arrangement of components that deliver varying proportions of carbohydrates, proteins, fats, vitamins, and minerals, making them nutritionally complete foods in many respects. Table of Contents are recise arrangement of components that deliver varying proportions of carbohydrates, proteins, fats, vitamins, and minerals, making them nutritionally complete foods in many respects.
distinct parts: the bran, the endosperm, and the germ. Each component serves a specific biological purpose in the seeds life cycle and contributes different nutritional elements to our diet. The protective bran layer The bran forms the outermost layer of the cereal grain, serving as a protective shell for the vital internal structures. This multi-layered
coating typically accounts for about 13-17% of the whole grains weight and performs several critical functions: Physical protection: The bran shields the endosperm and germ from environmental threats like insects, molds, and moisture. Fiber contents are contents are contents are contents. The bran shields the endosperm and germ from environmental threats like insects, molds, and moisture. Fiber contents are contents are contents.
health. Mineral reservoir: This outer layer houses significant quantities of essential minerals, including phenolic compounds that may offer health benefits. The brans composition varies slightly among different cereals.
Wheat bran, for instance, contains approximately 15-18% protein, 3-5% fat, and 60-70% total dietary fiber. Rice bran has a higher fat content (15-20%) due to its oil-rich aleurone layer, making it more prone to rancidity when stored improperly. The energy-rich endosperm Constitutes the largest portion of the cereal grain, typically
making up 80-85% of its total weight. This starchy center serves as the energy reserve for the developing seed embryo. From a nutritional perspective, the endosperm contributes: Carbohydrate supply: The endosperm primarily consists of starch granules (about 70-80%), providing quick energy when consumed. Protein content: Though less protein-
dense than the bran or germ, the endosperm contains significant protein due to its large proportion in the grain. In wheat, these proteins form gluten when hydrated and kneaded. Minimal vitamins and minerals: The endosperm contains relatively few micronutrients compared to other grain parts, which explains why refined flours (made primarily
from endosperm) are often enriched. The endosperm contains approximately 90% starch, while corn endosperm contains approximately 90% starch, while corn endosperm contains approximately 90% starch, while corn endosperm contains approximately 90% starch.
similar protein percentages. The nutrient-dense germ The germ, though smallest in size (only 2-3% of grain weight), packs remarkable nutritional density as it contains the embryo that would develop into a new plant. The germ contributes: Essential fatty acids: The germ contains most of the grains healthy fats, including polyunsaturated fatty acids:
necessary for various bodily functions. Vitamin reservoir: It serves as a concentrated source of B vitamins (especially B1, B2, and B6) and vitamin E, an important antioxidant. High-quality protein: Germ proteins contains numerous enzymes that
would activate during germination, converting stored nutrients into forms usable by the developing plant. Wheat germ, for example, contains approximately 25% protein, 10-12% fat, and significant amounts of thiamine, riboflavin, and vitamin E. Corn germ has an even higher fat content, which is why corn oil is commercially extracted from this grain
component. Nutritional composition of cereals Beyond their structural similarity, cereals share common nutritional characteristics while exhibiting notable variations and health benefits. Carbohydrate content and composition Carbohydrates form the predominant macronutrient in all cereals, typically
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constituting 70-80% of their dry weight. The majority of these carbohydrates exist as complex starches located primarily in the endosperm. These starches occur in two main forms: Amylose: A straight-chain polysaccharide that typically represents 15-30% of cereal starch. Rice varieties with higher amylose content remain separate and fluffy when cooked. Amylopectin: A branched-chain polysaccharide making up 70-85% of cereal starch. Higher amylopectin ratio varies significantly among cereals and even between varieties of the same cereal, influencing cooking properties and glycemic

respect to the name, second the causalt for country and the co
Cereal Scientist at Oregon State University, and by reading this paper written by Lisa Kissing Kucek, Wisconsin-based research geneticist with the USDA Agronomic Research Service.

What are the four parts of a grain kernel. What are the three basic parts of a grain of rice. What are the three parts of a grain kernel. What are the three main parts of a cereal grain. What are the parts of a grain kernel. What are the three parts of a whole grain. What are the three main parts of a grain kernel. What are the parts of a cereal grain. What are the 3 parts of a whole grain. What are the parts of a pollen grain. What are the 3 parts of a grain is refined what parts of the kernel are removed. What are the three main parts of a grain.

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