

Focus on Fibers: What RDs Need to Know Now

Presented by:

Julie Miller Jones, PhD, LN, CNS, Emeritus Professor, St. Catherine University, Minneapolis, Minnesota
Hope Warshaw, MMSc, RD, CDE, BC-ADM, Owner, Hope Warshaw Associates, LLC, Alexandria, Virginia

These questions were submitted by attendees and were answered by the presenters. Several responses point you back to a particular slide in the presentation for further clarification.

Questions	Answers
Topic: Physiologic Impact of Fibers	
Q: Does eating higher fiber foods decrease post prandial blood glucose levels?	A: Some fibers such as those which are viscous e.g. beta-glucan and guar, have been shown to slow glucose absorption and thereby impact post-prandial blood glucose. But the impact on blood glucose depends on the type of fiber. In some cases fibers, such as resistant starch, it lowers post-prandial glucose because when it replaces available carbohydrate, it is not readily hydrolyzed. So it does not contribute to blood glucose in the same way that available starches would. This in turn decreases the rise in blood glucose post prandially. Fibers such as cellulose may also dilute the impact of the starch consumed and in that way lower blood glucose. Fibers that are fermentable and eaten at night, such as for a snack, can help minimize blood glucose decreases sometimes seen in the morning. Thus fibers can impact post prandial blood glucose in a variety of ways.

<p>Q: What are the main health benefits from synthetic fibers?</p>	<p>A: I prefer not to use the term synthetic. Fibers from foods such as chicory root (inulin), resistant starch (high amylose corn fiber which is the RS2 type), pectin or beta- glucan, are fibers added to foods under the Institute of Medicine (IOM) definition of fiber from 2001. These are actually extracted from foods by a physical or chemical means. Fibers can also be made in a laboratory setting, but this is not common practice. More common is to modify an extracted fiber from a food such as a starch to make a starch that resists digestion. Resistant starch type 4 is an example of an extracted fiber.</p> <p>The health benefits vary with the type of fiber. Much data show that the specific effect of a particular type of extracted fiber is akin to the benefits of that fiber in its original fruit, vegetable or grain. In some cases the fiber enmeshed in the plant matrix has effects that are more pronounced than seen when the fiber is extracted. But in some cases the opposite is true.</p> <p>The specific health benefit is determined by the fiber type.</p> <p>See slides 14 – 20 for more explanation.</p>
<p>Q: How do some fibers increase insulin sensitivity and which ones do?</p>	<p>A: Some fibers upregulate genes affecting insulin sensitivity such as PPAR-gamma in rats. Some studies show that the fermentation of a variety of fibers produce short-chain fatty acids in the colon. This has been shown to improve insulin sensitivity. The precise mechanisms, however, are not known. Studies on humans show fibers, such as resistant starch, increase insulin sensitivity.</p>
<p>Q: Which type(s) of fibers should be recommended for which type of gastrointestinal issue - constipation, loose stools and irritable bowel?</p>	<p>A: Cereal brans, especially wheat bran, and psyllium are most effective for constipation. Pectin from applesauce and banana is useful for loose stools. More data are needed on the effects of fiber on irritable bowel syndrome.</p>
<p>Q: Which soluble fibers are the best pre-biotic?</p>	<p>A: Fibers that are excellent pre-biotics are those that ferment. Each type of fiber can promote the growth of different types of bacteria. We know that many different fibers promote the growth of beneficial bacteria in the gut and help inhibit the growth of pathogenic bacteria. So the answer to which fiber is best is not easily answered because each fiber may promote specific types of bacteria. The answer also depends on the colonic flora of the individual, which in turn depends on other aspects of the diet. More research is needed on this question. For now the best advice is to consume a variety of beneficial dietary fibers because they are like vitamins in that we need a variety of fibers with a variety of pre-biotic effects.</p>
<p>Topic: Fiber Intake</p>	

<p>Q: Is there an upper limit of fiber consumption that we should tell people not to exceed?</p>	<p>A: Data on vegetarians ingesting many grains, nuts, legumes, beans and fruits and vegetables suggest that they can comfortably ingest 80g of dietary fibers per day. In fact, some dietary surveys show intakes among vegetarians of up to 120g per day. In the US and other developed countries, there are no observed adverse effects on mineral uptake or any other aspects with this level of fiber intake. However in countries where the overall quality of the diet is poor and nutrient intakes are marginal, diets high in cereal brans, sorghum or millet with their high tannin and phytate contents or certain legumes, can have negative impact on the absorption of some minerals. In North America, fiber from fruits, vegetables, grains and legumes should not cause any problem and should be encouraged.</p> <p>There are different levels of tolerance with some functional fibers currently being added to foods. These include fibers such as inulin and other fructooligosaccharides (FOS). Some people tolerate it well up to 15g/day, others are sensitive and have some gastrointestinal issues with smaller doses. Diarrhea occurs in most people at 40 g of inulin and other FOS/day. Resistant starches are tolerated up to 80 g/day and polydextrose at 50 g/day.</p> <p>Certain fibers, such as psyllium, need to be eaten with adequate liquid for proper digestion.</p> <p>See slide 48 for more detail about tolerance.</p>
<p>Q: Will tolerance of fiber intake, as related to gassiness, improve as someone consistently increases their intake of fiber?</p>	<p>A: Tolerance of a higher intake of dietary fibers appears to improve for between 60-80% of individuals if the fiber is slowly added to the diet. For some people there is no improvement.</p>
<p>Topic: Resistant Starch</p>	
<p>Q: Can you provide a basic definition of resistant starches?</p>	<p>A: Resistant starches are a type of dietary fiber. There are 4 types of resistant starches, RS1,2,3, and 4. Resistant starches have been found to resist digestion in the small intestine and are fermented in the colon. When they are fermented they produce short chain fatty acids which have been shown to have some health benefits related to glucose control, weight management and digestion. See slides 37 to 48 for more detail.</p>
<p>Q: If the cooled rice or potato is reheated will it no longer have resistant starch?</p>	<p>A: Heating foods which contain resistant starch after being cooled does break down a portion of the RS in them. However, there isn't good data on the amount lost or retained. A good analogy is to an upward diagonal saw--every time you cool the RS, the RS content goes higher than before. Then heating it lowers the RS content, but not completely. Multiple heating/cooling cycles leave more RS than from one heating/cooling cycle.</p>

<p>Q: Are resistant starch flours available commercially for use in baking?</p>	<p>A: Yes. Hi-Maize (as 100% Hi-maize) or in a blended product (flour plus Hi-maize) is available for purchase from King Arthur flour company via their website (www.kingarthurfour.com). This product is not guaranteed gluten-free. Hi-maize that is guaranteed gluten-free can be purchased from Celiac Specialties (www.celiacspecialties.com).</p> <p>See slide 69 for more detail purchasing Hi-maize for home use.</p>
<p>Q: Is resistant starch a part of the dietary fiber total in the label?</p>	<p>A: Resistant starch tests as dietary fiber through commonly used analytic methods for determining the fiber count for food labels. RS is included within the dietary fiber on the Nutrition Facts label. If Hi-maize is used in a food product the ingredient list will include it as resistant corn starch or corn starch.</p>
<p>Q: Please elaborate or provide reference(s) for the relation between higher resistant starch intake and GLP-1.</p>	<p>A: Research on the gut hormones related to appetite, hunger and weight control is a growing area regarding weight management/obesity treatment and prevention and glucose control. Research is showing that RS may play a role due to the production of short chain fatty acids from the fermentation of RS in the colon. The short chain fatty acids produced seem to increase GLP-1 and may also play a role with PYY, GIP and other glucose- and appetite-related hormones. An article on this topic Obesity, Diabetes and Gut Microbiota in Diabetes Care, Oct 2010 (page 2277) is worth reading. Fascinating work about the relationship between food and health is going on in this area.</p>
<p>Topic: High Fiber Foods</p>	
<p>Q: Please give definitions of whole-grain and dietary fibers.</p>	<p>A: Briefly there is a lot of confusion on this topic. Dietary fiber is not synonymous with whole grain. Americans are deficient in both. Foods high in dietary fiber are wider than simply whole grains, such as fruits, vegetables and legumes. Foods high in whole grains aren't always high in fiber, brown rice is low in fiber and barley and bulgur are high in fiber.</p> <p>See slide 21 and 22 for more detail.</p>
<p>Q: Is stone ground "whole" wheat considered a whole wheat product?</p>	<p>A: Yes, stone ground whole wheat is a whole wheat product. It simply means that the kernels of grain have been crushed between two mill stones and not between steel rollers, which is more common modern milling process.</p>

<p>Q: Should we recommend that our patients purchase foods with added fibers, such as inulin. Do these foods with added fibers, like the Fiber bars, provide the same benefits as natural fibers found in foods?</p>	<p>A: While we all encourage our clients to eat foods with intact fibers, such as whole grains, fruits and vegetables; it is clear from years of nutrient intake data that Americans continue to fall far short on fiber intake (see slides 7 through 13). We need to encourage people to eat foods with intact fibers as well as encourage people to take advantage of new foods they enjoy containing functional fibers with proven health benefits, such as resistant starch. People do need to be cautioned that some functional fibers, especially if introduced in large quantity, may cause gastrointestinal side effects. This is not true for resistant starch which can be tolerated in large amounts (in excess of 45 g/day). See slide 48 for more detail about tolerance.</p>
<p>Q: Which is better for blood glucose management: 100%whole wheat pasta or Dreamfield's pasta?</p>	<p>A: A client's choice of pasta should be based both on their enjoyment of the product as well as its impact on their BG control as well as their nutrition and diabetes goals. (We encourage you to listen to an excellent webinar conducted on 11/16 about Functional Fibers supported by Dreamfields. It will answer this question).</p>
<p>Q: Has anyone actually tested the blood glucose response to Dreamfields? Is their carb count accurate for digestible carbs?</p>	<p>A: As far as we are aware Dreamfield's tests their products on healthy people who have normoglycemia and not on people with dysglycemia. We assume that the carbohydrate count on the Nutrition Facts label is accurate within the food labeling regulations from FDA. (We encourage you to listen to an excellent webinar conducted on 11/16 about Functional Fibers supported by Dreamfields. It will answer this question).</p>
<p>Q: As a diabetes educator I see pts that use added fiber foods such as Dreamfield's. When I look at their blood glucose levels 2 hours later they are still elevated. How can Dreamfield's claim only 5gm of useable fiber?</p>	<p>A: See the two answers above. To get further information about the Dreamfield's products review their website (www.dreamfields.com) or contact the company. (We encourage you to listen to an excellent webinar conducted on 11/16 about Functional Fibers supported by Dreamfields. It will answer this question).</p>
<p>Q: Please identify specific foods that provide viscous fibers?</p>	<p>A: Oatmeal, oat bran, barley and legumes and beans and some fruits such as figs contain high concentrations of viscous fibers. Okra is a food with natural viscous fiber. Some foods with added guar or hydrolyzed guar such as ice creams and salad dressings may also deliver some viscous fiber. Pectin is found in fruits such as figs. As a viscous fiber pectin is not as effective (gram –fro-gram) as the beta-glucan of oats and barley for cholesterol lowering or blood glucose control .</p>
<p>Q: I work with dialysis patients so low fiber diet is often recommended because of high phosphorus content. How much of the phosphorus is actually absorbed by the human gut from high fiber grains?</p>	<p>This is quite complicated to answer because it depends on the particular fiber, the initial phosphorus content, how the fiber itself is processed, the food it is in and many other factors.</p> <p>A selection of fibers that are low in phosphorus such as Hi-Maize would be a good choice. Wheat bran would be a less desirable choice.</p>

Q: Would beano or gas-X (to control gas, etc) blunt the potential gastrointestinal side effects of inulin if taken at the same time?	A: No data is available to date to answer this question.
Topic: Whole Grains and Dietary Fibers	
Q: Which is healthier from a fiber standpoint: a whole grain bread with less fiber or a white bread with added fiber(s)?	A: The answer depends on several factors. Two factors are the amount of fiber in the whole grain bread and whether a client will eat the whole grain bread. The good news is that for those people who won't choose a high fiber whole grain bread there are now a few white breads being manufactured with functional fibers to boost the fiber.
Q: Did you say the brown rice does not meet the guidelines for being labeled "whole grain"?	A: The definition for whole grain was modified to include brown rice (as the exception since the fiber content was lower than the cut-off, see slides 21 and 22 for more detail.)
Topic: High fiber foods and supplements	
Q: Do you recommend taking a daily fiber supplement?	A: Daily fiber supplements are useful for those with GI issues and for those with high cholesterol. Fibers added to food can provide physiological benefits and can help consumers meet the large gap between the current intake and recommendations.
Q: Can you comment on which fiber supplements are considered viscous?	A: Beta-glucan (from oat and barley), guar and hydrolyzed guar are viscous fibers. Psyllium also has some viscous component.
Q: What about recommending a psyllium based supplement?	A: Psyllium is an excellent supplement for constipation, not only because it is a good bulking and water-holding agent, but also because it has a lubricant. There are studies that show that when taken with food psyllium can have a cholesterol-lowering effect.
Q: Can you provide any insights on the fiber supplements, like Benefiber?	A: This fiber is resistant maltodextrin. It is very easy to use and add to foods because it does not change the texture or taste. It can help with laxation and some of the other fiber benefits. It also may have some pre-biotic functions.

<p>Topic: Diabetes Education/Subtracting Fibers</p>	
<p>Q: When looking at the label for a high fiber tortilla with added fibers, say from oat fiber, can you still deduct half the fiber from the total carbohydrates?</p>	<p>A: The simple answer is yes. The current recommendation from American Diabetes Association and American Dietetic Association is to subtract ½ of the dietary fiber in the serving which will be eaten from the total carbohydrate in the serving. Review content from the slides titled Factoring in Fiber (#62-64) to learn more. It is not necessary to teach the subtracting fiber concept to the vast majority of people with diabetes.</p>
<p>Q: In regards to carbohydrate counting, why does the general rule specify to only start deducting fiber at 5 grams or more?</p>	<p>A: The guideline applies for food or meal counts above 5 grams for various reasons including that the data on the Nutrition Facts label is only so exact, that carbohydrate counts on food labels have an allowed margin of error, people's counts are only so close and that it's only above a reasonable amount of fiber that this guideline will impact postprandial blood glucose. To quote from Wheeler ML, et al (<i>Choose Your Foods: Exchange Lists for Diabetes</i>. 6th Edition, 2008: description and guidelines for use. <i>J Am Diet Assoc</i> 2008;108:883.), "Adjustment is practical only if the amount per serving of either dietary fiber or sugar alcohols is > 5 grams."</p>
<p>Q: Is there a # of grams of fiber consumed per meal that an insulin-pump user would benefit from a 'square' (extended) or 'dual-wave' bolus (normal plus extended) function to avoid hypoglycemia?</p>	<p>A: This is a good question and one that many pump trainers would like to have one clear answer to, however, there isn't one because multiple factors are involved, from type of fibers, what else is eaten in the meal, starting BG, post meal activity (or lack thereof), etc. When it comes to helping people make better use of extended bolus pump features (and also using temp basal), people need to "check and learn" what happens in their body, with their foods and multiple personal factors.</p>