TABLE OF CONTENTS

04 From the Academy Update

07 Nutrition Journal Club Update

10 Orthorexia: The unhealthy obsession with being too healthy

13 Recipes From Jessica's Table
17 Controlling Type 2 Diabetes

20 Your Brain on Sugar

26 A Healthy Start to a New Semester in Three Easy Ways

28 How to Fuel your Body

31 Nutri News Contacts
Palmitoleic acid is an n-7 fatty acid, a small family of unsaturated fatty acids not commonly found in food but instead a product of palmitic acid metabolism in the body. Food sources that naturally contain palmitoleic acid are limited and include certain blue-green algae, macadamia nuts, and sea buckthorn oil extracted from the see of berries of the plant. Palmitoleic acid comes in two forms: a *cis* isomer when a source like macadamia nuts are consumed or produced endogenously in the body, and a *trans* isomer that is naturally present in full-fat dairy products and meat fat. Because previous studies in animals suggested that the *cis* form of this fatty acid may have beneficial effects, researchers wanted to see whether blood levels of the *trans* isomer, which is derived from diet only (no endogenous production), would be similarly associated with health benefits. Researchers found an association with lower insulin resistance, atherogenic dyslipidemia, and incident diabetes in study participants with higher levels of circulating *trans* palmitoleate. Their observational findings were striking, but the need for detailed further clinical and experimental investigation was stressed.
The daily recommended amount of fiber was originally derived from observational data that reflected a lowered risk of coronary heart disease in populations that consumed an adequate amount. The addition of functional fiber, such as inulin or psyllium, to foods may help some people increase their overall fiber intake. However, this form of fiber may not yield the same benefits as food sources that contain dietary fiber naturally. As with other nutrition-related research, a synergistic effect is thought to be responsible for fiber’s notable health benefits.

Although fiber is derived from one of the macronutrients, the absence of a deficiency state prevents it from being considered an essential nutrient. Furthermore, there is no Estimated Average Requirement (EAR) or Recommended Dietary Allowance (RDA) for fiber, as there are for other carbohydrate sources. An Adequate Intake (AI) has been established instead, and this amount is contingent on the amount of kilocalories consumed. The 2015-2020 Dietary Guidelines recommend that Americans make shifts in their food choices by eating more of the foods that provide dietary fiber. Therefore, focusing on a healthy dietary pattern that includes a variety of fiber sources, especially fruits, vegetables, whole grains, legumes, nuts and seeds will help Americans achieve the daily recommended amount for dietary fiber and fulfill other important nutrient requirements, while helping to lower their risk for some chronic diseases.

**Fiber Recommendations**

**Smoking Cessation and Weight Gain**

Many aspects of health care reform, including the Medicare Annual Wellness Visit and worksite wellness interventions, as well as Patient-Centered Medical Homes and Accountable Care Organizations have offered opportunities for dietitians to address tobacco usage. A meta-analysis published in the *British Medical Journal* indicated the reported weight gain after quitting smoking is higher than previously thought. The review looked at smoking cessation participants who had succeeded in quitting smoking for at least 12 months.

- On average, quitters who did not rely on drugs or nicotine replacements gained 2.5 lb one month after quitting, 5 lb at two months and steadily continued to gain up to 10.3 lb at 12 months.
- About 16 percent of people actually lost weight after quitting, and 13 percent gained more than 22 lb.

Dietetics practitioners can contribute to the health and well-being of the American people by making themselves aware of the smoking cessation resources available in their setting, and by collaborating with other health care professionals to facilitate changes in weight-concerned smokers.
Earn your Doctorate in Clinical Nutrition at the University of North Florida.

The online Doctorate in Clinical Nutrition is an advanced-practice doctoral program with emphasis on evidence-based practice and chronic disease prevention and treatment in under-served populations in both clinical and community settings. The DCN will prepare practitioners for leadership roles in clinical, community or higher education settings through course work, advanced practice residency and applied outcomes-based research.

UNF is ranked in the Top 75 in the country for "Best Online Graduate Education Programs," which includes data of nearly 1,000 distance education programs nationwide.
Finally! The fall semester of 2016 is here!

We have had our first Nutrition Journal Club meeting this past August 31st and now we are looking forward to what is in store for the month of September. On Wednesday, September 7th, 2016, from 11:00 AM to 12:00 PM, the NJC will be hosting our second club meeting at the Ballroom in the Student Union Building; sections C & D. The research article will be supplied at the meeting, but will also be available to students through e-mail and our Facebook page to review before the meeting. T-shirts will available this semester and will be distributed at one of the meetings.
If you missed last month’s issue of NutriNews, here is a short synopsis of what the Nutrition Journal Club entails.

The NJC was founded in April 2014 and offers supplemental research based learning to our Medical Nutrition Therapy (MNT) class, taught by Alireza Jahan-mihan, Ph.D., also known as Dr. Ali, the NJC’s advisor. Each month, a topic that corresponds with MNT is chosen. Once the topic is chosen, a research analysis that was conducted in relation to the topic is picked apart and broken down, so to speak. Each officer in the club is assigned a segment of the scientific method, in which they dive deeper into the study. Questions are presented to students who attend the meetings in order to initiate critical thinking when reviewing the studies. Participation is optional, but encouraged! Guest speakers are currently in the works and will be announced as more details are available to us.

Feel free to contact any of the officers listed below if you have any questions or if you would like to learn how to be more involved with the club. Be sure to check us out on Instagram (Instagram.com/unf_njc) and Facebook (facebook.com/unfjournalclub).

Good luck, everyone!
Welcome to Fall 2016 semester!

The SNDA officers are prepared for a successful semester and ready to help each and every student be as successful as they can be! As we gear up for our first meeting, we just wanted to remind everyone of the upcoming events and what you can do to help!

SNDA officers are working hard to get partial funding for students to attend FNCE. We want to help as many students as possible but will be limited. Once we have more information, we will update everyone via Blackboard and/or our new Facebook page. If you have any questions, please contact one of the SNDA officers or Ms. Shank.

Happy Studying!

Meeting Reminders

• Meet N' Greet: Thursday, September 8th at 11:30 in SG Ballroom

• Nutrition Social: Location, Time and Date TBD
any people are familiar with commonly recognized eating disorders such as anorexia nervosa and bulimia nervosa. These clinical conditions are characterized by a fear of gaining weight, an obsession with being thin, and the constant need to have control over food composition and consumption. In 1996, American physician Steven Bratman first introduced and defined the term “orthorexia” to parallel a diagnosis of anorexia nervosa for a number of his patients that presented with extreme obsessions concerning dieting and health foods¹. It wasn’t until after coining the term that Bratman discovered orthorexia to be a separate type of eating disorder in its own right. ▶
A key feature that distinguishes orthorexia nervosa from diagnosable disordered eating conditions revolves around the fact that sufferers share an all-consuming obsession with eating healthy foods. These practices of “perfectly clean” eating nearly comprise the entirety of a sufferer’s day\(^1\). Orthorexia is thought to mirror many elements of Obsessive Compulsive Disorder (OCD); the strong compulsion to eat foods that are minimally processed, “clean”, or are considered to be “safe” can drive sufferers to spend exorbitant amounts of time shopping, cooking, and planning meals to eat\(^2\). Orthorexic sufferers often isolate themselves from friends and family and may avoid social situations, especially those that involve food or going out to eat. According to Bratman, the most unique feature of this condition relates to the adopted sense of self or identity an orthorexic individual embraces in conjunction with their perceived notion of “perfect eating”\(^1\). Some may consider their eating habits to be superior to others and feel a lofted sense of accomplishment the more “perfectly” they eat.

What is considered to be “perfect” eating? Orthorexic diets tend to follow patterns similarly seen in vegan or raw food diet plans. Meals frequently contain sources of uncooked fruits and vegetables and often times orthorexic sufferers spend lengthy periods of time choosing the most unblemished and perfect looking produce from stores or gardens\(^1\). A stark contrast between orthorexia nervosa and anorexia nervosa is the viewpoint on calories; anorexic individuals may painstakingly count every single calorie they consume on a daily basis, often in a manner that falls drastically under daily recommended values\(^2\). Orthorexic individuals, on the other hand, are not as concerned with the caloric content of an item so long as it contains ingredients they consider to be healthy. Calorie dense avocados or grapeseed oil, for example, may be used extensively by someone with orthorexia whereas an anorexic individual would strive to avoid such concentrated sources of fat and calories\(^2\).

At first glance, it may be difficult to comprehend that an obsession with eating healthy can actually be a damaging thing. Orthorexic individuals often exceed the daily recommendations for fruit and vegetable servings and virtually exclude processed foods and unhealthy forms of fat from their diets. As future RDNs or healthcare professionals, it almost sounds like the perfect patient, right? Wrong. It’s the all-consuming obsession with food, social isolation, and neglect on behalf of other aspects of health that can cause orthorexic sufferers to become malnourished, severely underweight, and in some cases, at risk for death\(^2\).
Our society today has become obsessed with two major topics in regards to nutrition and health: obesity and the trendiness of eating healthy. Despite the fact that obesity statistics have soared in past years throughout the USA and other countries, the increasingly influential trend of “being healthy” has grown as well. Nutrition and its impact on health is a hot topic; hashtags concerning food and nutrition are some of the most popular tags used on social media sites such as Instagram, Facebook, and Twitter. While the promotion of healthy eating practices and recipes should be a positive thing, over-emphasis on certain aspects of these topics can unfortunately be misinterpreted and taken too far. This obsessive side of modern-day food culture has led to the development of unhealthy relationships with food for many individuals.

In addition to the adverse psychological effects orthorexia can exert on an individual, a number of nutrition-related complications can arise as a result of the continued practice of orthorexic eating habits. Existing literature on the subject has revealed that orthorexic patients often undergo severe weight loss which can increase the risk of infertility and kidney malfunction. Muscle wasting, hair loss, and amenorrhea in females are other common health issues seen in orthorexic patients. The restrictive side of the condition in terms of food consumption frequently causes nutrient deficiencies in essential vitamins and minerals such as iron, calcium, potassium, and B vitamins. These micronutrient deficiencies can lead to more serious complications like osteoporosis and decreased immunity.

Currently, orthorexia nervosa is not clinically recognized as a diagnosable eating disorder. Healthcare professionals (especially Registered Dietitians) should still familiarize themselves with the cardinal signs of this condition and understand how to help individuals that may be affected. Dietitians should strive to communicate the importance of balance to patients; labeling foods as “good” or “bad” has proved to be an ineffective strategy when counseling clients and could even worsen the warped ideology orthorexic patients have towards nutrition. Encouraging moderation and mindful eating practices could serve as beneficial interventions and as always, practitioners should keep the thoughts and concerns of the patient as the focal point of every counseling session. By practicing active listening and remaining attentive to a patient’s concerns, RDN’s can effectively serve as an identifying force and combater of the evolving condition of orthorexia nervosa.

References:
2016 has been designated as the “International Year of Pulses” by the United Nations in the hopes of increasing public awareness on the nutritional benefits and agricultural sustainability of pulses\textsuperscript{1}. What are pulses, you ask? The term “pulse” refers to leguminous plants such as lentils, chick peas, all varieties of dry beans, and even black-eyed peas. These plant-based sources of protein may be small in size but they pack a powerful nutritious punch. Pulses are low in fat and contain high amounts of soluble fiber which helps to lower cholesterol and blood glucose levels\textsuperscript{2}. Pulses also provide significant amounts of iron, zinc, folate, and magnesium and can serve as appropriate protein sources for those following vegan or vegetarian diet plans\textsuperscript{2}. Join in the spirit of the International Year of Pulses by checking out these easy and tasty recipes!

References:
**Honey Sesame Chickpeas**

**Ingredients:**
- 1 small onion, finely diced
- 2 cloves garlic, minced
- 1/2 cup honey
- 1/3 cup soy sauce
- 2 tablespoons toasted sesame oil
- 1 tablespoon rice wine vinegar
- 2 tablespoons vegetable oil
- ¼ cup water
- 1/4 teaspoon crushed red pepper flakes
- 1 teaspoon fresh grated ginger
- 1 can chickpeas OR 1 ½ cups cooked dried chickpeas
- (Cooked rice or grain of preference for serving)

**Directions:**
1. Place the diced onion, garlic, honey, soy sauce, sesame oil, vinegar, vegetable oil, water, red pepper flakes and ginger in a medium saucepan. Bring to a boil, then reduce to a simmer and cook for 5-10 minutes until slightly thick.
2. Add the chickpeas and bring back to a boil. Reduce heat again to medium low and simmer for 10 minutes until chickpeas are coated with the thickened sauce.
3. Serve immediately over cooked rice or grain of preference.

Recipe developed by Delish Knowledge; Recipe and image reproduced from: http://www.cookingwithpulses.com/recipes/honey-sesame-chickpeas/

---

**Baked Lentil Biscuits**

**Ingredients:**
- 1 ¾ cups all-purpose flour
- 1 tbsp baking powder
- 1 tbsp granulated sugar
- 1/4 tsp salt
- ¼ cup unsalted soft margarine
- 2/3 cup puréed cooked lentils
- 2/3 cup 1% milk

**Directions:**
1. Preheat oven to 425 °F (220 °C).
2. In a bowl, combine flour, baking powder, sugar, and salt. Cut margarine into mixture and add the lentil purée until the mixture resembles coarse oatmeal. Add milk into the flour mixture until just incorporated.
3. Turn out dough onto a lightly-floured surface and pat down to 1½-2 inches thick. Cut out biscuits with a 2-inch cookie cutter.
4. Place biscuits on a baking sheet at least 1-inch (2.5 cm) apart and bake until golden (about 14-16 minutes).

Recipe developed by Canadian Lentils. Recipe and image reproduced from: http://www.lentils.ca/recipe/baked-lentil-biscuits/.
Cucumber and Black-Eyed Pea Salad

Ingredients:
- 3 tablespoons extra-virgin olive oil
- 2 tablespoons lemon juice
- 2 tsp chopped fresh oregano, or 1 tsp dried
- Freshly ground pepper to taste
- 4 cups peeled and diced cucumbers
- 1 14-ounce can black-eyed peas, rinsed
- 2/3 cup diced red bell pepper
- 1/2 cup crumbled feta cheese
- 1/4 cup slivered red onion
- 2 tablespoons chopped black olives

Directions:
1. Whisk oil, lemon juice, oregano and pepper in a large bowl until combined. Add cucumber, black-eyed peas, bell pepper, feta, onion and olives; toss to coat. Serve at room temperature or chilled.


Coconut Chocolate Chip Lentil Blondies

Ingredients:
- 1/2 cup split red lentils
- 1 cup water
- 1 cup of lightly packed dark brown sugar
- 2 eggs
- 2 teaspoons pure vanilla extract
- 1 cup all-purpose flour (or your favorite gluten free option)
- 1/2 teaspoon baking soda
- 1/4 teaspoon cinnamon
- 1/2 teaspoon sea salt
- 1 cup unsweetened coconut flakes
- 1 cup mini chocolate chips

Directions:
1. Preheat oven to 350°F (180°C). Lightly spray a 9x9-inch baking pan with non-stick cooking spray.
2. To prepare the lentils: Bring the lentils and water to a simmer in a small saucepan. Reduce the heat and cover; continue cooking until the lentils are soft and tender, about 10 minutes. Pour the soft lentils into your food processor. Add the brown sugar, eggs, and vanilla. Process until smooth.
3. In a large bowl, whisk together the flour, baking soda, cinnamon, and salt. Add the wet ingredients, coconut, and chocolate chips, reserving 2 tablespoons of each for garnishing.
4. Transfer the batter onto the baking pan. Smooth out the top and sprinkle with the reserved coconut and chocolate chips. Bake for 25 minutes. Cool and cut into bars or squares for serving.

Recipe developed by Trudy Stone. Recipe and image reproduced from: http://www.lentils.ca/recipe/coconut-chocolate-chip-lentil-blondies/
Earn your Master of Science in Nutrition and Dietetics online.

The MS in Nutrition thesis and non-thesis option is a distance learning degree for those students who wish to emphasize the application of advanced nutrition knowledge in clinical or community based health programs. Applicants for the MS Thesis or Non-Thesis option in Nutrition are persons with a baccalaureate degree from a U.S. regionally accredited institution and ACEND/CADE accredited program with a major course of study in Food and Nutrition, Human Nutrition, or Food Management or Registered Dietitians.

UNF is ranked in the Top 75 in the country for "Best Online Graduate Education Programs," which includes data of nearly 1,000 distance education programs nationwide.

UNF UNIVERSITY OF NORTH FLORIDA.
It is common to hear people claim that exercise is the miracle cure for all diseases (at the very least for preventing diseases). Type 2 diabetes, or adult onset diabetes is a chronic condition that affects for the body processes blood sugar, also known as glucose. Diabetes patients usually have problems with cells using insulin properly. According to The American Diabetes Association, in 2012, over 29 million Americans were diagnosed with diabetes.

Approximately another 1.4 million people are diagnosed with diabetes every year.\textsuperscript{1} For these diabetes patients, besides a well monitored meal plan and medication, what else is a great way to treat their diabetes? The answer is exercise! Like mentioned in the first sentence, it is commonly known that exercise relieves symptoms, increases overall quality of life, and even outright cures diseases! The best part of exercise is that it is pretty much free!
What makes exercise great for diabetes? Exercise causes your muscles to use the glucose in the blood, liver, etc. which lowers the blood sugar level. It also increases fitness levels and reduces the risk of heart disease. A study done by Bakhshalipour, Vahid; Sareshkeh, Siavish Khodaparast; Moghadam, Majid Keramati; and Kazemi, Maryam Falah shows that with moderate exercising, inactive type 2 diabetes patients improved their sleeping patterns, body mass index, and weight. This study does not talk about exercise and blood glucose control, but it still shows how much the diabetes patient’s life improved from just moderate exercise. Another study done by Ji-Hye, Park and Young-Eun, Lee concluded that with a combination of cardiovascular exercise and weight training, the risk of a glycemic control failure lowered significantly. For diabetes patients, exercising really reduces the risk for any blood sugar problems.

“...with moderate exercising, inactive type 2 diabetes patients improved their sleeping patterns, body mass index, and weight”

With all of these benefits, there are some risks that should be considered before exercising. Too high or too low of a blood sugar level can complicate diabetes problems in patients if they exercise. Mayo Clinic has a general exercise guideline relative to the blood sugar level of diabetes patients. For patients with blood sugar levels lower than 100 mg/dL, it is best to eat a carbohydrate snack before exercise so that the blood sugar level goes up. Levels between 100 and 250 mg/dL is ideal for diabetes patients to exercise. Anything above 250 mg/dL is a caution zone because the blood sugar levels may be too high. There is also a risk for high ketones, which indicates that the body does not have enough insulin to regulate blood sugar properly. This leads to exercise complications.

The knowledge that exercising improves the human body is very obvious to most people. The problem is that with all these resources and common knowledge, health problems like obesity, diabetes, heart disease, etc. still exists. There is probably at least one person in most families that have health problems due to lack of a healthy diet and/or exercise. Maybe a close friend or a loved one has diabetes or other health problems. It would be great to help motivate them into improving their lifestyle. As nutrition students, it is a duty to spread validated knowledge to the community and to remind readers that even with easy access to a superfluous amount of information, many people are clueless about healthy eating and exercising. The best part of exercise is that one’s imagination is their limit and in most cases, it doesn’t cost a thing to exercise. Give friends and family with health problems such as diabetes a sample meal plan or exercise program so that they can be led to the right path to healthiness.

“...it doesn’t cost a thing to exercise”


YOUR BRAIN ON SUGAR: TAKING A LOOK AT THE NEUROSCIENCE BEHIND THE CONSUMPTION OF SUGAR

By: Michael Callahan

According to Schmidt (2015), 47 pounds of cane sugar and 35 pounds of high-fructose corn syrup is consumed by the average American per year. The U.S. Department of Agriculture (USDA) claims the average American consumes 156 pounds of added sugar per year. It is no secret that sugar consumption is way up. Added sugar is found in all of the packaged and processed foods we nibble on today. This is often being consumed in the form of fructose, which is absorbed much more rapidly than glucose. It is essential to understand that sugar, or glucose, is also necessary for proper brain functioning. According to Mergenthaler (2014), the human brain consumes 20% of glucose-derived energy.

At 5.6 mg glucose per 100 g human brain tissue per minute, the brain is considered the main consumer of glucose, and yet weighs only 2% of the body weight. Metabolism of glucose generates ATP, which provides the fuel for proper brain functioning, as well as provides a foundation for the generation of neurotransmitters and cellular maintenance. This exemplifies the importance of proper regulation of glucose metabolism within our bodies. Considering how sugar affects the physiology of our brain and body can give us insight into the possible impacts of sugar overconsumption.
To better understand how it is processed in the body, let's first define sugar. All sugars are carbohydrates, or compounds containing Carbon, Hydrogen, and Oxygen (C, H, and O). Sugar, in its simplest form, is considered a monosaccharide. Glucose and Fructose are examples of monosaccharides. Together, Glucose and Fructose combine equally to create the polysaccharide sucrose. That wonderful white sugar we put into our coffee is known as sucrose (C12H22O11). Other forms of sugar include lactose, dextrose and starch.

Sensations from sugar can be experienced from pizza or refined starch, as it is converted to sugar in the body. The faster the starch is converted to sugar, the quicker the brain gets the reward for it. Highly refined foods and fructose are absorbed faster, and are therefore more desirable to us because they bring immediate pleasure. This often leads to overconsumption, leading to the body being flooded with more sugar than it can handle. Whole grains are digested more gradually and in an orderly fashion. According to an Australian Psychologist Robert McBride, there is an optimum concentration in food and breaks, known as the bliss point, at which sensory pleasure is maximal. Sugar has the highest bliss point, which can be seen by the overconsumption of sugar as opposed to protein or fat.

Energy homeostasis and food uptake is regulated by a complex network communication between the peripheral (ex: stomach, gut, liver, pancreas) and central (brain and spine) nervous system. This regulation directly affects the endocrine and metabolic systems of the peripheral and central nervous system. Sugar affects both the peripheral and central nervous system which both work simultaneously to process the consumption of sugar.

Energy homeostasis and how and when we decide to eat is regulated by our peripheral sweet taste and sugar detectors on our tongue. Within the oral epithelium and in the gut are taste-signaling mechanisms. These mechanisms play a role in sugar detection as well as regulation of intestinal and pancreatic hormone secretion (for example, insulin when sugar is digested) (Ochoa, 2014). It is important to understand how both the peripheral and central nervous system digest, absorb, and process sugar separately to understand its effect on the body as a whole.

Sugar consumption provides our body with glucose, the most important energy source in our body. Digestion begins in the mouth, typically before the food has even entered. The sight of sugar alone typically elicits the release of salivary amylase from our taste buds, which creates the mouth-watering sensation. During the digestion process, sugar is broken down from its complex form into monosaccharides such as glucose, fructose and galactose. After just minimal digestion in the mouth, the sugars travel down the esophagus to the stomach where hydrochloric acid (HCl) neutralizes salivary amylase and continues to break down the sugars. It is then passed on to the small intestine, where most of the digestion occurs. Various enzymes lie in the intestine and target specific sugar molecules. Enzyme Lactase, for example functions to break down lactose, whereas enzyme sucrase functions to act on sucrose. These monosaccharides are then passed on and stored in the liver for processing and distribution. As sugar is being digested, the pancreas detects this surge of sugar and releases insulin. The role of insulin is to regulate blood sugar levels in the body. Insulin's role is to remove glucose from the bloodstream in order to maintain homeostasis, and glucose is stored as glycogen, our reserve energy fuel.
Glycogen is stored in the liver and in muscle and is our primary source of energy. This exemplifies the importance of sugars (carbohydrates) in our diet. Rapid overconsumption of sugar however, signals to the pancreas to release excess insulin resulting in hypoglycemia. This is also known as the “sugar crash”, or having low blood sugar from excess glucose uptake in the bloodstream by insulin. This is where the brain comes into play. The low blood pressure following the sugar crash communicates to the brain to consume more sugar. This causes a positive feedback cycle to even more consumption of sugar and a drop in blood sugar all over again.

But how is the digestion of sugar processed in the brain? Glucose is essential to brain function. Thinking, memory and learning are all dependent on the consumption of carbohydrates to provide the fuel for our body. It is important to understand the role of glucose in brain functioning to better understand how it processes sugar in our body. Before sugar is even consumed, salivary amylase is being released. This results in the mouth-watering sensation that happens before eating delicious food. Perception of sugar begins immediately on the apical surface of taste receptor cells, located within taste buds in the tongue. There are two primary groups of sugar detectors: G-protein coupled receptors (GPCR), and sugar transporters. Enteroendocrine cells sense sugars through GPCR, which includes the sweet taste receptors type 1, T1R. As sugar is tasted, sucrose binds to the sweet taste receptors T1R2 and T1R3, which promote a dopamine release. These sweet taste buds fire up and send dopamine signals up to the brain stem to the cerebral cortex. This is where our taste is processed. Chemical and electrical signals will then stimulate the brain’s reward system. Food is considered a “natural reward” in the brain. Eating, having sex, and nurturing others are all behaviors that contribute to our survival as a species. It is therefore important to reinforce these behaviors in our brain as pleasurable. This will reinforce us doing these behaviors, and encourage us to repeat. Because the brain requires sugar as its main fuel source, it makes sense that sugar stimulates the brain’s reward system. Simply put: our brain wants sugar. Our brain feels happy when we consume sugar. The brain’s reward system reinforces our consumption of sugar with pleasurable feelings. Sugar provides us with the energy necessary to survive and reproduce. It is innate within us as human beings to want sugar.

Let’s take a further look into the neuroscience behind the consumption of sugar and the reward system of the brain. Two systems in our brain regulate our intake of sugar, including energy homeostasis/the regulation of feeding, and our reward system. The hypothalamus, and the dorsal vagal complex, along with certain structures that are a part of the limbic system are what control our hunger (Ochoa, 2014). This is called the hedonic drive to eat, and works directly with our motivation-reward system. Within the arcuate nucleus of the hypothalamus of the brain, glucose levels and energy homeostasis signal to the peripheral nervous system. Hormones (signals) such as insulin, are sent and received to and from the gut and the brain in an attempt to regulate glucose in the blood. Recent research within the past few decades has indicated there are neuromodulators that regulate these energy and reward pathways. These substances are often orexigenic agents (increase feeding) or anorexic agents (decrease feeding). Within our brain are also glucose-sensing neurons which play a role in neuroendocrine function, nutrient metabolism, and energy homeostasis. Glucose-sensing neurons in the brain contain receptors and respond to peripheral hormones such as insulin (regulates sugar), and leptin (regulates fat), indicating our energy reserve levels.
Our reward system is supported by the mesolimbic dopamine (DA) system in the brain. Dopamine is considered the primary neurotransmitter involved with this reward system pathway. An evolutionary trait known as the mesolimbic pathway is a system within the brain that deciphers our natural rewards for us. Pretend that you just ate a freshly baked cookie out of the oven. This pleasurable sensation creates the release of the neurotransmitter dopamine, by a bundle of neurons called the ventral tegmental area. An area of the brain known as the nucleus accumbens receives this dopamine signal. The nucleus accumbens functions alongside the prefrontal cortex, which dictates motor movement. These areas of the brain work together to tell us how great that chocolate chip cookie was, and that maybe it's time to eat another one, or two...or three. The prefrontal cortex also activates hormones that processed these pleasurable feelings telling us to remember that for the future.

So far we have learned that sugar is not necessarily a bad thing; it actually contributes to proper brain functioning and homeostasis. Our brain receives sugar as a pleasurable sensation, remembers that sensation, and encourages us to do it again. In a balanced, healthy body these signals are working properly and will communicate to us when it is time to eat, and more importantly, when it is time to stop eating. Overconsumption of sugar, however causes a disruption in our electrical and chemical systems ultimately throwing our bodies out of balance. At this point, you may still be okay with the occasional sugar crash. The entire tray of Christmas cookies is sometimes just worth it. But let's take a further look at what it means to listen to our brains positive feedback signals to consume more sugar. As mentioned previously, sugar spikes the release of dopamine in the nucleus accumbens. Just like sugar, drugs are involved in the same pathway involving dopamine release. Long term exposure to excess sugar intake changes the gene expression in the midbrain and frontal cortex. An excitatory receptor called D1 experiences an increase in concentration from sugar, whereas inhibitory receptor type D2 experiences a decrease in concentration. The dopamine transporter, a protein pump which pumps dopamine out of the synapse and back in the neuron afterward, is also inhibited by repeat sugar consumption. This experience can be explained very similarly to how drugs are processed. Regular sugar intake causes prolonged dopamine signaling. This means that we ultimately need more sugar to activate the midbrain dopamine receptors like before. Basically, the brain develops a tolerance to sugar and more is needed to experience a dopamine release similar to before.
Data supporting sugar and its effect on the brain is currently a hot topic. The correlation between the rise of obesity rates and high fructose corn syrup consumption, and sugar in general, poses an interesting hypothesis on sugar’s effect on the brain and the body. Studies are becoming more common in an attempt to use data to support these claims. Looking at how sugar is processed and digested in our body gives us a new perspective of how it can potentially affect us on a daily basis. From the beloved first cookie, to the crazy sugar rush, to falling asleep upside down on the couch. Regardless of the data to support sugar intake and body function, one of the best (and free) ways to test this is on yourself. Try giving up sugar and take notice of your daily symptoms throughout the day, and then try reintroducing it (hopefully not in the form of an entire pack of Oreo), and see how it makes you feel. As mentioned earlier, carbohydrates and glucose play an extremely important role in energy and brain function. Our memory, focus, alertness are all dependent on glucose to work properly. Within the broad category of carbohydrates, fruits and vegetables and whole grains will provide the body with proper nourishment. It is best to become more aware of what is being consumed in ingredients lists to avoid excess sugar intake. Paying better attention to food labels and added sugar can be very eye opening. Studies on dietary sugars such as sucrose, glucose and fructose and their effects on the peripheral and central systems are becoming much more common. Understanding how each system is effected can help us to better understand how our body is affected as a whole. More data will continue to come out to support claims of sugar’s effect on the brain and body.

References


Macdonald, F. (3, Nov. 2015). This is how Sugar Affects the Brain. *Science Alert.* http://www.sciencealert.com/watch-this-is-how-sugar-affects-your-brain


Schmidt, E. (15, May 2012). This is your brain on sugar: UCLA study shows high-fructose diet sabotages learning, memory. *UCLA Newsroom.* http://newsroom.ucla.edu/releases/this-is-your-brain-on-sugar-ucla-233992.
The beginning of a new semester can always be intimidating. New professors, new classmates, and new routines. As a college student, the last thing on one’s mind is their eating habits during a stressful period such as starting a new semester or prepping for exams. Starting a new semester off healthy can be an important component to successful study sessions and being able to stay awake in class. Here are some healthy tips to help you ace your classes this fall!

**Protein for Brain Power**

Amino acids, derived directly from our diet, are the main components of the neurotransmitters in our brain. Two amino acids in particular have been found to be helpful for studying - tryptophan and tyrosine. Tryptophan has a calming effect on the brain, while tyrosine activates the brain. These two amino acids make up a great combination, as you can power through a study session while taking care of your brain by calming it from stress yet ensuring that it is awake and ready to retain important information. Both amino acids can be found in some easy to pack snacks such as yogurt and cottage cheese, chickpeas, sunflower and pumpkin seeds, peanuts and almonds, bananas, and dates.
Ever notice yourself nodding off in class? Although this can be due to many things such as lack of sleep or eating meals largely composed of carbohydrates, this may also be a sign of dehydration. Dehydration is directly linked to fatigue which may lead to issues both in and out of the classroom. Making sure that you are drinking 16 oz (the size of one water bottle) per hour can help you stay focused and feeling awake. Adding some fruit to cold water has been proved to help alertness, as well as help those who dislike the lack of flavor that water possesses. Some great fruity combinations would be watermelon and mint, raspberry and lemon, and orange and blueberry.

**Eat your Vegetables!**

If you have ever been around kids, you know that most are not in favor of vegetables. There’s a typical video I always picture in my mind of a family at the dinner table, with the child slipping his vegetables to the dog under the table. I thought as people got older, that would change - yet here I am in college, and I still hear students say “Ew” to vegetables. Veggies are high in nutrients such as vitamins and antioxidants, as well as fiber. Consumption of phytochemicals and phenolic compounds, both found in a variety of vegetables, have been linked to reduction of chronic diseases. Destruction of free radicals, strengthened immune system (which we all know can be compromised while walking around campus), and maintaining a healthy blood pressure are just some of the benefits one can reap from eating their veggies! Easy-to-pack vegetables include carrots, peppers, broccoli, snap peas, grape tomatoes, and cucumbers. For those who don’t enjoy raw vegetables, an option would be to mix plain, low or nonfat greek yogurt with a ranch packet. This makes a thick and creamy ranch for dipping that is high in protein and much healthier than store-bought and processed ranch dressing.
Picture this, you are sitting on your couch scrolling through your Instagram explore page and you happen to come across an outstanding fitness account. Sitting there intrigued by their latest deadlifting video, in their vibrant purple colored leggings, Juggernaut black tank top, and a $50 weightlifting belt. Slightly motivated, you scroll through their account some more and you see a picture of a beautifully displayed four piece pancaked/cookie masterpiece, topped with a scoop of cookie dough ice cream. Layered on top are sprinkles, chocolate drizzle, and of course, the infamous “one tablespoon”-actually five, of peanut butter.

Sitting there drooling over the protein pancake that you wish you could make, you scroll some more and then only to find a photograph of this person with a rock solid six pack. With your mouth wide open, you close the app, put on your running shoes, and go for a run- hoping one day you will be like that person on their account. Not ever taking into consideration of how many filters they used or if Photoshop was involved. Subconsciously, starting a cycle of thinking that it is okay to eat poorly and still seeing results, just like the fitness fanatic in that Instagram account.

We, as a society are guilty of this, or at least a handful of people are. Social media has become a battlefield of reality verse fantasy. It has become a battlefield for body image, religious, and political issues that do not become relevant to us until it becomes too late.

So the question is now, how do we stop this vicious cycle of thinking we can chow down on that protein pancake- that probably has the calorie intake of a whole day’s worth of food? The solution? A balanced diet. Seems simple enough- three ounces of protein, half a cup of a carb/ starch, 1-2 cups of vegetables, and
heathy fat. Notice, I said generally, because that is generic. Everyone’s body is different; everyone metabolizes food differently. So therefore, your diet is like your own personal puzzle- that you have to figure out on your own terms.

The second question, how do we know what to take in more of? How do we measure what we need to eat before and after a workout without under or over doing your diet? This is where the fun comes in to play. You experiment! Add or take away from the “food puzzle.” Have fun with listening to your body! The article, Should You Eat Before a Workout? claims that you should eat something before you go for a workout! The reason being is that muscle break down is more likely to happen. Which isn't what you want to do. There are three things you should do when thinking of eating before a workout: 1. Right timing. 2. Intensity of the workout. 3. Fuel Up.1

Right timing, is very important! The closer to a workout, the simpler your food should be. It should usually be a carb, like a banana, apple, or a bowl of cereal, or even some pulses (beans, lentils, legumes etc.). In the book, written by, Cynthia Sass, there is a section that talks about pulses. Aside from being great for your pre-workout munchie, they are also effective endurance boosters! A study was conducted to where athletes were given potatoes and another group of lentils, running at different intensity level until exhaustion at 80% of max effort. Do you think the potato group ran better? Nope, at 23 percent, the lentil group lasted longer and managed a better blood sugar regulation over a series of workouts.2 You want your body to absorb the nutrients

"Everyone’s body is different; everyone metabolizes food differently"
fairly quickly. There are a couple reasons behind that. One reason is because your body is working to digest the food, so your energy level will be sluggish if you consume a full meal. A second reason being that you could experience cramping. As a child, remember mom always said to wait thirty minutes until swimming again? That is because she did not want you to cramp up while swimming. You want your food to be fully digested. The food that is undigested is useless fuel for you.

Intensity is key to your diet! Are you training for a marathon, doing a crossfit (HIIT) workout, or brisk walking the Loop around campus? A lot of people (me included) sometimes go carb crazy and over-indulge. The example in the article is, “you are going on a 100 calorie burning elliptical- you do not need that 200 calorie snack beforehand.” Because that is not necessary for the workout. You will not be able to burn that all off. In talking to an RD, I asked her the same question. What and how much do you consume? Her response was this: “nutrition recommendations for athletes or people who are training are always set by duration and intensity of the training. You would also have to take into consideration the goals (lose fat, gain lean mass, etc) of the individual. A person who is heavily training with Crossfit and able to sustain a high training volume will have a different diet than someone who is doing Crossfit 3 x per week and not able to do as much. It's entirely possible that a football player who trains in a "traditional" way (lifting weight, running sprints, etc), would have a similar diet to somebody who is heavily involved in Crossfit. It's also possible that a very recreational exerciser who lifts weights and runs would have similar dietary needs to somebody who does Crossfit a few times a week.” So, just like the aticle, Mrs. Osterberg references the same. (Email communication, July 11,2016)

The last, Fuel Up! Go back to Number One of this list to determine how to fuel up! Are you going to the gym in two- three hours? Eat more of a complex meal- your body will be able to break down and absorb the nutrients. But if you are heading out the door, a piece of fruit would be perfect to fuel your workout without give you cramps and sluggishness.

You are done with your workout, what do I eat now? In at least thirty- forty-five minutes from your workout, you want to eat some veggies, and your healthy fat. Most importantly, keep it real! Know what you are consuming- in general. The healthiest and most nutritious foods are the foods that you can easily pronounce- that includes an ingredients label on the back of a meal/ protein bar. Your body will not absorb chemicals easily, but it will with real food!

Now, I think it is time you go grab yourself a banana, your running shoes, and get our there and kick some butt with all the energy you will be fueling yourself with!

References:
Fall Volunteering Opportunity with St. Vincent’s Mobile Health Nutrition and Wellness Program!

WHAT?: This program is coordinated by RD and UNF alum Michelle Lynch; this nine week program is administered to underserved students within Duval county in grades 3rd - 5th. The program aims to increase engagement in healthy lifestyles, prevent and decrease childhood obesity, and reduce stress in our community’s most vulnerable pediatric population.

WHO can volunteer?: Any student belonging to the Brooks College of Health or Student Nutrition and Dietetics Association at UNF is eligible to volunteer. Students must be willing to commit to at least 9 consecutive weeks (1 semester) of service- hours and scheduling can be flexible.

WHY should you consider volunteering with St. Vincent’s?
- Consistent source of volunteer hours
- Helps to enhance your resume and/or future DICAS application
- Leadership opportunities available!
- Students who commit to over 9 weeks of service get a FREE purple St. Vincent’s DryTech t-shirt.

Contact Michelle Lynch, MSH RDN LD/N
@ michelle.lynch@jaxhealth.com if interested!
CONTACT US

NUTRI NEWS

Sara Boyd
Editor in Chief
sara.boyd@unf.edu

Dawn Dragone
Co-editor
dawn.dragone@unf.edu

Shannon Wilkinson
Co-editor
shannon.wilkinson@unf.edu

Dr. Alireza Jahan-mihan
Faculty Advisor
UNFNutriNews@yahoo.com