Relying on good mental health might depend on the metabolic process of synthesizi...

Health & Medicine

Imagine sitting on the beach. You have your butt plopped in your rainbow colored beach chair. A red and white umbrella provides you some semblance of shelter from the hot sun. The cold beer you hold in your hand has condensation running down the side. The waves crashing on the ground and the advancing tide tempt you with even more sweet relief from the summer heat. As you stand up to get in, the sun’s radiant heat reminds you that it is time to reapply sunscreen. But wait! You may want to hold off on the sunscreen for a little bit; your mental health could depend on it.

The sun emits two kinds of ultraviolet rays: UVA and UVB. While evidence shows that these rays are harmful to the body with prolonged exposure, some exposure to these rays can actually be good for you. When the UVB light comes into contact with your skin, it reacts with a form of cholesterol found naturally in the skin to make Vitamin D. (Holick et al. 2013) Recent studies have actually shown that Vitamin D is very important in mental health. It is being shown that Vitamin D works as an enzyme which helps the amino acid Tryptophan turn into the neurotransmitter Serotonin (Ames et al.), which is widely accepted as being very important in the regulation of mood.

What does this have to do with mood? Well there is a mental illness called Seasonal Affective Disorder. According to Oltmanns in his book Abnormal Psychology, “[r]esearchers refer to [seasonal affective disorder] as a mood disorder in which the onset of episodes is regularly associated with the changes in seasons.” He continues to state that it is “ usually characterized by somatic symptoms, such as overeating, carbohydrate craving, weight

gain, fatigue, and sleeping more than usual.” (Oltmanns) Dr. Belilovsky adds “ change in sleep habits,

inability to get out of bed, lack of interest, lack of exercise, irritability, sadness, low self-esteem, lack of concentration, difficulty in school/work, lack of desire to be with other people, social isolation, and a craving for carbohydrates” to the list of symptoms. Researchers seem to have isolated this disorder’s origins as being mostly biological. (Belilovsky 2010)

One of the newest explanations goes back to the all important Vitamin D, which was mentioned previously. During the winter months, the axis of Earth shifts so that during the early morning and late afternoon hours, there is “ a longer path for the solar UVB photons to travel through the ozone layer, which efficiently absorbs them. This is the explanation for why…little if any Vitamin D is made in the skin during the winter.” (Holick et al. 2013) With this axis shift, there is very little time in the day where the distance that the UVB rays have to travel is short enough to penetrate the ozone layer and cause the chemical reaction in our skin. This, coupled with the colder temperatures reducing our desire to go outside, cause us to not produce as much Vitamin D. Since Vitamin D helps turn Tryptophan into Serotonin, it can be expected that there are decreased Serotonin levels in the body.

Another possible explanation of Seasonal Affective disorder is presented by Dr. Belilovsky. He states that “[it] was once an adaptation to decreased availability of food in the winter. People with Seasonal Affective Disorder burn fewer calories and were better able to cope with winter starvation in primitive societies.” (Belilovsky 2010) His research goes on to show that it is

more common at high latitudes where winter is the darkest. He goes on to state that “[t]he lack of sunlight causes increased production of melatonin by the pineal gland.” (Belilovsky 2010) Since melatonin is the “ sleep hormone,” this change helps to explain the change in sleeping habits. It is believed by Dr. Tsiouris that this “ form of metabolic depression […] is the process underlying the observed […] vegetative symptoms of major depression in humans.” (Tsiouris 2005)

One other cause of Seasonal Affective Disorder that was briefly touched on by Dr. Belilovsky is more of a psychosocial theory. He states that pediatric patients may learn the behavior from the parents. To treat this prophylactically, he states that “ parents need to recognize and treat Seasonal Affective Disorder in themselves, as children often acquire the mood of the adults in the household.” If the child already has the disorder, he states that “[a] happy adult is better able to provide the comfort and empathy that a child with Seasonal Affective Disorder needs most of all.” (Belilovsky 2010)

Since most of Seasonal Affective Disorder’s etiology is presumed to be biological, physicians may go through many tests to confirm the disorder. Some of the things the physician may test for are thyroid disease, anemia, hypoglycemia, and mononucleosis. Thyroid hormone levels are checked in the body because hypothyroidism and depression share many symptoms. According to Seeley, “ Hyposecretion of T3 and T4 decreases the rate of metabolism.” This can lead to apathy, somnolence, and reduced appetite. Anemia is also checked for because a deficiency of hemoglobin in the blood

can cause decreased oxygen delivery to the cells. This will cause the body to decrease metabolism in an attempt to reduce cellular oxygen demands. The same mechanism is used by the body in hypoglycemia. If the body’s sugar levels are low, the body will compensate by decreasing metabolism in an attempt to reduce cellular glucose demands. (Seeley 2014)

If labs come back within normal limits, the physician will then start to look at psychological disorders. According to the DSM-V, a patient must meet the following criteria to be diagnosed with Seasonal Affective Disorder:

A regular temporal relationship exists between the onset of mood symptoms and a particular time of year that is not better accounted for by seasonally related psychosocial stressors (e. g., seasonal unemployment, bereavement, trauma).

Full remission of mood symptoms (or change from depression to hypomanic/manic symptoms) occurs at a regular time of year (e. g., resolution of depressive symptoms during the spring).

Over the last 2 years, at least 2 major depressive episodes have occurred that demonstrate the temporal seasonal pattern, without evidence of nonseasonal major depressive episodes occurring during that same time period.

Over the lifetime course, the number of seasonal major depressive episodes substantially outnumbers nonseasonal major depressive episodes.

The major points that differentiate Seasonal Affective Disorder from some other mood disorder are that there is a full remission of mood symptoms at a regular time of the year (most commonly the spring), and that over the lifetime, the number of seasonal major depressive episodes substantially outnumbers the nonseasonal major depressive episodes.

To treat the Vitamin D deficiency theory, many physicians will recommend air ionizers and exercise. The air ionizers can help “ because they replace UV-generated ions that are more prevalent in the summer.” (Belilovsky 2010) The exercise is helpful as well, but in an indirect way. Dr. Craft states that according to the Monoamine Hypothesis, “ exercise leads to an increase in the availability of brain neurotransmitters that are diminished with depression.” (Craft 2004) The other option that Dr. Belilovsky suggests is increasing Vitamin D intake. He states that “ Low prevalence of Seasonal Affective Disorder in Iceland, which correlates with high fish intake, suggests fish oil and Vitamin D can also be given as treatments.” (Belilovsky 2010) We can also hypothesize that this will work because by increasing the amount of Vitamin D in the body, there will be a greater availability for Tryptophan to turn into Serotonin.

One other treatment that Dr. Belilovsky describes is diffuse light exposure. It is believed that this light exposure can help offset the production of melatonin during these times of decreased sunlight. This can help decrease the aforementioned “ hibernation” tendencies. By decreasing these tendencies, the body’s metabolism may not slow down so much. He also recommends exercise to treat the “ hibernation” theory as well. He doesn’t

directly state why exercise helps in this sense, however it can be assumed that the Monamine Hypothesis of Exercise in Depression that was mentioned earlier plays a part here as well.

Besides the holistic treatments described above (exercise, air atomizer, diet adjustment, and light therapy), a doctor may prescribe a selective serotonin reuptake inhibitor, or a selective serotonin-norepinephrine reuptake inhibitor. These drugs may be used in conjunction with a previously mentioned holistic treatment, and/or psychotherapy. The medications will increase the bioavailability of certain hormones in the brain to allow for increased neurotransmission in the brain, as serotonergic and norepinephrine neurotransmission are very closely related to mood regulation. Psychotherapy can help provide the patients with coping mechanisms and different ways of interoperating the environment.

According to Westrin, since Seasonal Affective Disorder is a recurrent condition, long term treatment should be considered. This suggests that the disorder doesn’t really go away. In fact, one of the treatments suggested by Westrin is the use of a drug called Wellbutrin, in conjunction with therapy and holistic measures. Wellbutrin XL (bupropion XL) is a dopamine and norepinephrine reuptake inhibitor. This medication is suggested because it is easy to start and stop. It is suggested that treatment with this drug begin between September and November, and continue through early spring. They slowly build the meds up when you start it, and taper it off when you stop. Westrin states that “ bupropion XL reduces the recurrence rate of depressive episodes in patients with Seasonal Affective Disorder.” (Westrin 2007)

Since Seasonal Affective Disorder is a biological problem more often than not, it is easier to treat. There is concrete ideas as to what is going on, and concrete treatments. Changes in diet such as increasing fish oils and Vitamin D can help immensely. If symptoms are really bad, these lifestyle changes can be supplemented with pharmacotherapy and psychotherapy. Although many still aren’t completely understood yet, we have a good grasp on what causes Seasonal Affective Disorder and how to treat it.