

## **CHAPTER 14**

# **Nutrition for Depression**

- 1. Balance blood sugar levels**
- 2. Eat foods high in B Vitamins, Vitamin C, folic acid & magnesium**
- 3. Eat foods high in tryptophan**
- 4. Eat foods high in phenylalanine & tyrosine**
- 5. Eat good fats**
- 6. Drink 8 cups of fluids/water a day**
- 7. Identify & avoid food intolerances**
- 8. Take St. John's wort**
- 9. Avoid caffeine & artificial sweeteners**



# SCI and Depression

Depression is common for individuals with spinal cord injury (SCI) because of the multiple dramatic life changes that suddenly occur.

Depression can interfere with the rehabilitation process. An individual who is depressed may not be able to process, absorb and utilize the information and resources made available to them in the hospital and rehabilitation settings. This can make reintegration back into their home and community more difficult. Depression can also lead to self-neglect. For example, research shows that there is an increased risk of developing pressure sores and urinary tract infections due to neglect in self-care activities (which in turn can magnify the depression).

– Elliot, Frank, 1996

**20-40%**

It's estimated that people with SCI are 5 times more likely to experience depression than their able-bodied peers, with rates for people with SCI being approximately 20-40%.

## Symptoms of Depression include the following:

- Loss of or increase in appetite
- Irritability
- Tearfulness
- Disturbed sleep
- Lack of energy
- Feelings of worthlessness
- Weight loss or weight gain
- Reduced drive and motivation
- Suicidal thoughts

**In this chapter you will learn about the various ways to address depression through nutrition. It will discuss specific nutrients and foods that can help boost your mood, as well as foods to avoid.**



## Depression and Nutrition

Traditionally, nutrition has not been used to address depression. Specific nutrient deficiencies can, however, contribute to depression symptoms. Optimum nutrition (specifically for your brain) can improve your mood and help give you the energy and motivation you need for you to perform your daily activities.

Vitamins B3, B6, folic acid and B12, essential fats, and amino acids such as phenylalanine, tryptophan and tyrosine can help boost your mood and motivation. Stress causes nutrients such as Vitamins C, B5 and B6 to be used up far too quickly in the body. This may lead to nutrient deficiencies that can contribute to the onset of depression.

Your digestive system also contains approximately 100 million neurons and produces many of the neurotransmitters needed by your brain to help you think, stay focused and feel motivated, as well as feel happy and calm. These neurotransmitters are predominantly made from amino acids, which are the basic building blocks that make up proteins. For example, the neurotransmitter **serotonin**, made from the amino acid tryptophan (found in turkey, eggs, chicken and salmon), helps you to feel happy and can increase your sense of well-being, while the neurotransmitter **dopamine** helps to make the hormones adrenaline and noradrenaline, which can help to increase your motivation level and drive.

Furthermore, your brain and gut are constantly communicating with each other. This is why we often feel a lot of emotions in our stomach. For example, our tummy turns in knots when we get nervous, or we get butterflies when we get excited.

**Obesity (a common secondary health complication for individuals with SCI) can negatively impact body image, self-esteem and mobility. While these issues can increase your risk of depression, studies show that losing weight can significantly improve your mood and self-esteem.**

### EXERCISE REGULARLY

Exercise improves mood through the release of endorphins and serotonin.

Exercise also helps to increase lean muscle mass, facilitate weight loss, improve blood sugar and insulin levels, reduce pain, increase energy and improve body image. All of these health benefits can help boost your mood.



### IN OUR GENES?

There may be a genetic disposition to depression. Some people's ability to manufacture or transport serotonin (the neurotransmitter responsible for making us feel happy) may not be working properly.

This genetic disposition can make some individuals with an SCI more prone to depression than others.

# Nutrition for Depression

## 1 Balance blood sugar levels

Unstable blood sugar levels can have an impact on depression. When blood sugar levels drop, there is an inadequate supply of glucose to the brain. When this happens a person can experience fatigue, irritability, dizziness, insomnia, poor concentration and forgetfulness, as well as depression. If your diet is high in sugar, refined carbohydrates and processed foods, it can not only cause blood sugar crashes, but can also lead to insulin insensitivity, carbohydrate cravings and ultimately weight gain, which can lower your mood even more.

You can help balance your blood sugar levels by taking minerals such as chromium, magnesium and zinc. These help to sensitize your cells to insulin and help keep blood sugar levels more balanced.

### To help balance blood sugar levels:

- Eat 3 small meals and 2 snacks a day
- Combine protein with a complex carbohydrate at each meal. For example, eat proteins such as fish, chicken or eggs with sweet potatoes, lentils, brown or wild rice
- Avoid refined and processed foods such as white bread, pastries, cookies, muesli bars and sugar. These cause blood sugar levels to skyrocket



## 2 Eat foods high in B Vitamins, Vitamin C, folic acid & magnesium

Many people who are depressed are deficient in **folic acid**, and research indicates that these individuals may be less likely to experience any real benefits from taking SSRI antidepressants (selective serotonin re-uptake inhibitors). Folic acid deficiency is the most common nutrient deficiency in the world. You may want to consider getting your blood checked to see if this may be one of the underlying reasons for your depression.

Folic acid, together with some of the other **B Vitamins (such as B6 & B12), Vitamin C & magnesium** help to increase production of serotonin. They also help with the conversion of the amino acids phenylalanine and tyrosine into dopamine, noradrenaline and adrenaline, which help with boosting motivation, mental alertness and excitement.

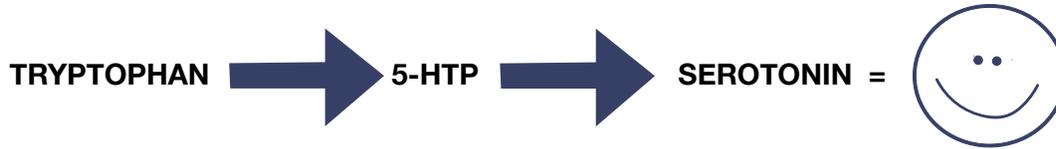
Your brain contains the highest amount of **Vitamin C** of any organ in your body. This vitamin has numerous roles in brain chemistry, such as increasing motivation and mental alertness and protecting the brain against toxicity, while at the same time enhancing the activity of certain antipsychotic drugs.

**Magnesium** is involved in over 300 functions in the body including making serotonin, reducing stress, anxiety and pain, helping with post-traumatic depression, and improving sleep.

*It's important to eat a variety of fresh fruits and vegetables, whole grains, nut, seeds, legumes, fresh fish & grass-fed beef to get the necessary nutrients to maintain healthy brain chemistry. It may also be helpful to take a high-potency multivitamin.*

### 3 Eat foods high in tryptophan

Tryptophan is an amino acid that is converted to 5-HTP (5-hydroxytryptophan) which is then converted to serotonin (the “happy neurotransmitter”). Serotonin is an important brain chemical involved in mood, behavior, appetite and sleep.



Tryptophan can help not only to boost your mood, but also to improve your sleep, as well as reduce carbohydrate cravings, pain and migraines.

There are many lifestyle and diet choices that can negatively affect your body’s ability to convert tryptophan into serotonin. These include: cigarette smoking, alcohol abuse, eating too much sugar and/or protein, unstable blood sugar levels (diabetes and hypoglycemia) and certain nutrient deficiencies.



People who are deficient in serotonin may need to take the supplement 5-HTP (5-hydroxytryptophan) as studies show that 5-HTP can be very effective in improving depression symptoms with minimal to no side effects. When supplementing with 5-HTP it is best to find a brand that also contains Vitamins B3, B5 and folic acid, as these vitamins help convert 5-HTP into serotonin.

***Tryptophan is found in salmon, tuna, eggs, turkey, lamb, chicken, beans & oats.***

**IMPORTANT NOTE:**

**It is contraindicated to take 5-HTP if you are on antidepressants.**

A woman’s rate of making serotonin (also known as the “happy neurotransmitter”) is approximately 50% less than a man’s, which is why women are more likely to experience depression than men.



**Avoid smoking & second hand smoke**

Smoking and second hand smoke affect your body’s cortisol levels and limit the amount of tryptophan getting into the brain.

## 4 Eat foods high in tyrosine & phenylalanine

**Phenylalanine** and **tyrosine** are amino acids that help you to produce the hormone adrenaline. This hormone helps to keep you upbeat, awake, excited, motivated and engaged.

Phenylalanine has a direct effect on brain chemistry by helping to make neurotransmitters such as dopamine, epinephrine, norepinephrine and phenylethylamine (PEA). These neurotransmitters help to elevate your mood and feelings of love, as well as decrease pain, suppress appetite and improve your memory and learning.

Phenylalanine and tyrosine are well supplied in a diet with an adequate intake of protein (45-60 g a day). However, phenylalanine is an essential amino acid, which means your body cannot make it, therefore, you must get this nutrient from your diet.

Phenylethylamine (PEA) is also found in high concentrations in chocolate, which is why it is often craved when someone is feeling depressed or feeling low. This doesn't mean that you should stock up on chocolate; however, a few pieces of dark chocolate (70% or higher) can be helpful.

You may want to consider getting your urine checked to determine your phenylethylamine (PEA) levels, as low levels of PEA (indicative of low tyrosine and phenylalanine levels) are often found in people who are depressed.



***Foods high in phenylalanine include spirulina, turkey, fish, eggs, grass-fed beef, lamb & veal.***

***Foods high in tyrosine include seaweed, spirulina, turkey, eggs, low-fat cottage cheese, salmon, tuna & whole grains.***

## 5 Eat good fats

60% of your brain is made up of fats. People generally do not eat enough foods high in essential fatty acids (good fats) which are vital for brain health and function. Essential fats can help boost your brain's ability to make serotonin, as well as other neurotransmitters. A diet void of or deficient in good fats can alter nerve structure, fluidity and function, and this in turn can negatively affect your mood.

One particular essential fatty acid which is important for your brain health is called **DHA (docosahexaenoic acid)**. Research shows that people on antidepressant medication who persisted in having significant symptoms of depression experienced major improvements when supplementing with **omega-3 fats** with a high DHA content.

– Patrick Holford, 2004

***Good sources of omega 3 fatty acids are walnuts, flax, hemp & pumpkin seeds.***

***Foods high in DHA include salmon, mackerel, herring, sardines, anchovies, tuna, marine algae & eggs.***

Bad fats such as trans fats, hydrogenated oils, margarine, processed and fried foods interfere with the body's ability to use these good fats and can displace good fats from the brain.



## 6 Drink 8 cups of fluids/water a day

It may surprise you to know that drinking water can help improve your mood. The brain uses electrical energy that is generated by water. When your body and brain are provided with enough water, this can help give you more energy.

Individuals with SCI are often dehydrated due to taking certain medications, poor diet and limited intake of fluids. The amino acids tyrosine and tryptophan are needed by the brain to make neurotransmitters to help boost our mood. When the body is dehydrated, these amino acids are used instead to help transport wastes out of your body, and therefore cannot perform their brain-boosting jobs.

### Find it difficult to drink plain water?

- Try getting your water from herbal teas, smoothies (using water instead of milk) or broths
- Eat lots of fresh fruit and vegetables
- Add a small amount of juice to your water if you need flavor to make it more palatable



## 7 Identify & avoid food intolerances

Some foods that are considered to be healthy, such as nuts, strawberries, citrus fruits, milk, corn and whole wheat, are also known to be common food intolerances. These intolerances can cause chemical reactions which can contribute to depression.

There are also thousands of chemicals added to our foods, often as preservatives, artificial colors and flavors. Many people are allergic or intolerant to these chemicals, which can also negatively affect your body and your mood.

**Food intolerances can cause fatigue, slowed thinking, irritability, agitation, nervousness, anxiety, depression and learning disabilities.**

The symptoms of food intolerances can take anywhere from 1 hour to 3 days to appear. This can make it difficult to identify the food that you are intolerant to. You may want to consider getting a food allergy test done to determine what, if any, foods you may be sensitive to and should avoid. Alternately, you can complete the **Food Elimination Diet** (see the Appendix for details).

Good digestion is important to ensure that food is broken down properly, and this can help reduce the negative effects of food intolerances. A digestive supplement including digestive enzymes, bile and HCL can be helpful.





## 8 Take St. John's wort

St. John's wort is a herb that helps to address mild to moderate depression. It also has the added bonus of helping to relieve pain and improve sleep.

### **IMPORTANT NOTE:**

**It is contraindicated to take St. John's wort if you are on antidepressants.**

## 9 Avoid caffeine & artificial sweeteners

There are numerous studies that show a connection between people who have a high coffee or caffeine consumption and depression. People often use caffeine as a way to “self-medicate” by giving them that boost of energy to get them motivated and started for the day. However, some people are particularly sensitive to caffeine and will experience nervousness, anxiety, irritability, headaches and heart palpitations. Caffeine also places stress on your adrenal glands and increases the secretion of the stress hormone cortisol, which can negatively affect your mood.

Long-term elevation of cortisol can have detrimental effects. It is known that in the general population the level of cortisol in the bloodstream peaks in the morning, and then decreases as the day progresses. However, for individuals who are depressed, cortisol peaks earlier in the morning and does not level off or decrease in the afternoon or evening.

Although the exact mechanism that causes depression is uncertain, clinical studies suggest that chronically elevated cortisol may induce clinical depression. As a result you should avoid coffee, sodas and other products that contain caffeine.

Additionally, the artificial sweetener aspartame can block the formation of serotonin and contribute to depression, headaches and insomnia. Avoidance of all artificial sweeteners is recommended.



**If you need to sweeten your hot drink or food – use healthy alternatives such as honey, pure maple syrup or stevia.**

### **Reduce Your Stress**

Stress is very common in the SCI population. Stress rapidly reduces serotonin levels and also uses up essential vitamins and minerals in your body (such as the ones identified in this chapter).

When your body is depleted of these nutrients, they are unavailable to assist with maintaining healthy brain function and performing the chemical conversions needed to make the neurotransmitters that bring about a happy and upbeat mood.

***Please refer to Chapter 13 - Nutrition for Stress for further information and nutritional support.***

## Turkey Chili

*Turkey is high in tryptophan, so this dish is a great way to boost your serotonin levels.*

**Servings: 8**

### Ingredients:

- 2 lbs. of ground turkey
- 2 cans of tomatoes
- 2 cans of red kidney beans, drained
- 1 can of tomato paste
- 1 medium chopped onion
- 1 clove of garlic
- 1-2 tablespoons of chili powder
- Add spices for flavor (basil, oregano, parsley and black pepper)

### Directions:

1. Cook turkey in a large pot and then stir in tomatoes, kidney beans, tomato paste, garlic, onion and spices
2. Simmer uncovered for 45 minutes stirring occasionally

### NUTRITIONAL CONTENT PER SERVING:

Proteins: 24 grams

Carbohydrates: 16 grams

Fats: 9.7 grams

Calories: 250

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## Salmon Salad with Avocado

*This salad provides a high dose of the good fats your brain needs to boost your mood.*

**Servings: 1**

### Ingredients:

- Salmon (smoked, canned or grilled)
- Handful of spinach
- 1/2 avocado, cut up
- 1/4 cup of sunflower seeds
- 1/4 of a bell pepper, chopped

### Directions:

1. Place all ingredients into a salad bowl
2. Eat straight away

### NUTRITIONAL CONTENT PER SERVING:

Proteins: 31.8 grams

Carbohydrates: 19 grams

Fats: 34.5 grams

Calories: 486

## Blues Buster Smoothie

*This hearty smoothie is rich in antioxidants, Vitamin C, magnesium and good fats to help kick-start your day. Servings: 1*

### Ingredients:

- 1 kiwi (peeled)
- 1/2 cup of strawberries
- 1/2 cup of raw oatmeal
- 3 tablespoons of Greek yogurt
- Water (amount dependent on preference for thickness of smoothie)
- 1 tablespoon of ground flax seeds

### Directions:

1. Place all ingredients in a blender, mix and serve

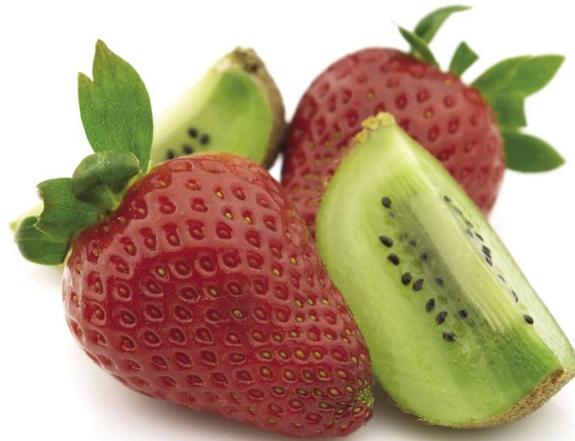
### NUTRITIONAL CONTENT:

Proteins: 12 grams

Carbohydrates: 51 grams

Fats: 8 grams

Calories: 310



# Food & Supplement Recommendations

- Consult with your medical or health care professional before starting any dietary changes and/or supplement use.
- If you are pregnant or nursing, do not take any supplements before consulting with your medical health care professional.
- References for this chapter are listed in the back of the book.

NUTRIENT	PURPOSE	FOODS	SUPPLEMENT DOSAGE	CONTRAINDICATIONS/CONSIDERATIONS
<b>ESSENTIAL</b>				
5-HTP/tryptophan	To increase the synthesis of serotonin	Tryptophan foods include: salmon, lamb, venison, chicken, tuna, turkey, eggs, oats, sunflower seeds, sardines, spinach & cod	5-HTP: 100 mg twice a day (once in morning upon rising and once at bedtime)	<p>Best with Vitamins B3, B6 and folic acid to help with conversion into serotonin</p> <p>Take on an empty stomach</p> <p>A small percentage may experience some nausea with 5-HTP as approximately 80% of serotonin is made in the gut. Drop the dose and your body will adjust</p> <p>Consult with your health care professional if you are taking an antidepressant before using this supplement</p>
Omega-3 essential fatty acids	For healthy brain function and to boost mood	Salmon, mackerel, sardines, herring, walnuts, tuna, halibut & flax seeds or flax seed oil	Fish or flax seed oil: 2-4 1000 mg capsules or tablespoons of flax or fish oil a day in divided doses	<p>Omega-3 has blood-thinning properties. Consult with your health care professional if you are on blood-thinning medication. Stop taking 2 weeks prior to surgery</p> <p>Fish oil can increase the risk of mania in patients with bipolar disorder</p> <p>People who have hypersensitivities or allergies to fish or shellfish may also be allergic to fish oil supplements. Signs of an allergic reaction include a rash or hives, difficulty breathing and swelling of the throat, face or mouth. An allergic reaction to fish oil should be considered a medical emergency</p>
Folic acid	<p>Helps with the conversion of tryptophan into serotonin</p> <p>Often people with depression have a folic acid deficiency</p>	Chick peas, navy beans, lentils, spinach, broccoli, asparagus, romaine lettuce, chicken liver, whole grains, salmon & avocados	<p>200-400 mcg a day for mild to moderate depression</p> <p>800-1200 mcg a day for chronic or severe depression and those with a known folic acid deficiency. These doses are only to be used under the direction of a health care professional</p> <p>Best taken with a multivitamin or in a B complex</p> <p>Most active form is folic acid 5-methyl-tetrahydrofolate</p>	<p>Take with 100 mg of Vitamin B6</p> <p>Best taken in a multivitamin but also individually supplemented if deficiency identified</p> <p>Don't take more than 400 mcg per day unless directed by your health care provider</p> <p>High doses of folic acid might cause abdominal cramps, diarrhea, rash, sleep disorders, confusion, irritability, nausea, stomach upset, behavior changes, skin reactions, seizures, gas, excitability and other side effects</p> <p>Consult with your health care professional if you are taking anticonvulsant medications</p>
<b>IMPORTANT</b>				
Phenylalanine	<p>Needed to help make dopamine, norepinephrine and adrenaline which helps you to stay focused, feel motivated and awake</p> <p>Converts to phenylethylamine (a mood-elevating neurotransmitter that gives you the feeling of bliss and love)</p>	Fish, chicken, turkey, eggs, fish, spirulina, grass-fed beef, lamb & veal	<p>500 mg a day before breakfast</p> <p>Best taken on an empty stomach as amino acids tend to compete for absorption</p>	<p>Best to eat a phenylalanine-rich diet as opposed to supplementing</p> <p>Consult with your health care professional first if you have a heart condition or hypertension</p> <p>Do not take if you are on antidepressants, have a seizure disorder, are diabetic, experience panic attacks, or have PKU – phenylketonuria</p> <p>It is not recommended to take a single amino acid for an extended period of time without supplementing with other amino acids as well. Long-term isolated amino acid supplementation can create an imbalance in the body</p>

NUTRIENT	PURPOSE	FOODS	SUPPLEMENT DOSAGE	CONTRAINDICATIONS/CONSIDERATIONS
<b>IMPORTANT</b>				
Tyrosine	To help make norepinephrine, adrenaline and dopamine which help to boost mood, alertness and motivation	Fish, chicken, eggs, whole grains, oats, yogurt, avocados, bananas, legumes & beans	500-1000 mg 30 minutes before breakfast  Best taken on an empty stomach as amino acids tend to compete for absorption	Best to eat a tyrosine-rich diet as opposed to supplementing  Tyrosine increases mental alertness so should not be taken at night  People with an overactive thyroid (hyperthyroidism) or Graves disease should not take tyrosine  Take at a different time than tryptophan as it will compete for absorption into the body  Do not take if on antidepressants, if you have hypertension or are prone to getting migraine headaches  It is not recommended to take a single amino acid for an extended period of time without supplementing with other amino acids as well. Long-term isolated amino acid supplementation can create an imbalance in the body
<b>HELPFUL</b>				
Vitamin B3 (niacin)	For healthy brain function. Helps with balancing dopamine and adrenaline as well as boosting energy levels  Helps regulate blood sugars which can cause depression symptoms	Spelt, salmon, beef, chicken, turkey, veal, lamb, sunflower seeds & tuna	50 mg 2 times a day  Best taken in a multivitamin or in a B complex	If taken in high doses of more than 100 mg a day, can cause liver damage, loss of vision, stomach ulcers or gout  People with liver disease, kidney disease, high blood pressure, diabetes, gout and peptic ulcers should avoid this supplement  You should not drink large amounts of alcohol if you take Vitamin B3  High doses may cause skin flushing. Niacinamide, nicotinamide and inositol hexaniacinate are non-flushing forms of niacin  Avoid time-release niacin as this can be toxic to the liver. Niacin may affect anticonvulsant medications and should be used under the care of a medical professional
Vitamin B6	Helps with the conversion of tryptophan into serotonin and for people who experience depression as a result of low Vitamin B6 levels	Beef, venison, sunflower seeds, chicken, avocados, bananas, lentils, brown rice & tuna	50-250 mg a day  Best taken in a multivitamin or in a B complex  Most active form: Pyridoxal-5-phosphate  Less active form: pyridoxine hydrochloride	Not dreaming or remembering dreams can be a sign of a Vitamin B6 deficiency  Although Vitamin B6 is abundant in food, it is not usually in high amounts and gets easily lost with cooking and processing. You may need to supplement to get best results  Do not take higher than 1000 mg as this can cause peripheral neuropathy, a condition characterized by damaged nerves that cause pain and numbness in the extremities  Side effects may include loss of appetite, sleepiness, headache, tingling and vomiting

NUTRIENT	PURPOSE	FOODS	SUPPLEMENT DOSAGE	CONTRAINDICATIONS/CONSIDERATIONS
<b>HELPFUL</b>				
Vitamin B12	Assist with conversion of tryptophan to serotonin	Salmon, lamb, beef, venison, sardines, eggs & fish	500-800 mcg a day  Best taken in a multivitamin or in a B complex  Methylcobalamin is the more active form as opposed to cyanocobalamin	Consult with your health care practitioner before supplementing with B12 due to its impact on the nervous system  Take in conjunction with other B vitamins as this increases absorption but can also individually supplement if deficiency identified  If you take antibiotics, acid reflux, ulcer or diabetic medications, it may interfere with your body's ability to absorb and use Vitamin B12  May cause skin itching, diarrhea, a feeling of being swollen, muscle weakness, cramps and pain, excessive thirst and urination, confusion shortness of breath, fatigue, headaches, dizziness and difficulties breathing or swallowing
Vitamin C	To help convert dopamine to norepinephrine which helps you to feel upbeat, driven and motivated	Parsley, papaya, pineapples, bell peppers, citrus fruits, tomatoes, strawberries, kiwi, broccoli, Brussels sprouts, cabbage, cauliflower, kale & peas	2000-5000 mg in divided doses  Best taken with food  Buffered forms of Vitamin C are easier on the stomach  Taking Vitamin C supplements with bioflavonoids will help increase absorption	Sulfa antibiotics increase elimination of Vitamin C  High doses of Vitamin C can cause loose stools or gastrointestinal problems, so reduce dosage if needed  Take in divided doses throughout the day as Vitamin C is quickly used up in the body  Take lower doses if you are prone to kidney stones  Consult with your health care professional if you are on blood-thinning medication as Vitamin C can act as a natural blood thinner
St. John's wort	Works best with mild to moderate depression (not severe)  Also helps to improve sleep and reduce pain	NA	300 mg 2 to 3 times a day for mild depression  and  600 mg twice a day for moderate depression	It takes a couple of weeks to begin to feel results  Side effects may include gastrointestinal symptoms, allergic reactions, anxiety and dizziness  Do not take if on antidepressants  Can cause photosensitivity and can reduce the effectiveness of certain medications such as contraceptives, antidepressants (especially SSRI), immunosuppressants, anticoagulants and anti-convulsants. If taking these medications, please consult with your health care professional first