

NUTRITION AND LIFESTYLE: TRYPTOPHAN, MELATONIN-RICH FOODS



Source: [Map](#) by Shawn Dulaney

TRYPTOPHAN AND MELATONIN FOR SEASONAL ADAPTATION

Lizzie Johnson, certified Health and Life Coach

Kamyar M. Hedayat, MD

SUMMARY: This article reviews the role of tryptophan, melatonin and related neurotransmitters in adaptation. Sources of these substances are discussed. Indication for and recipes related to seasonal eating is presented emphasizing optimal adaptation through increased consumption of the starting material for serotonin and melatonin.

Introduction

Serotonin and melatonin are neurotransmitters derived from tryptophan. They play important roles in circadian and seasonal adaptation (c.f. [Dr. Hedayat's A brief review of Circadian and Seasonal Adaptation](#)). In circadian adaptation, they work together. In the day they optimize adaptability by increasing alertness and permissive cortisol

function. At night, they optimize drainage, detoxification, growth and restoration by suppressing diurnal physiology. In seasonal adaptation, serotonin and melatonin peak at opposite times of the year. To prepare for spring, melatonin assists in adrenal and thyroid relaunching for spring cleaning of accumulated winter toxins. To prepare for autumn, serotonin increases the general level of cortisol production.

INDICATIONS FOR THIS DIET

Patients who suffer from nocturnal dysadaptation will experience insomnia, non-restorative sleep, incomplete detoxification at night and thus be at risk for degenerative disorders and a shorter lifespan. However, it should be cautioned that a meta-analysis showed that there is a greater risk of all-cause mortality from sleeping longer than 9 hours and more so than sleeping less than 6.5 hours.¹ What is important is the quality of sleep: the duration and alternation of light and deep sleep phases.

Those who suffer from diurnal dysadaptation can experience matinal brain fog, feelings of dread or despondency that resolve later in the morning. Conversely, they can also feel matinal overwhelmed or anxiety. They can also experience sensory overload or poor concentration from a general feeling of mental sluggishness.

Seasonal adaptation disorders are numerous, related to insufficient peripheral adaptation of the adrenals and thyroid. The most general consideration is to watch for disorders of spasmophilia which are vast, but include depression, seizures, asthma, allergies, cystitis, dysuria, muscle cramps, etc. The specific disorder will be determined by the endobiogenic terrain. For example, with an insufficient adrenal cortex re-adaptation in the autumn, one person may experience elevated alpha-sympathetic activity and thus constipation and gastric hyperacidity. Another may have a compensatory rise in prolactin and thus a change in their menstrual cycle or PMS symptoms. A third may experience a central corticotropic response, with elevated CRH, ACTH and vasopressin, resulting in worsening congestive heart failure, hypertension or edema. The common aggravations of spring dysadaptation are worsening arthritis, arthrosis, gout, goiter, seasonal allergies and accelerated growth of known cancers, to name a few. The occurrence of any of the circadian and seasonal disorders listed here would be an indication for this diet.

RECOMMENDING THE DIET

Tryptophan's reference daily intake (RDI) is 4 mg/kg (1.8 mg/lbs), or, 280 mg/d for a patient weighing 70 kg (154 lbs.). Thus, 250-300 mg per day would be 100% RDI for an average adult.

There are two approaches to recommending a diet rich in tryptophan and melatonin. For circadian disorders, recommend 100-150% of the RDI (250-450 mg) daily throughout the year. For seasonal disorders, recommend 150-200% (375-600 mg) per day in the 4 weeks of pre-seasonal adaptation: February 18th to March 20th, and August 19th to September 20th.

CONSIDERING THE MOST EFFICIENT FOODS

Foods in table 1 are listed by category, and within category from highest to lowest concentration of tryptophan per serving.

"Top foods," *italicized*, contain >100% RDI of tryptophan per serving. These foods can be added to a general diet without meal planning. Foods with lesser amounts of tryptophan will need to be combined to reach the optimal level.

1. Poultry
2. Red meat
3. Fish
4. Soya (Tofu)
5. Buckwheat
6. Cacao

"Superfoods", in **bold**, are rich in tryptophan and melatonin, fulfilling two roles:

1. Salmon
2. Sardines
3. Cherries
4. Almonds
5. Dairy
6. Eggs

Salmon and sardines are the most efficient foods for periodic adaptation because they are rich in tryptophan and melatonin such that a single serving well exceeds requirements.

Since tryptophan is the precursor to both serotonin and melatonin, it may be sufficient to eat the tryptophan-rich foods. Thus, the cultural wisdom of eating more fish in the spring and summer becomes apparent, as well as the indulgence in hot cocoa and value of sweet potatoes in the fall and winter! Those adhering to vegan or vegetarian diets need not worry. Multiples of the RDI can easily be accomplished in a single meal with judicious food-

combining. For example, buckwheat with hemp seeds, toasted almonds and dried tart cherries offers >200% RDI of tryptophan and melatonin, which fulfills the needs for daily and seasonal adaptation. There are lots of great ways to get creative in every season. For a number of seasonal-specific recipes follow table 1. Try them for yourself, because studies show that physicians who prepare these meals are more likely to recommend them to their patients.

COMPLETE LIST OF FOODS

Table 1: Foods rich in tryptophan and melatonin

	Food	L-Tryptophan (mg)	Serving Size	Melatonin
Meat	<i>Chicken Breast</i>	681	6 oz.	
	<i>Skirt Steak</i>	636	6 oz.	
	<i>Ground Turkey</i>	612	6 oz.	
Fish	<i>Salmon: Sockeye, Wild Atlantic</i>	570-480	6 oz	YES
	<i>Atlantic Cod</i>	461	6 oz.	
	<i>Canned Sardines</i>	411	8 oz.	YES
Vegetables and fruits	Bean Sprouts	159	100 g	
	Sweet Potato, boiled	92	8 oz.	
	Sweet Potato, baked	46	8 oz	
	Cooked Spinach	72	8 oz.	
	Avocado	64	8 oz.	
	Portobello Mushrooms	57	8 oz.	
	Broccoli	53	8 oz.	
	Asparagus	52	8 oz.	
	Yellow and Red Pepper	24	8 oz.	
	Cherries, tart	14	8 oz.	YES
	Goji berries			YES
	Raspberries			YES
Seeds and Nuts	<i>Cocoa as powder</i>	293	1 TB	
	Pumpkin seeds	164	1 oz.	
	Chia Seeds	124	1 oz.	

	Hemp seeds	105	1 oz.	
	Flax seeds	84	1 oz.	
	Pistachios	71	1 oz.	
	Almonds	60	1 oz.	YES
	Tahini	56	1 TB	
	Pistachios			YES
Legumes	<i>Soya: firm Tofu</i>	592	8 oz. cubed	
	<i>Navy Beans</i>	236	8 oz.	
	Kidney Beans	198	8 oz.	
	Soya: edamame	195	8 oz.	
	Black Beans	181	8 oz.	
	Soya: isolate protein powder	78	1 TB	
Cereal grains and grasses	<i>Buckwheat, Uncooked</i>	326	8 oz.	
	Quinoa	96	8 oz.	
	Teff	103	8 oz.	
	Oats, Uncooked	365	8 oz.	
Dairy and Eggs	High Fat Milk	224	16 oz.	YES
	Skim Milk	211	16 oz.	YES
	Cottage Cheese	166	4 oz.	YES
	Cheddar Cheese	155	1 Oz	YES
	Grated Shredded parmesan (hard)	137	1 oz.	YES
	Egg	83	1 large	YES

Sources: www.myfooddata.org,
<https://nutritionfacts.org>.

RECIPES

Autumn Adaptation: August 18-September 20



TEFF PORRIDGE

teff, milk, almonds, goji berries, dried apricots, peaches

- 1 cup Teff grain
- 3 cups Water
- 1/2 - 1 cup Milk
- 1 tsp Cinnamon
- 1 tsp Cardamom

Optional toppings: maple syrup, chopped almonds, dried goji berries, dried apricots, sliced bananas, or sliced peaches.

Directions:

1. Lightly toast the Teff grains for about 30 seconds in a saucepan
2. Add the water and bring to a boil. Reduce to a simmer. Cover and simmer on low heat until the water is absorbed (about 10 min).
3. Once the Teff is thickened, add the milk and the cinnamon. Stir and continue to warm.

4. Serve in two bowls and add the toppings of choice.

Serves 2

TURKEY CHILI

turkey, orange pepper, kidney beans, black beans, option for Quinoa

- 1 TB Extra Virgin Olive Oil
- 454 grams of Lean Ground Turkey (to prepare vegetarian use 16 oz. cooked Quinoa)
- 1 yellow Onion, chopped
- 2 cloves Garlic, crushed
- 2 Carrots, chopped small
- 8-10 Portobello Mushrooms, chopped small
- 1 Red Pepper, chopped small
- 1 Orange Pepper, chopped small
- 1 Jalapeno Pepper, chopped small
- 3 TB Chili Powder
- 1 tsp. Cumin
- 1/2 tsp. Dried Coriander
- 1 tsp Sea Salt
- 2 cups Diced tomatoes
- 2 cups Crushed tomatoes (from a can)
- 2 cups Black Beans (cooked, rinsed)
- 2 cups Kidney Beans (cooked, rinsed)
- Optional: cilantro leaves and scallions to serve

Directions:

1. Heat the oil in a large stew pot and saute' the onions and garlic.
2. Add the carrots, mushrooms, peppers and continue to saute'.
3. Add the spices and the tomatoes.
4. Drain and rinse the beans and add to the pot.
5. Simmer for 10 minutes.
6. Serve with fresh cilantro leaves and scallions diced on top.

Serves 8-10

Winter Adaptation: November 18-December 20

OVERNIGHT BUCKWHEAT OATS

Buckwheat, milk, chia seeds, hemp seeds, soy protein powder, sliced almonds, milk

1 cup Buckwheat Groats - soaked, drained
 ½ cup Milk
 4 tsp. Maple Syrup or Honey
 1 tsp. Cinnamon
 1 Tsp. Vanilla
 Pinch of sea salt

Optional toppings or add ins:

1 TB Soy Protein Powder, hemp seeds, chia seeds, sliced almonds, berries, fruit

Directions:

1. Cover the buckwheat in water and let it soak for at least 2 hours or overnight.
2. Drain the buckwheat and blend them in a food processor/blender to pulse them a few times to create smaller pieces.
3. Add the rest of the ingredients - maple syrup, cinnamon, vanilla, salt and blend until creamy and smooth. (can also add the protein powder or chia seeds at this point, if using them. Blending the seeds releases the nutrients out of the seed.)
4. Divide into two bowls and cover with toppings of your choice.



COTTAGE CHEESE PANCAKES

cottage cheese, eggs, chia seeds, oats, quinoa

1 cup Cottage Cheese
 4 Eggs
 1 cup uncooked Rolled oats or cooked Quinoa
 2 TB Chia Seeds (this is an optional way to add more tryptophan)
 1 ripe banana
 1 TB Coconut Oil or Butter

Directions:

1. Add cottage cheese, eggs, banana, quinoa or oats to a blender until smooth.
2. Heat oil or butter over medium heat in a skillet, pour 1/4 cup of batter at a time to cook the pancakes.

Makes 5 pancakes



RED CURRY POACHED COD FISH

codfish, yellow and green pepper

- 1/2 cup Basmati Rice (uncooked)
- 1/2 Yellow Onion, thinly sliced
- 1 Green Pepper, sliced thin
- 1 Yellow Pepper, sliced thin
- 2 TB Thai Red Curry Paste
- 1 cup Canned Coconut Milk
- 1 Cod Fillet
- 1 Lime (juiced)
- Fresh Cilantro/Coriander chopped

Directions:

1. Cook the Rice according to the directions
2. Place the coconut milk, curry paste, onions, and peppers in a pan over medium heat and bring to a boil, reduce to low, and simmer for two minutes.
3. Add the fish, cover, and cook for five minutes, or until cooked through.
4. Divide the rice, fish, vegetables, and sauce between plates.
5. Top with lime juice and Cilantro



KOREAN BBQ BOWLS

Skirt steak, ground turkey, bean sprouts, egg, edamame

- Skirt Steak or Ground Turkey (908g)
- 1 TB Butter or Ghee
- (For the marinade)
- 1/2 Yellow Onion sliced into strips
- 3 cloves garlic (minced)
- 1 tsp. Ginger (minced)
- 1 TB Maple syrup or brown sugar
- 1 TB Sesame Oil
- 1 TB Fish Sauce
- 1 TB Sriracha or gojuchang sauce
- 3 TB Rice Vinegar or White Vinegar
- 1/4 cup Tamari or Soy Sauce

- Cooked brown rice
- Cucumber, sliced
- Carrots, sliced or shredded
- Mixed greens
- Bean sprouts
- Edamame
- Broccoli

Optional fried egg for each serving, mint, sesame seeds

Directions:

1. Cook the Brown rice according to the directions.
2. Slice the skirt steak into thin pieces and season liberally with salt and pepper.
3. Whisk the marinade ingredients together and pour over the steak. (If you are using turkey, saute' the turkey in a skillet. Then pour the marinade over the cooked turkey and cook until heated through)
4. Heat the butter in a skillet over medium/high heat. Once it is hot, add the onion. Cook on medium/high until the onions are soft. Add the steak and cook for about 3 minutes. The steak cooks quickly.
5. Create the bowls by arranging rice and meat. Top with cucumbers, carrots, bean sprouts, greens, broccoli, edamame or the optional fried egg and herbs.

Spring Adaptation: February 18-March 20

ASPARAGUS MUSHROOM FRITTATA

eggs, parmesan cheese, milk, asparagus, portobello mushrooms, spinach

8 Eggs
 1/4 cup Milk
 1 cup Parmesan Cheese, shredded (Cheddar can be used)
 1TB Butter or Ghee
 2 cups Portobello Mushrooms
 1 Cup Asparagus, chopped 1/2 inch
 1 cup chopped, fresh spinach (can be frozen)
 2 stalks of Scallions/green onions
 Sea Salt and Black Pepper to taste

Directions:

1. Preheat oven to 400 degrees F (204 C)
2. Whisk eggs and milk in a bowl.
3. Heat a skillet or cast-iron pan over medium heat and melt the butter. Saute' the

mushrooms, and asparagus until softened. Add the Spinach and scallions. Saute' until wilted.

4. Pour egg mixture, salt/pepper, and Parmesan cheese on top of the vegetables. Spread the vegetables evenly through the egg mixture.
5. Transfer the skillet to the oven and bake for 12-15 minutes until the eggs are set and firm in the middle of the pan.



RAINBOW BUDDHA BOWL WITH TOFU

Tofu, quinoa, sweet potato, avocado, broccoli, edamame, hemp seeds

400g Firm Tofu
 1 tsp Cornstarch
 1 TB Tamari / or Soy Sauce
 1 TB Sriracha Sauce
 1 tsp Maple Syrup
 1 cup Cooked Quinoa
 2TB Avocado Oil
 1 Sweet Potato

1 cup Broccoli Florets
 1 cup Shredded Purple Cabbage
 1/2 cup Shredded Carrots
 1 Avocado, sliced
 1-2 Radishes, sliced
 Top with 1 TB hemp seeds
 Optional: 1 tsp Black Sesame Seeds, edamame

Tahini Sauce:

1.5 TB Tahini
 2 Limes, juiced
 2 TB Water

Directions:

1. Preheat the oven to 350°F or 180°C
2. Cut the tofu block into cubes. Transfer the tofu to a medium bowl for mixing. Add the cornstarch and mix well making sure all the tofu cubes are well coated. Add the soy sauce, Sriracha, and maple syrup. Marinate for 10-15 minutes.
3. Cook the quinoa according to the package directions.
4. Cut the sweet potato into cubes, coat in avocado oil, and place them on a baking sheet. Bake for 10 minutes, then add the tofu to the baking sheet. Bake for 20-25 more minutes.
5. Chop the broccoli into bite-sized pieces and sauté in a skillet on the stove with some oil. Steaming is also an oil free option.
6. Shred the carrots and cabbage finely with a food processor or simply chop with a knife into bite-sized pieces.
7. Combine the tahini dressing ingredients together in a jar or bowl.
8. Once the tofu, sweet potato, and broccoli are all tender, arrange all the ingredients in individual bowls and drizzle with the tahini dressing.

1 tsp Garlic, minced or 1/2 tsp dried garlic powder
 1 tsp Maple Syrup
 1/2 tsp Salt



SALMON WITH PISTACHIOS

Pistachios, Salmon

1/2 cup Pistachios (removed from the shell)
 1/4 tsp Sea Salt
 567 grams Salmon Fillet
 1 Lemon, juiced
 Chopped fresh parsley, and dill
 Brown Rice for serving

Directions:

1. Preheat oven to 375°F/191° C. Line a baking sheet with parchment paper.
2. Place pistachios and sea salt in a blender and pulse just until course but not into a fine powder.
3. Lay Salmon filets on the baking sheet and coat them with the pistachio mixture. Place in the oven and bake for 15 minutes or until the fish just begins to flake.
4. Remove the fish from the oven and pour lemon juice on top and fresh herbs.

5. Serve with brown rice and vegetables such as asparagus or a fresh salad.

Serves 4

Summer Adaptation: May 18-June 20



CHERRY RASPBERRY SMOOTHIE

raspberries, milk, tart cherries, optional soy protein, pumpkin seeds

2 cups Plain Kefir
1 cup Frozen Raspberries
2 cups Frozen or Fresh Tart Cherries (pit removed)
1/4 cup Oats or Pumpkin Seeds (if oats are not available or to make it grain free)
2 scoops Vanilla Protein Powder (soy or pea protein)
2 cups Frozen or Fresh Chopped Spinach

Directions:

Add all ingredients and place in a blender. Blend until smooth.

Serves 2



MEDITERRANEAN SALAD WITH SKIRT STEAK

skirt steak, feta cheese, mustard seeds, fenugreek, goji berries

For Dressing:

1/4 cup Extra Virgin Olive Oil
1 Lemon juiced
1 tsp. Mustard
1 tsp Mustard Seeds
Sea salt & black pepper (to taste)

1 cup Cherry Tomatoes
1 cup diced Cucumber
1 Avocado, diced
1/4 cup Purple Onion, Sliced thin
1/4 cup Pitted Kalamata Olives
142 grams grilled Skirt Steak, (sliced or cubed)
1/3 cup Feta Cheese (crumbled)
2 TB of each -Fresh mint, fenugreek, parsley
goji berries, optional topping
Fresh greens of choice such as arugula, or mixed greens
Serves 2

Directions:

1. In a small jar, combine olive oil, lemon juice, mustard +seeds, salt/pepper. Set aside.
2. Arrange arugula, tomatoes, olives, sliced steak, and feta in a bowl. Top with fresh herbs and feta cheese.
3. Drizzle the dressing on top and enjoy!



SALMON NIÇOISE SALAD

egg, salmon, asparagus, sweet potato, fenugreek, mustard seeds

4 Hard-boiled Eggs
 4 cups Sweet Potato cubes, boiled (can use mini white potatoes with less tryptophan, halved)
 3/4 pound Asparagus/ Haricots verts trimmed
 1 cup Grape Tomatoes
 Lettuce of choice
 1 Lemon, juiced

454 grams Salmon Fillet (option to use canned salmon or sardines)

For the Dressing:

1 TB mustard
 1/4 cup Extra Virgin Olive Oil
 1 4/ cup Apple cider Vinegar or Red Wine Vinegar
 2 Garlic cloves, minced
 2 medium shallots, minced
 1/4 tsp. Mustard seeds
 Chopped fenugreek and dill leaves for garnish

Directions:

1. Preheat oven to 400°F
2. Rinse and pat the salmon dry and place on a baking sheet with oil. Sprinkle lemon juice on top. Cook until just a little undercooked, and flaky. (About 8-10 minutes, depending on the thickness)
3. Place the eggs in a pot of water. Bring to a boil, remove from heat, cover the pan, and let sit for 12 minutes. Rinse eggs under cold water and peel.
4. In a saucepan place the cubed potatoes in water and bring to a boil until the potatoes are tender
5. Place the asparagus in a pot of boiling water. Cook until just tender, about 4-5 minutes. Drain and place in ice cold water to stop the cooking. Pat dry.
6. Whisk all the dressing ingredients together.
7. Arrange the potatoes, asparagus, lettuce, tomatoes, eggs, and fish on a plate. Drizzle the dressing on top and serve. ✱

About the Author

Lizzie Johnson is a mother of 4 children, a professional Health and Life Coach, a Fitness Trainer, and a Social Worker (BS). She lives in Jackson Hole, Wyoming, USA with her husband Adam. She is passionate about listening, rhythmic living, and holistic eating. Her coaching practice is devoted to helping clients create personalized systems that move them towards healthier ways of living.

References

1. Liu TZ, Xu C, Rota M, et al. Sleep duration and risk of all-cause mortality: A flexible, non-linear, meta-regression of 40 prospective cohort studies. *Sleep Med Rev.* 2017;32:28-36.

CONFLICTS

No conflicts of interest.
