

## **Alternative and Holistic Medicine: Sleep Matters | The Missing Link in Functional Medicine**

**By Dr. Michael John Badanek, BS, DC, CNS, CTPP, DACBN, DCBCN, MSGR./CHEV**

One of the biggest missing links in functional medicine is definitely sleep.. Because when the body sleeps, we all know it heals. Illness and injuries all improve when the body gets adequate sleep. Even certain chronic conditions like arthritis and fibromyalgia. But sleep is more than quantity. Adequate high quality sleep is also critical for brain health and keeping your memory sharp. Interestingly the memory is consolidated during sleep as the information a person learns during the day is transformed from the short term to the long term memory. The connections between the brain cells that help you remember things with sleep are actually strengthened.

A cause of poor memory and bad decision making comes from lack of sleep. With lack of sleep you also have high levels of stress hormone called cortisol. As we all know these elevated levels of cortisol have a negative effect on the hippocampus the sea horse, the memory center in our brain. It is truly the structure in the brain that is closely tied to memory and true consolidation of information. So when you get high quality sleep, so you know, your cortisol levels drop during the night giving your hippocampus a chance to do its job of organizing memories. When you don't sleep and cortisol levels are higher than normal the result is forgetfulness, difficulty processing new information, and trouble concentrating and staying focused. Therefore a lack of good sleep can also be associated with something called Alzheimer's disease and some other forms of age related dementia.

So during sleep, the brain's specialized lymphatic system flushes out metabolic waste products that accumulate in the fluid between brain cells. That includes the deleterious beta amyloid and tau the proteins that form the characteristic brain plaque and tangles of Alzheimer's. So we know from a lot of earlier studies that acute sleep deprivation actually elevates this beta amyloid levels in the brain. So we are going to try and spend the next 45 minutes to an hour talking about the different ways and issues that sleep matters, the missing link in functional medicine.

### **Quote | Thomas Dekker**

An interesting quote to start the day is, Sleep is that golden chain that ties health and our bodies together.

### **Importance of Sleep**

So what is the true importance of sleep? Well what I like to say is that nothing really heals, nothing really happens in our office if we don't help the patient with sleep. So as a chiropractor, I have a chiropractic degree and I still see some chiropractic patients musculoskeletal and the like, if they don't get good sleep they are not able to recover, they are not going to heal from their injuries, I really haven't done my job. Certainly in the functional medicine world, if we don't increase the sleep, as I just alluded to in my earlier opening statement about cortisol and brain and Alzheimer's and

the such, if people aren't sleeping we are getting systemic rises in inflammation, cortisol which poses an issue and overall chronic deleterious disease like the Alzheimer's. So sleep is critically important but it is truly overlooked.

### **Why we need sleep:**

1. **Restoration:** consolidation of memories and reset synaptic strength.
2. **Detox:** you want to detox. We talked about it just a little earlier. Detox flushes toxins from the body that build up during your waking hours.

So sleep is critical, and not only just sleep but good quality sleep. A study just came out, interestingly enough you needed between 6-8 hours of quality sleep. Without that quality sleep you weren't getting healed and you weren't getting that health response that was needed for the end of the day.

Interesting – you guys can't see me – I just opened up my cell phone today, Science Daily right now I just got a beep – an article, Lack of sleep intensifies anger, impairs adaptation to frustrating circumstances. So every day there is more and more information, so if you want to be at the leading edge as healthcare practitioners let's start talking sleep.

### **Sleep Disorder Impacts**

1. Heart disease
2. Diabetes
3. Mood disorders
4. Autoimmunity
5. Obesity
6. Memory issues
7. Immune dysfunction
8. Micronutrient deficiencies
9. Musculoskeletal
10. Neurodegenerative issues

Sleep disorders impact those who have a higher rate of addictive disorders, those who consume a large amount of alcohol, marijuana, drug use. May be delay in onset of addictive personality, sleep disorders when younger equate to higher rates of adolescent drug use, also mood disorders, also anxiety.

### **Alcohol Dependency and Sleep**

Those with insomnia, those having trouble sleeping are 55 times more likely to abuse alcohol. Also a higher alcoholism relapse rate for those who suffer from insomnia. Due to

the effects of alcohol, not uncommon for people to self medicate, alcohol may also cause sleep disorders with either causing issues falling asleep or disturbed second half of their sleep.

### **Sleep Deprivation**

People who have sleep deprivation experience lower pain thresholds, meaning they have more pain. So when a patient walks into my office and complains about pain one of the things I may ask him is how well do they sleep.

- Learning disorders, the ability to have a cognitive day. Without question, you remember taking those final exams how many times did you hear people say did you get a good night's sleep?
- Appetite suppression, you are just not hungry. You are not hungry all today and then you want to eat right before you go to sleep, really messing up your metabolism and leading you down a path of increasing weight gain.
- Seizures and epilepsy
- Increased incidence and progression of cancer.
- And similar impairment to alcohol consumption.

### **Poor or No Sleep**

Poor sleep or no sleep has really shown that sleep quality and duration has a direct link to chronic health conditions.

Other studies have shown circadian based therapy helps sleep duration for those who have to work at night, for night shift workers.

### **Rhythm**

Interesting, life is rhythmic, cyclical and dynamic. So you should stay connected with natural rhythms and their cycles, true keys to good health. Aligning daily activities to be in sync with the biological clock are truly the first steps to promoting refreshing sleep.

So the real question is why focus on circadian sleep disruption first when seeking solutions to insomnia? Truly staying in tune with natural rhythms is the key to good health. Flexibility in your body's rhythms allow adaptability and recovery but the natural tendency is towards the synchrony with the day and the night cycle. Promoting refreshing sleep by aligning your daily activities to be in sync with your biological clock are truly the first steps in managing insomnia. Remember human circadian rhythms run longer than 24 hours, when left to run freely it must be regularly reset to stay in harmony with the earth's cycle which is 25 hours.

### **Sleep is a Circadian Rhythm**

Sleep is a circadian rhythm, our connection to nature and the natural order. The body's internal clock that completes its rhythmic cycle about every 24 hours in synchrony with the external clock of the earth's rotation, the day and the night cycle.

Remember there are measurable biological rhythms: body temperature, blood pressure, mental alertness, hormones, neurotransmitter production, physical strength and aerobic capacity.

Our circadian rhythm, our body's own internal clock is regulated by the SCN in the hypothalamus. It should be about 24 hours in length, factors that may influence this circadian rhythm are brain hormones, stress, the environment both the light and the dark of the environment, and the timing and size of many different meals.

### **Cycles of Light and Dark**

So, interesting the cycle of light and dark truly controls sleep. The superchiasmatic nucleus SCN is the biological clock located in the hypothalamus. This SCN is regulated by light, photo stimulation from the retina and acts to inhibit pineal gland production of melatonin the sleep hormone. So the pineal gland secretes melatonin, a structural simple hormone that communicates information about environmental lighting to various parts of the body. Ultimately, melatonin has the ability to entrain biological rhythms. It has important effects on the reproductive function of many animals. The light transducing ability of the pineal gland has led some to call the pineal gland the third eye.

### **Sleep is Cycles**

Sleep is cycles, within cycles, within more cycles and cycles and cycles. So easily disrupted by demands of living in industrialized societies. So we are not sleeping well.

### **We are not sleeping well**

It is truly not surprising that we are not sleeping well. An estimated 50-70 million adults in the US have chronic sleep and wakeful disorders. Estimates of the prevalence of SLEEP MATTERS | THE MISSING LINK IN FUNCTIONAL MEDICINE insomnia depend on the criteria used to define insomnia and more importantly the population studied.

A general consensus has developed from population studies that approximately 30% of a variety of adult samples drawn from different countries report one or more of the **symptoms of insomnia**, which are:

- • Difficulty initiating sleep
- • Difficulty maintaining sleep
- • Waking up too early
- • And in some cases non-restorative or poor quality sleep

So truly the conclusion from an NIH State of Science conference indicated that the addition of a diagnostic requirement that included perceived daytime impairment or distress as a function of the insomnia symptoms resulting in approximately a 10% prevalence of insomnia. Finally the application of more stringent diagnostic criteria really will help us down a path to understanding what sleep disorders are.

### **24 hour sleep wake cycle**

A lot going on in this slide, I'll tell you that, there is no doubt in my mind. Within the 24 hour sleep-wake cycle circadian phases dictate when the body wants to sleep.

So here we have the delayed phase, people fall asleep 2 hours later than the desired bedtime.

The standard phase, people fall asleep earlier than normal. Standard is the right time and I'm sorry advanced phase is when they fall asleep earlier.

This is very common, the discrepancy between when the body wants to sleep and what society expects can actually lead to sleep deprivation.

### **Melatonin cortisol tides**

The ebb and flow of melatonin cortisol tides follows night and day. Cortisol is a stress response hormone, rises during the day, declines at night, supports awareness and ability to respond appropriately to demands. Melatonin a sleep hormone, rises at night in response to dark. Declines with the light of day supporting good quality sleep.

### **While sleeping**

While sleeping our sleep cycles go through 5 stages. You are likely to spend about a third of your life in the state of unconsciousness known as sleep. But the real question is what is going on when you are catching up with someone with disease, in some ways probably more than most people expect. So #1 stage 1 is:

1. Serotonin, it's mood, appetite, sleep, when sleeping you go through these different phases and in these different phases ultimately you have what we call each one of these sleep cycles lasts 70-90 minutes per night. At the end of each cycle you are nearly awake. You get an intermediate sleep most of the night is spent in this stage, it truly helps to refresh the body.
2. Stage 2 melatonin, deep sleep, difficult to wake somebody up, you can't get them out of that deep sleep. It is really the most restorative stage, lasting 30-40 minutes in the first few cycles, less in later cycles.
3. Stage 3 and stage 4
4. - very serotonin based. REM rapid eye movements, it's when you are dreaming. Heart rate increases, lasts about 10 mins in the first cycle, 20-30 mins in the later cycle.
5. Stage 5 is acetylcholine, histamine and a decrease of GABA or GABA being depressed.

### **Within the Stages**

Within the stages we cycle from less time in deep sleep to more time spent in active REM. So when we talked about the 5 stages of sleep including the repetition, they occur cyclically. The first cycle which ends after the completion of the first REM stage, usually lasts for 100 mins. Each subsequent cycle lasts longer as its respective REM stage extends. So a person may complete 5 stages in a typical night's sleep. So just remember those different

stages we got low voltage, mixed frequency, sleep spindles and k complexes, mostly slow waves and some more slow waves.

### **Sleep wake cycle disruption results in:**

- Difficulty falling asleep
- Difficulty in maintaining sleep
- Waking too early
- Chronically non-restorative or poor quality sleep.
- Day time impairment or distress that is associated with impaired sleep.
- And this happens more than 3 times a week you are considered someone who may have insomnia.

### **Circadian sleep disrupters**

How about circadian sleep disrupters, well let's look at a few different things:

- Light
- Higher levels of noise
- Elevated room temperature, it is much more beneficial to have room temperature lower, to lower your core to get a better quality sleep than an elevated room temperature
- Travel and jet lag, let's talk about that a little: I travel all over the world it is very interesting, if we go from the east to the west coast it is not as adverse to our overall health. For every time zone that we go it is an hour but it is usually one hour to recover on the next night's sleep whereas if you go from the west to the east coast for whatever reason it is more adverse to your health, you have to consider 1.5 hours of additional sleep for each additional time zone.
- Shift and night workers also have an issue
- And northern climate seasonal affective disorder also have some sleep issues.

### **Age, Health, Status, and Social Expectations**

So here we have **Delayed sleep phase, DSP:**

- Typically adolescents, young adults
- Normal total sleep time

#### *DSP symptoms*

- Persistent inability to fall asleep greater than 6 months and awaken at socially accepted times.
- Peak alertness in late evening and night.

## **Advanced Sleep Phase**

- Elderly and depressed
- Usually stable sleep schedules
- Normal total sleep time

### *ASP symptoms*

- Persistent early evening sleep onset between 6-9pm
- Early morning wake up 3-5pm
- Peak alertness in the early morning

## **REM – NREM Imbalance, Sleep, Aging & Cognitive Dysfunction**

- Diminished REM frequency is associated with aging
- Melatonin levels progressively diminish with aging, gradual calcification of the pineal gland.
- REM sleep alterations in dementia may reflect loss of cholinergic neurons.
- Reduced dream recall may be a sensitive indicator of cholinergic reserve

## **Mediators of inflammation**

Mediators of inflammation are associated with disrupted sleep in chronic illness. I just did a Facebook live about this, it is truly fascinating to look at these mediators of inflammation associated with the disruption of sleep in chronic illness. So an inflammatory state is known to exist in sleep disorders. Interleukin 6 for example is an inflammatory cytokine, a great example, that is elevated in sleep apnea and narcolepsy. Better sleep is associated with decreased secretion of IL6 whereas disrupted nocturnal sleep is associated with increased day time IL6. Other markers of inflammation like C-reactive protein, TNF alpha and some ones we don't talk a lot about including plasma endothelin-1 and the circulating soluble form of ICAM-1 may be elevated in the setting of sleep disorders.

ET-1 is a potential vasoconstrictor and a mediator of inflammation, elicited from endothelial cells. And ICAM-1 is ubiquitously expressed adhesion molecule imported from leukocyte trafficking and [unclear word @ 19.20mins] inflammatory processes.

So interestingly enough in contrast to the literature on sleep and cytokines such as the interleukin 6 and 8, the linkages between the elevation of the aforementioned ET-1 and ICAM-1 and disturbed sleep aren't quite as clear but the literature is growing quickly with them.

## **Secondary causes of sleep disruption**

- Sleep related breathing disorders
- Restless leg syndromes

- Caffeine sensitivity
- Medications

### **Sleep related breathing disorders**

Sleep related breathing disorders impair sleep quality and daytime function.

*Common physical findings*

- An enlarged tongue

### **Worrying**

Many people worry about or are worrying about the vicious cycle of the daytime stress and the non-restorative sleep. So here they are worrying about the rudimentary life events. They get acute episodes of initiating and returning back to sleep, the sleeplessness becomes the focus of worry. You get chronic non-restorative sleep or sleep debt. Chronic response activation like an increase in salivary cortisol and you are getting a decrease in heart rate variability.

- Overweight or obesity, somebody who is corpulent.
- Enlarged tonsils and / or uvula
- Small lower jaw / retruded chin
- Nasal polyps

*Some more common signs and symptoms:*

- snoring
- irritability
- personality changes
- depression
- poor memory
- night time sweating
- decreased sex-drive
- diminished performance
- accident proneness
- morning headache
- high BP
- diabetes
- stomach acid



Now, I'm covering a lot of symptoms, a lot of things that can cause the problem because not enough doctors as I surveyed as I lecture, are dealing with sleep. So I'm going very heavy emphasis at the beginning on what to look for and what is going on. I promise you before the end of the night we are going to have multiple protocols for multiple conditions that occur because of lack of sleep.

### **Caffeine Sensitivity**

Caffeine sensitivity, what is the mechanism of action – well it is a stimulant that blocks adenosine - inhibitory neurotransmitter has important role in brain, regulating the release of potentially excitatory neurotransmitters such as dopamine and glutamate

Different sources are tea and colas, and cocoa beverages. Caffeine content per cup is 80-155mg really depending on the way they prepare it. Caffeine stimulation – but for some it is truly over stimulating. I'm a big proponent of coffee – love my coffee, my organic non-pesticide coffee. I work with my Barry House over here. Greater than 5 cups daily though can make a slight change in blood pressure.

### **Current sleeplessness and Rx therapies**

Medications that may affect sleep:

- Amphetamines – what effect do they have, they are stimulants.
- Antidepressants – they can cause insomnia
- Anti-hypertensives can cause insomnia
- Appetite suppressants, stimulant
- Bronchodilators with asthma – stimulant
- Cholesterol lowering drugs can cause insomnia
- Corticosteroids, can cause insomnia
- Parkinson's drugs can cause insomnia
- Stimulants obviously can stimulate
- and thyroid hormone obviously can stimulate in excessive dosage

So take a moment, take a look at these drugs and tell me how many of your patients are on one of these and you can basically realize they are either going to be in a stimulated or possibly in an insomnia state.

### **Who benefits from a natural approach**

Who benefits from a natural approach to disturbed sleep?

- Those who have difficulty going to sleep
- Those who have difficulty maintaining sleep

- Those who wake too early
- Those who wake chronically tired despite adequate opportunity and circumstances for sleep
- Those who experience impaired sleep and daytime impairment or distress
- And those who have sleep difficulties occurring at least 3 times per week and it has been a problem for over 1 month

### **Summary: Sleep – wake cycle biochemical mediators**

So the summary of the sleep-wake cycle of biochemical mediators, you get this disrupted sleep wake cycle. So you get the limbic HPA axis hyper arousal. You also have the neuro immune cytokine imbalance. Neurotransmitter imbalance with GABA, serotonin and glutamate, and low endogenous melatonin.

### **Natural ingredients that support restfulness, relaxation and promote better sleep quality**

- Interestingly enough, here is melatonin, a hormone that is naturally produced in the brain, that helps regulate sleep waking and the body's circadian rhythm. It has neuro immune balancing properties. We are going to spend a lot of time on melatonin here.
- Chinese skullcap protects against oxidative stress and supports CNS health which is important for maintaining healthy sleep wake cycle. Calms stressed-induced limbic HPA axis hyperactivity.
- Passionflower, Lemon balm, Hops and Valerian, they are fabulous because they are a traditional mixture of European herbs. For added support for relaxation and a sense of calm / *GABA and melatonin receptor stimulation*
- Calcium and magnesium may help relieve minor pain associated with muscle tension which can be caused by stress or physical over exertion.

### **Within the Stages**

Within the stages, our neurotransmitters and hormones toggle between relaxing and exciting

- So non-REM relaxing inhibiting: our serotonin, GABA and melatonin.
- Whereas exciting: acetylcholine and histamine, which stimulate brain arousal centers, they actually awake promoting neurotransmitter

### **Key nutrients for sleep**

- Phenibut, 4-amino-3-phenylbutyric acid HCL
- Vitamin B6 or P5P

- Taurine
- Melatonin
- 5 HTP
- Passionflower

Biotics makes a great product, you can look at Phenotrophic Ultra PM, this is based on their product, it is an outstanding product.

### **Gamma-aminobutyric acid GABA**

So let's look a little bit further, so here we are going to look at GABA which is:

- The main inhibitory neurotransmitter in the CNS.
- It has nootropic effects which are enhancing memory or cognitive functions.
- GABA may actually antagonize noradrenaline in the CNS and the periphery leading to a greater fluid flow and metabolic clearance of brain.
- In addition it is quite effective at treating addictive disorders such as alcoholism and a reduction of anxiety and depression.

### **Oral GABA vs Phenibut**

Phenibut binds to GABA receptors and it is able to allow more compounds to pass the blood brain barrier with the addition of a phenyl ring.

### **GABA receptors and Phenibut**

GABA-a receptor is known as a fast-acting receptor, GABA-b is known as the slower acting receptor. Therefore we know that this Phenibut 4-amino-3-phenylbutyric acid HCL works on both receptors therefore greater CNS penetration.

### **Glutamate and Neuro-Excitation**

Interesting, greater than 80% of neurons are excitatory and 70-90% of synapses release glutamate. The problem with glutamate is when glutamate passes and goes out, what you just saw was calcium going inside to intracellular structures. When calcium goes inside to intracellular structures, that calcium allows for plaquing like tau plaquing. What can blunt this glutamate release of calcium to go inside the cell, Taurine. Taurine acts as a GABA agonist and Taurine protects neurons from glutamate induced neuronal exotoxicity by lowering the intracellular level of free calcium.

### **B6- pyridoxal 5'-phosphate P5P**

P5P is essential because it enables over 140 enzymatic reactions.

## **Serotonin metabolism**

Serotonin metabolism, what you are seeing here is serotonin metabolism works much better when you have 5 HTP and melatonin.

## **Passionflower or Passiflora incarnate**

- Overall calming effect and anti-anxiety
- MAO inhibitor thus improving depression, stress, anxiety, sleep disorders and restlessness.
- It also stimulates GABA production
- And may even be used for muscle spasms and pain

Interesting in this, Passionflower was put against a drug for a 4 week period and they found out there was no difference in outcomes on the positive side, however job performance decreased with the drug and there were other side effects. Once again, drug vs natural supplement the natural supplement wins.

## **5HTP and Passionflower**

5HTP and Passionflower, so you are seeing the 5HTP come in with the Passionflower allowing for an increase in serotonin.

## **Melatonin**

- Melatonin is not just for sleep, they also found that it has a positive effect on total cholesterol.
- Melatonin sleep induction without alteration in sleep architecture.
- Raises brain endorphin levels
- And weakens the SCN alerting response to light which triggers the waking state.

Melatonin, let's talk a little bit about it's neurobiology:

## **Neurochemistry**

- Reduces neuronal firing,
- Inhibits dopamine release
- Indirect antagonist
- Reduces circulating cortisol

## **Neuroimmune**

- Modulates T-lymphocyte production
- Inhibits COX activity
- Inhibits NOS activity
- Potential scavenger of radicals
- Inhibits NMDA receptor complex.

### **Study | Review on Melatonin #1**

Here is a systemic review on melatonin, the bottom line it was effective in decreasing sleep latency, in improving sleep quality in elderly insomniacs.

### **Study | Meta-analysis on Melatonin #2**

Another meta-analysis on melatonin found that it was effective in improving sleep parameters in children with autism spectrum disorders. The sleep duration had 44 minutes longer compared to the placebo and the sleep onset latency was 39 minutes shorter compared with placebo. Therefore the indication of some improvements in

daytime behavior was improved behavior, better social interaction and more playfulness, and better academic performance – all from an improvement in sleep.

### **Study | Meta-analysis on Melatonin #3**

Effective in delayed sleep phase disorder DSP: Advanced mean endogenous melatonin onset by 1.69 hrs in adults and 1.13 hours in children. This advanced mean sleep-onset time by 0.7 hours in adults and 0.64 hours in children. Finally, decreased mean sleep-onset latency by 30 mins in adults and 16 mins in children.

### **Study | A 4<sup>th</sup> systemic review on melatonin**

It showed that it was effective in preventing or reducing jet lag taken close to the target bedtime at the destination. This is especially important for those travelling in an easterly direction as we talked about before.

Daily doses of melatonin 0.5 and 5mg doses are very similarly effective except that people fall asleep faster at 5mg. The benefit is greater the more time zones you are crossing.

### **Study | Another systemic review on melatonin**

Helped improve sleep quality in children with ADHD. Most studies showed improvements in sleep onset, sleep duration, and sleep latency.

### **Melatonin Safety**

Melatonin safety, which sometimes gets questioned. It is now generally regarded as safe with little risk of toxicity especially in **short term use**.

- The side effects may include fatigue and dizziness.
- High doses 8mg or above are associated with reduced sperm motility, dizziness and headaches.
- Should not be used in pregnancy or when women are breast feeding.
- And it may reduce the effectiveness in patients taking warfarin.

### **Directions for using melatonin**

So what are your directions for using melatonin, one of the most popular without question sleep supplements:

- Children 1-3mg daily one hour prior to bedtime.
- Adults same thing, 1-3mg daily prior to bedtime.
- Don't use of course if pregnant or nursing
- Cautionary use with a history of seizures and depression. Also if you are taking anticoagulant medication.

### **Study 1992 | Light Stimulus: Circadian Rhythm**

Interesting the pineal melatonin response, continuous exposure to darkness, introduction of light pulse immediately impacts melatonin levels.

Melatonin can restore circadian rhythm even in the blind. It's an old study but still quite pertinent.

### **Study 2008 | SCN and Melatonin**

In a light dependent fashion the SCN will modulate melatonin release from the pineal gland and control circadian rhythm.

### **Neurological benefits by resetting circadian rhythm**

Proper hormone production of serotonin, melatonin promotes relaxation. Reset restful sleep cycles. Promote calmness. Ultimately promoting healthy mood and brain health.

### **Melatonin – More than a circadian rhythm regulator**

Melatonin is more than a circadian rhythm regulator, melatonin is actually a central nervous system antioxidant, ROS and RNS. Melatonin interestingly enough significantly attenuated LPS induced neuro-inflammatory changes in rats, so it may be a therapeutic potential for neuro-inflammation as an integral part of neurodegenerative disorders.

So with LPS coming from the gut, which is endotoxemia, LPS through the gut to brain axis really expresses how if your gut is damaged your brain can be damaged and we are SLEEP MATTERS | THE MISSING LINK IN FUNCTIONAL MEDICINE

seeing so many disorders that are brain related having this tie in through this gut to brain axis. This is truly now speaking to the neurodegenerative disorders and melatonin may be something that everyone of us wants to put in their armamentarium for their gut protocol especially if they test barriers and are testing LPS lipopolysaccharide, which leads us down the path – if exposed, because it is carried by gram negative bacteria – to systemic inflammation, possibly leaky gut or chronic leaky gut and maybe ultimately even SIBO.

### **Magnesium**

As we know, most Americans are magnesium deficient. We don't consume enough. There are multiple forms of magnesium to take. One of the biggest problems in our daily consumption or lack of consumption of magnesium is we are not eating enough vegetables, which are typically higher in magnesium, and everybody drinks a lot of coffee – sometimes coffee can strip the bones of this magnesium and calcium. Magnesium is an essential element critical to hundreds of physiological processes. As we've said before a substantial number of US adults have an inadequate intake. It is truly involved in sleep regulation.

### **Study | Magnesium and Sleep Quality**

Here was an 8 week randomized controlled study and they found that by taking magnesium:

- Decreased insomnia severity index and sleep onset latency
- Decreased serum cortisol concentration
- You increased sleep time and efficiency

And increased serum renin and melatonin concentration

They did a 20 day RCT with elderly subjects and found it partially reversed sleep electroencephalogram. They also had a modulated nocturnal hormone secretion.

### **Botanicals**

How about some botanicals. How about some botanicals that are traditionally used for their mild sedative and positive anxiolytic properties.

1. Well we've got Valerian
2. Lemon balm
3. Passionflower
4. Hops
5. Chinese Skullcap, we talked about before

### **Representative clinical studies | Valerian, Passionflower, Hops and Primary Insomnia**

So what about some representative clinical studies, here we had a 2 week RCT adults with primary insomnia, Valerian and Passionflower and Hops. The finding was this standardized polyherbal extracts was found to be a safe and effective as a short-term alternative to drugs / zolpidem for primary insomnia.

### **Study | Lemon Balm & Valerian and Anxiety**

Here is another representative clinical study where we had single dose RCT, healthy volunteers, we had Lemon balm and Valerian root and placebo and had a great outcome in reference to the idea of anxiety.

### **Study | Valerian & Hops for Sleep Disturbances**

Another study that showed a single dose of RCT healthy adults with sleep disturbances, Valerian, Hops, and Placebo. The findings were very simple in health adults with sleep disturbances the Valerian Hops combination helped them reach deeper sleep and improved sleep quality compared with placebo.

### **Scutellaria baicalensis Georgi (root)**

And our typical root is very interesting in that it is a traditional formulation. It clears heat, anti-inflammation, anti-bacterial, anti-hypertension, anti-allergy, and sedation. Organ affinity. So what is the mechanism? The mechanism is interesting in that it possesses the ability to decrease the expression of pro-inflammatory cytokines and NFkB activity. So when you are able to decrease the expression of NFkB, NFkB is a signal transducer of inflammation you are without question anti-inflammatory. And by not shutting off other pathways you are anti-inflammatory, you are actually managing and modulating inflammation.

### **Healthy sleep hygiene**

So healthy sleep hygiene resets our biological clocks. Healthy sleep hygiene we are going to go into in a bit more detail as we start to get to winding down on this webinar.

### **Tips for a Good Night's Sleep**

Here are tips for getting a good night's sleep, so to get all those beautiful Z's what a better choice than that.

- Big proponent of maintaining a regular sleep schedule.
- In addition, you want to establish a regular relaxing bedtime routine
- So in reference to sleep schedule, someone like me who is travelling through the different time zones, for me I have to be very specific and try not to change – so if I go to California I don't want to change 3 hours and come back from a week end, it just doesn't work. I may change that one hour but that's it. So obviously I'm going to go to bed a little earlier even though I don't sleep enough, I readily admit that. It is my achilles heel. And I'm going to get up really early. So in a bedtime routine, a bedtime routine is give yourself 15-30 minutes to fall asleep.
- Get the lights out, reduce the noise. Create a creative sleep conducive environment, shut yourself off, get rid of your blue light. And I'm going to go into more detail.
- Sleep on a comfortable mattress and pillow. Sleep on the side, side sleeping is a great choice, face down sleeping is a really bad choice it is also really bad for your lower back.



- Stop eating about 3 hours before bedtime. #1 you don't want to be digesting your food. #2 you don't want any of your carbohydrates or fats or energy sources to keep you up.
- And try not to have caffeine, nicotine, and alcohol close to bedtime.
- Some other tips for good sleep as I alluded to earlier was, shut off all electrical devices at least 2 hours before bed. If not two, at least one.
- Gentle stretching before you go to bed and exercise on a regular basis.
- Dosing your sleep aids should be about 1-2 hours before your desired bedtime. And those who suffer from anxiety begin small dosages earlier in the evening to begin calming of the system.

### **Mattress**

Mattress, the mattress that matters – you are looking for a mattress that provides comfortable surface support, it's going to go with / envelope your body's natural contours and curves, it is not going to be too hard or too soft so there's any pressure points, and it is going to lead to a better ergonomic sleep position. It should truly encourage deeper sleep. Some of the key materials:

1. Open cell memory foam, it contours to your individual body, it is not going to stimulate any tender or trigger points, and it can distribute the body weight easily. My choice, it's right up there is the BioPosture mattress.

So the mattress that matters, the right mattress provides a moderately firm comfortable surface that supports the body's natural curves without pressure points and leads to a healthier sleep position. It is not only comfortable but it creates a therapeutic sleep environment by encouraging deeper sleep with fewer awakenings.

Popular material for the support mattress is the open cell memory foam. Because memory foam mattresses contour to the body they usually don't cause pressure points, instead they support and align the spine by distributing weight evenly. Modern memory foam responds to pressure, the signature of the body and returns quickly to its original shape. This memory foam is fabulous for people with injuries, arthritic pain, neck pain and some conditions like fibromyalgia and anybody that has chronic pain that would lead to the loss of sleep.

In addition, Celliant which is bio-functional mineral textile, it contains infrared particles, promotes increased local blood flow and supports the delivery of oxygen. Also helping daily activity recovery. It is going to increase blood flow by 8%, increases the duration and quality of the sleep.

Finally, chemical exposure matters, here is my biggest take away with a mattress. Here is one mattress that has no flame retardants, virtually every mattress has a flame retardant. That means you are spending one third of your day, your child's day, your patient's day, whoever's day, on a flame-retardant mattress. These are doctor authorized so you can get flame retardant mattresses. We all talk about detox, but how about the environment in which we sleep, and that environment should have non-flame retardants. If you want more information I'll keep that up for 5 seconds /TJ Williams, [tjwilliams@bioposture.com](mailto:tjwilliams@bioposture.com)

### **Poor Sleep**

Poor sleep leads to harmful eating habits and increases in obesity and diabetes. So, interesting even poor sleep is leading us down a path of our diabetes which is occurring in America every day.

### **Dr. Rob's Gut Matrix**

So my Dr. Rob's Gut Matrix. So we talked about a lot of different things, I was asked a question and I just put this in today. I did a Facebook live on sleep and somebody said do you feel that if you don't get good sleep it could lead you down the path of leaky gut? Well what I'll say is, if you are going down the path of leaky gut and you don't get sleep, you are not going to recover. Our gut needs to turn over every 9 months, it needs to recover so within my gut matrix if we were not to sleep enough and it would lead us down a path of getting leaky gut, leaky gut leads us to an overload of toxins to the liver, liver dysfunction and toxic chemical overload. If we have leaky gut and we clearly see an increase in obesity and diabetes which can be correlated to a leaky gut, you are going to have an increase in insulin and blood sugar problems, insulin resistance, pre diabetes, diabetes, body composition issues, musculoskeletal failures, leaky gut, leaky heart, autoimmune, thyroid, gut to brain axis, the brain to gut axis. So sleep is a component of healing to avoid all the things we just mentioned.

### **Microbiome gut-brain axis structure**

I may be guilty of this also, I talk all about the gut-brain axis but I never talk about the HPA axis in reference to the gut -brain so just to get your neurons firing while you sleep very well tonight and the next few nights, understand that if you have a microbiome gut-brain axis problem you are going to have an HPA problem also.

### **Study**

Sleep encourages concussion recovery. Athletes with good quality sleep after they sustain a concussion are more likely to recover within a two week period. Those who take longer who don't get to sleep sometimes they recover in greater than 30 days, I think the number was 32. So girls are more likely than boys to have bad quality sleep. One of the factors why females don't respond as well to concussion and come back as quick.

So let's share a concussion nutrition protocol, because I promised you a lot of protocols and one for neurodegenerative disease. So here is a concussion protocol that I share with all the major sports organizations.

1. Protein and fat. Protein helps heal the injury. You want to take about a gram to kilogram of body weight. Fat, no carbs, fat is the fuel for the brain so I'm a big proponent of the ketogenic diet for those who have a concussion. The ketone bodies, the predominant one the gold medal winner beta hydroxybutyrate is without question a great choice to stimulate energy in the brain. Also fat is a great source of energy for the brain and BHB also stimulates glutathione the master antioxidant which you'll see later is a great nutrient to have to decrease brain tissue damage.

2. Creatine gives the brain an intense immediate energy to help heal the cells, both in long and short term injuries.

3. You want to reduce the inflammatory damage to the brain, fish oils, DHA. We could have a whole webinar just on DHA and its ability to help reduce inflammation in the brain and its effect on concussion. DHA, bottom line is the higher the more omega 3s the better response you are going to get when you have any kind of TBI concussion. It will help within a 30 day period post-concussion healing majority of the axonal damage. The key to it and one of the biggest misses and takeaways is if you have patients who have or partake in athletics and concussion is a very common outcome, fish oils before will decrease the incidence of concussion.
4. Boswellia helps with diffuse axonal injury.
5. Quercetin is a great antihistamine.
6. Ginger is excellent for the gut.
7. Turmeric, the most valuable ingredient and most bioavailable ingredient in turmeric is curcumin, curcumin is also shown to decrease NFkB. Curcumin helps with the release of BDNF which is a critical element for brain neurogenesis. So curcumin and turmeric are excellent. It also stimulates the nrf2 antioxidant pathway.
8. Resveratrol and grape seed extract also great choices.
9. Antioxidants, one of my more favorite ones alpha lipoic acid. ALA works with the water and fat part of the cell.
10. SPMs, specialized pro-resolving mediators allow for the resolution of inflammation, allow for the resolution of inflammation in the brain and the homeostasis between the initiation and the resolution. They also decrease cytokines and chemokines and they also decrease the release of MMP9 which is the MMP matrix metalloproteinases which damage the basal lamina of the blood brain barrier.
11. Choline is critical for brain development.
12. Vitamin D is essentially neuroprotective.
13. Zinc is a great enzyme for CNS injuries.
14. Sulforaphane, made from raw broccoli, so you have to chew it, chop it, don't cook it. Inhibits MMP9 and activates NRF2 pathways.
15. Magnesium L Threonate is a great weapon against delayed brain injury. Magnesium L Threonate 2g, Sept 2016 study showed consuming that, 9-14 years decrease in aging in the brain. Increases your bioavailability of magnesium in the brain by 15% and in the blood cerebral spinal fluid by 50%. It also decreases your incidence of Alzheimer's by 80%.
16. Acetyl L carnitine is an uncoupling protein, it energizes the brain.
17. Glutathione as we talked about, is the master antioxidant, the body's #1 intracellular antioxidant.
18. Honokiol, something we don't talk about, a beautiful herb increases BDNF, and it decreases excitocity.
19. And finally modified citrus pectin also reduces TNF alpha.

## **Bredesen: ReCode**

And finally since we talked a little about sleep pertaining to Alzheimer's disease, let me share recode which is called the reversal of cognitive decline this is Dr. Dale Bredesen's protocol that I use and let me share it with you. Let's just get to it. He talks about ketosis, ketosis is where the liver as we talked about earlier produces ketone bodies, beta hydroxybutyrate increases BDNF production. BDNF allows for brain neurogenesis. It shows that the brain can have nerves heal, you want to add MCT, coconut oil, olive oil, avocado and nuts. Truly all good quality non-trans fats. ApoE4 is what we should all be tested for to see if we have the propensity or the familiar dependency for Alzheimer's and a little statement as metabolism goes so does cognition.

So again the anti-Alzheimer's diet he calls it the ketoflex 12/3. So he likes the ketogenic diet, so essentially it is intermittent fasting. For 12 hours you are not going to eat. For 12 hours you are going to eat. And the last 3 hours before you sleep you shouldn't eat. So that's where he gets the 12/3 from. He emphasizes plant based dieting and emphasizing vegetables non-starchy. It does include both cooked uncooked and colourful vegetables/ fish, poultry, meat in small amounts. And as I said before it is a 12 hour fast. If you have the apoE4 genotype 14-16 fast and only eat for 8 hours. He finds that the 12/3 helps prevent leaky gut and optimizes the microbiome. And finally you want to choose foods with a GI under 35. So you want to avoid fruit juices, if you are going to eat fruit eat whole fruits. Of course blueberries and blackberries are your best choice. You want to avoid the Berfooda Triangle – simple carbohydrates, saturated fats, lack of fiber. Avoid gluten and dairy. Reduce toxic load. Include good fats. Avoid processed foods. And eat what we call SMASH fish, salmon, mackerel, anchovies, sardines and herring. And finally couple of quick takeaways, meat is the condiment not the main course. Include pre and probiotics. Include digestive enzymes. Cook at proper temperatures and times. Use a keto meal replacement and always go for MCT powder.

## **Supplements to Avoid Alzheimer's**

And finally here are some major supplements to avoid Alzheimer's, and we talked about the sleep effect

- Methylated B's
- Vit C, D, E, K2
- Resveratrol
- Acetyl I carnitine
- Coenzyme Q 10
- Omega 3 fatty acids curcumin
- SPMs
- And magnesium

## **Lifestyle changes**

- Exercise, when I'm done with this I'm going to exercise.
- Get some good sleep, if that hasn't resonated after the last 58 mins
- Reduce stress
- Do some brain training
- Always look to resolve inflammation
- Inhibit any new oncoming inflammation
- Remove all inflammatory sources
- And please adhere to my heal the gut seven R program

### **Deto for cognitive decline**

Let's not forget we talked about sleep being a detoxification of your brain, remember sleep is critical because detox for cognitive decline is a critical element to avoid any cognitive decline. And speaking of which, sleep and brain detox, sleep allows for the clearance of CNS metabolites be removed including amyloid beta in Alzheimer's. And it cleared two fold faster when mice slept because it had a greater flushing effect those mice who were sleeping compared to those mice who were alert.

**Dr. Badanek has been and currently is 38 years into active/private practice in the Ocala/Marion County, Florida region. Dr. Badanek practices Natural/Holistic Medicine through the use of Functional/Integrative Models for diagnostic and treatment protocols for the health challenged. Find him online at [Dr.Badanek.com](http://Dr.Badanek.com) and [www.alternativewholistic.com](http://www.alternativewholistic.com), and see what the facility has to offer the sick and health challenged. To schedule an appointment call 352-622-1151**