Examine Personalized Preview

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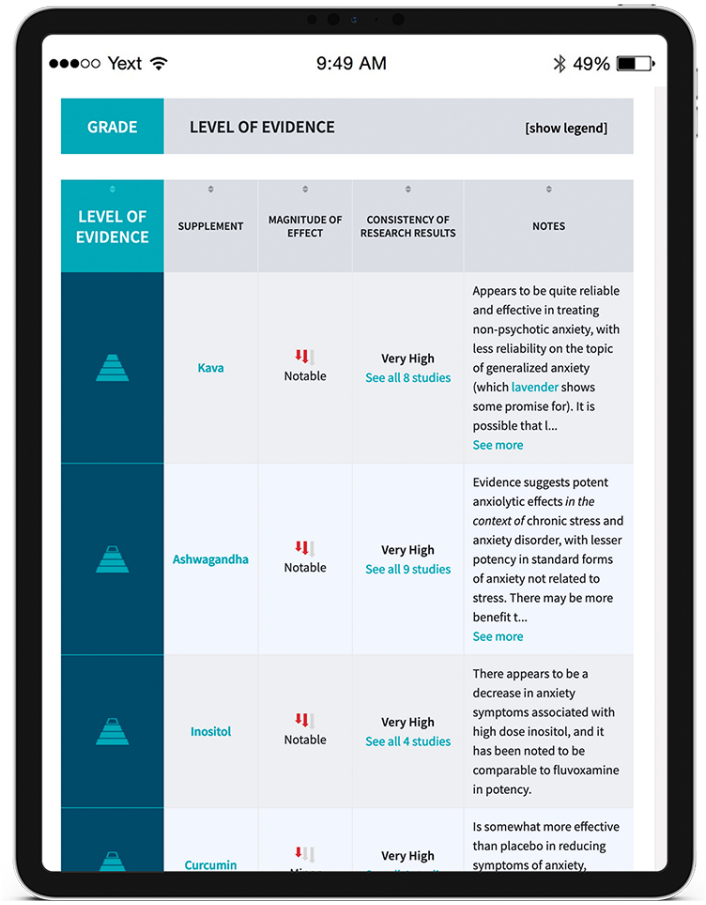
Here is a preview of the Human Effect Matrix for anxiety:



Enjoy the preview. If you have any questions, please don't hesitate to contact us.

Easily keep up with the latest research.

Get Started with Examine Personalized

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Gut Health

Did you know ...Dopamine and serotonin are neurotransmitters. As such, they are frequently associated with the brain. Yet more than 90% of serotonin and 50% of dopamine are found in the gut. The reasons for this are a subject of investigation.

Going nuts for a healthy heart and gut

Background: *Cardiovascular disease* (CVD) is the leading cause of death worldwide, and modifying diet is one of the main ways to reduce risk factors for CVD. Recent evidence suggests this effect may be related to changes in the gut microbiota. For example, eating walnuts, which are high in the omega 3 *alpha-linolenic acid* (ALA), improves gut microbiota and reduces CVD risk factors, but the active compound responsible for these benefits is unclear.

The study: In this randomized crossover trial, 42 adults at risk for CVD, characterized by elevated BMI, blood pressure, and LDL-C, were provided a standard Western diet for three weeks followed by three six-week isocaloric study diets. The study diets were: a diet containing whole walnuts (57–99 grams per day; 2.7% ALA), a fatty acid matched diet without walnuts (2.6% ALA), and a diet with oleic acid instead of ALA (0.4% ALA). Fecal samples were collected and CVD risk markers (blood pressure and total cholesterol levels) were measured at the start of the study and after each of the three diets.

The results: All three diets resulted in differentially enriched bacteria relative to the standard Western diet, suggesting replacing saturated fatty acids with unsaturated fatty acids in the presence or absence of walnuts affects the gut microbiome. The two ALA diets resulted in increased *Roseburia* population (a bacteria associated with reduced damage to the gut lining), and the walnut diet resulted in the largest increase in *Gordonibacter* population (a bacteria associated with reduced CVD risk). There was also a correlation between increased *Lachnospiraceae* population after the walnut diet and reduced blood pressure and cholesterol levels. Thus, it is possible that both the ALA and the bioactive compounds in walnuts modulate gut microbiome changes. Future studies on CVD outcomes, rather than risk factors alone, are needed to further this research.

Notes: While the analysis included all 42 participants, only 34 participants completed all diet periods, and two participants were on an antibiotic regimen during the course of the study, though removing these participants from the analysis did not affect the results. Furthermore, the conversion of ALA to EPA, which affects the gut microbiota, was not examined.

A sigh of relief: Breathing techniques for acid reflux

Background: *Gastroesophageal reflux disease* (GERD), commonly known as heartburn, is a disorder of the upper digestive tract in which a recurrent reflux of stomach acid into the esophagus causes chest pain and eventual esophageal erosion. While the causes range from overeating to weakened stomach sphincter muscles, first-line drug treatment is the same: proton pump inhibitors. These drugs involve a number of risks, so a safer alternative is needed. Breathing exercises that enhance diaphragm tension may be one such alternative.

The study: This was a meta-analysis of 7 randomized trials enrolling 194 participants with GERD. Each evaluated the efficacy of breathing exercises used with or without proton pump inhibitors. Breathing exercises were not standardized across the trials, but all techniques focused on strengthening the diaphragm. Trial length ranged from four weeks to nine months.

The results: GERD symptoms were reduced after participants completed breathing exercises. Researchers observed improved lower esophageal sphincter pressure in three trials. Larger controlled trials are needed to determine if a specific breathing exercise program could benefit people with GERD and reduce the need for medication use.

Ironclad probiotics

Background: Anemia is a condition characterized by a deficiency of healthy red blood cells and subsequent circulation of oxygen-poor blood. Symptoms include fatigue, shortness of breath, and dizziness. While there are multiple causes, roughly half of all cases are a result of iron deficiency, as iron is crucial for the formation of hemoglobin, a substance in red blood cells that enables them to carry oxygen. Iron supplementation is the standard intervention for anemia, but absorption is low in some people. Altering gut microbiota may be one way to increase iron bioavailability.

The study: This was a systematic review of 12 controlled trials examining the effects of probiotics on iron absorption and status in children and adults. Researchers recruited healthy participants and participants with a formal diagnosis of iron deficiency anemia. Treatment duration ranged from seven days to five months. Probiotic delivery varied widely, with some trials requiring supplementation on an empty stomach and others alongside a special meal of fermented foods. A meta-analysis of eight crossover trials (122 participants) using the probiotic Lactobacillus plantarum was also conducted.

The results: Overall, only one study reported an improvement in iron blood levels, but dietary non-heme iron (iron originating from plants rather than animals) absorption increased during Lactobacillus plantarum supplementation in the eight crossover trials. This may be a reflection of low adherence, as few studies closely monitored the participants, and/or small sample sizes. Further investigation is needed.

A gut feeling about the accuracy of microbiota tests

Background: The gut microbiome is connected to human health in numerous ways, from influencing emotional wellbeing to the development of autoimmune diseases. Accurate testing of the intestinal microbiome would enable researchers and clinicians to discern which microbial compositions and changes improve health and ultimately leads to a better understanding of the dynamic gut-health relationship. Unfortunately, current sampling methods are limited and do not always reflect true microbial composition.

The study: This review summarized the gut microbiota sampling methods in use today, including their advantages, shortcomings, and how they could be improved.

The results: There is a need for more precise, affordable, and convenient sampling methods which take into account the large diversity of the gut microbiota in different parts of the gastrointestinal tract. Fecal samples are the most commonly used test, but these samples only reflect the bacteria present in the lower digestive tract and the test can be inaccurate because the bacteria present in feces is not always the same as the bacteria that is left behind in the gastrointestinal tract. More accurate tests, however, tend to be highly invasive and impractical in a clinical setting. Future methods may use small, swallowable devices that allow for the accurate examination of the gut microbiota in various locations.

Note: Methodology is an important component of gut microbiota studies. Just because a study finds that a certain food or supplement greatly alters a participant's fecal sample does not mean said food or supplement results in better gut health. Stay curious!

Investigating optimal vitamin D dosage for children with IBD

Background: About 60–70% of children with *inflammatory bowel disease* (IBD) have low vitamin D levels. A typical treatment regimen is supplementation of 50,000 IU (1,250 μg) of vitamin D per week for five to eight weeks, but treatment non-adherence can be high. However, a one-time "mega dose" of 200,000–800,000 IU (5,000–20,000 μg) may be just as effective.

The study: This was a randomized trial of 44 children, ages 6–21 (average of 15), with baseline vitamin D levels of less than 30 ng/mL (75 nmol/L). Average vitamin D levels at baseline were 22 ng/mL (55 nmol/L). Participants took 50,000 IU (1,250 μg) of vitamin D in one dose per week for six weeks or a single 300,000 IU (7,500 μg) dose.

The results: Both groups had significantly higher vitamin D levels 12 weeks into the study, but the weekly treatment group had the higher average levels of the two groups (40.4 and 29.8 ng/mL, respectively). Researchers noted that 80% of participants said they prefer the single dose over the weekly protocol.

Synbiotic supplementation coupled with ketogenic diets

Background: The effects of a ketogenic diet on the microbiome are not well understood. This study was designed to investigate changes in the gut microbiome during a weight loss program and any subsequent effects on inflammation.

The study: This was a randomized controlled pilot study that enrolled 33 participants into a four-month weight loss program. The study began with a two-month very-low-calorie ketogenic diet (phase 1) immediately followed by a two-month low-calorie (non-ketogenic) diet (phase 2). Three groups were tested: group 1 took a synbiotic during both phases, group 2 took a synbiotic only during phase 2, and the control group took a placebo throughout the study.

The results: No significant changes in microbiome diversity were observed in any group. The group that took the synbiotic only during the second phase experienced greater weight loss and decreased markers of inflammation.

Note: This was a pilot study designed to investigate whether further studies with more participants and more specific endpoints would be worthwhile for exploring synbiotic supplementation during a ketogenic diet. Thus, the results should be evaluated with caution until they are replicated.

Herbs for gastrointestinal disorders: Oils and tinctures and plants, oh my!

Background: From *irritable bowel syndrome* (IBS) to acid reflux, functional gastrointestinal disorders (meaning there is no structural abnormality causing the symptoms) affect up to 10% of people worldwide and greatly reduce quality of life. In the absence of a clear cause, treatment strategies are limited. Recent surveys suggest people suffering from these disorders can use herbal therapies to help alleviate symptoms, but there is limited evidence supporting the efficacy of such therapies.

The study: In this meta-analysis, researchers analyzed the results of 49 randomized trials including a total of 7,396 participants using herbal therapies for one to six weeks to treat functional gastrointestinal disorders. The trials compared herbs to placebo and included primarily people with IBS, but also studied people with functional acid reflux and constipation. Only five trials compared herbs to conventional pharmacotherapy.

The results: Herbal therapies were generally effective for relieving IBS, functional acid reflux, and constipation. These therapies were also found to be no worse than treatment with pharmaceuticals. Since over 33 different herbal formulations were used across the trials (peppermint oil, Tong Xie Yao Fang, rikkunshito, and others), these results do not specify which formula had the highest probability of improving symptoms. Additionally, the majority of included studies were suboptimal in design due to a lack of blinding and serious adverse event reporting, and because the researchers relied on subjective symptom scores as indicators of therapeutic effect.

Copying Genghis Khan: Yogurt consumption for digestive health

Background: Believed by Genghis Khan to embolden warriors with extraordinary bravery, yogurt remains a popular food and is a good source of protein, calcium, and probiotics. It is believed to strengthen the gut barrier (in soldiers and non-soldiers alike) and improve digestive health, but the mechanism for this effect is unclear.

The study: The aim of this cross-sectional study was to investigate the association between reported yogurt consumption and blood levels of the lipopolysaccharide CD14, an increase of which is linked to gut barrier disruptions. The study used existing data from two U.S. cohorts and included 632 female and 444 male adult participants. Food frequency questionnaires at two time points (1986 and 1990 for women; 1990 and 1994 for men) were used to calculate yogurt intake. Blood samples from these time points were analyzed for CD14 concentration.

The results: Higher yogurt consumption (defined as two or more cups per week) was associated with a decrease in CD14 blood concentration in both men and women. The effect was more pronounced in men, including men with Western dietary patterns and alcohol intake. Thus, it is possible that yogurt consumption enhances gut barrier integrity even in the context of a less than optimal diet. These findings are subject to a number of limitations inherent to observational studies, including potential food recall inaccuracies and little direct control over confounding factors. The results of this study also don't inform whether yogurt consumption decreased digestive and gut-related issues, as researchers only examined the surrogate marker CD14.

Dietary factors contributing to gut health

Background: The gut's microbiome plays a vital role in the body's hormonal, immune, metabolic, and neurological health. Changes in the gut's microbiome are correlated with a number of diseases. Yet the role played by the diet in the development of the gut's microbiome isn't fully understood.

The study: This umbrella review (a review of reviews) included 86 reviews of studies on the effect of nutrition on the gut's microbiome. The findings were qualitatively evaluated. A large number of nutritional factors were taken into account, including calories, carbs, fat, protein, fiber, vitamins, and minerals.

The results: Most research to date has been on dietary fiber, which seems to have a number of positive effects on the gut's microbiome and health. Protein has the potential to produce undesirable byproducts that "stagnate" in the gut. Many, many more nutritional factors are discussed for their varying effects on the abundance and diversity of the microbes that live within the human gut.

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Healthy Aging & Longevity

Did you know ...Horvath's epigenetic clock is a measure of DNA methylation that can be used as a measure of biological aging.

Ketogenic therapy for Alzheimer's disease

Background: Alzheimer's disease, a common form of dementia, is a brain disorder that impairs memory. Keto therapy — i.e., following a keto diet or supplementing with ketones or *medium-chain triglycerides* (MCTs) — is believed to provide some protection by reducing oxidative stress and making more energy available to brain tissues.

The study: It was a systematic review of 10 randomized controlled trials that enrolled 444 participants with Alzheimer's. The interventions varied greatly, but generally involved ingesting MCTs. Only 3 trials tested a keto diet (with or without MTCs).

The results: Keto therapies were consistently associated with better overall cognition. Making more precise claims would be very difficult, due to major differences in study design.

Note: Dementia can make eating difficult, thus creating a risk of malnutrition. A keto diet may increase this risk, both because it may reduce appetite and because meeting all nutritional needs requires more planning when many foods are restricted. This may be why a majority of these studies opted to use an MCT supplement rather than put the participants on a keto diet.

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💪 Muscle Gain & Exercise

💡 *Did you know ...While exercise can improve immunity, extended bouts of intense exercise can lower it.*

Oral rehydration: Running fluid-ly

Background: Even a 2% loss of water weight is deleterious to cognition and exercise performance. For athletes, proper hydration is both important and challenging, as prolonged exercise decreases hydration status while increasing levels of oxidation and inflammatory biomarkers. Appropriate rehydration strategies help preserve optimal health and exercise performance.

The study: In this double-blind crossover trial, 12 healthy males underwent three days of testing (baseline plus two test days) to determine if a *low-osmolality carbohydrate-electrolyte solution* (LCS) affects dehydration, oxidative stress, renal function, and aerobic capacity after exhaustive endurance exercise. On each test day (separated by three weeks), participants consumed 600 mL of LCS or water one hour before and after an hour-long treadmill run at 70% max effort, followed by a run at 90% effort until exhaustion. Researchers measured body weight and heart rate and took blood and urine samples multiple times throughout the experiment.

The results: Although researchers observed no differences in participant exercise capacity or renal function, drinking LCS did result in less fluid loss, improved markers of oxidative stress, and slightly higher electrolyte levels (sodium and potassium) after exhaustive exercise. Larger studies including more diverse populations and performance tests are needed to confirm these effects.

Note: The authors state that the dehydration levels noted in this study may be the reason why there was no exercise improvement after LCS consumption. The researchers measured an average 2% loss of body weight, but some research suggests endurance performance begins to suffer at losses of more than 3%.

Low-GI energy bars improve sport performance later in the game

Background: Carbohydrates are an important energy source during prolonged or strenuous activity. Premature fatigue during prolonged or strenuous activity is linked with the depletion of carbohydrates from blood glucose or liver and muscle glycogen stores. *Low-GI* (glycemic index) foods are known to reduce the increase in blood glucose and insulin over time. This decreases carbohydrate oxidation in favor of fat oxidation, sparing carbohydrate and muscle glycogen stores. This study was designed to investigate whether consuming carbohydrate-matched low-GI energy bars, as opposed to high-GI energy bars, before and during a soccer match can preserve carbohydrate energy levels and improve sport performance.

The study: In this crossover study, 8 male recreational soccer players consumed 1.5 grams of available carbohydrate per kilogram of body weight (1.5 g/kg) from a low-GI bar (GI = 45) or high-GI bar (GI = 101) two hours before a 90-minute simulated soccer match, and 0.38 g/kg during a 15 minute half-time break. The test involved alternating 6-minute intervals of paced jogging, running, walking, and sprinting, and 3-minute intervals of soccer-specific skills (timed ball dribbling, agility running, heading, and kicking accuracy). Performance and metabolism were assessed before and during the simulated soccer match.

The results: Carbohydrate oxidation was lower and fat oxidation was greater during the match in the low-GI sport bar group. Performance later in the game was improved in the low-GI group, with greater agility (running speed) and heading (jumping height) reported. None of the participants complained of gastrointestinal discomfort after consumption of the bars. Researchers believe that the reduction in carbohydrate oxidation in the low-GI group led to the sparing of muscle glycogen and improved performance later in the game.

Note: The main limitation of this study is that muscle glycogen was not measured directly, which would require a muscle biopsy. To control for muscle glycogen levels before the test, participants had their dietary intake and physical activity levels standardized the day before and during the trial.

Whey protein does not improve ACL rupture recovery

Background: Rupture of the *anterior cruciate ligament* (ACL) can cause knee instability and quadricep inactivation, reducing strength by up to 35%. Eccentric muscle training has been demonstrated to improve recovery from this injury. Given the known effects of whey protein on improving strength and muscle mass, this study was designed to examine this effect in the context of eccentric muscle training and ACL injury.

The study: This randomized controlled trial allocated 37 men with ACL rupture to engage in isokinetic eccentric training twice a week for six weeks, with or without 22 grams of whey protein isolate per day. Quadricep cross-sectional area (measured with MRI), concentric strength, eccentric strength, knee function, and knee circumference were measured at baseline and six weeks into the study.

The results: Overall, both groups experienced significant improvements, but the whey protein isolate group did not see any benefits over the control group.

Strategies for preventing exercise-induced hypoglycemia in people with type 1 diabetes

Background: Since people with type 1 diabetes can't make insulin on their own, they need to take exogenous insulin to control their blood sugar levels. This can be tricky when exercise is added to the mix. Since exercise makes the body more sensitive to the effects of insulin, it can make people who take exogenous insulin at increased risk for hypoglycemia. This study examined two different strategies to mitigate exercise-induced hypoglycemia in people with type 1 diabetes.

The study: In this retrospective analysis of two small clinical trials, a total of 18 participants performed moderate intensity cycling for 45 minutes. The participants were then divided into three subgroups. The carbohydrate group supplemented 15–30 grams of carbohydrates during exercise, while the insulin reduction group only reduced their insulin dose with their last meal by 50%. The third control group did not receive an intervention.

The results: The carbohydrate group did not experience any hypoglycemic events, but there were four hypoglycemic events in the insulin dose-reduction group.

EPA-rich fish oil linked to improved exercise performance and reduced post-exercise swelling

Background: *Eicosapentaenoic acid* (EPA) and *docosahexaenoic acid* (DHA) supplementation reduces *delayed onset muscle soreness* (DOMS), swelling, and inhibits the reduction of muscle strength and *range of motion* (ROM) associated with exercise. The aim of this study was to evaluate the effects of EPA/DHA in untrained people, using an exercise model (elbow flexors) that results in strong muscle fatigue.

The study: This eight-week randomized control study enrolled 16 healthy young men. Participants received either an EPA and DHA supplement (600 mg of EPA and 260 mg of DHA) or a placebo daily. Participant exercise performance (work output, peak torque, muscle fatigue), ROM, and upper arm circumference were assessed before, immediately after, and one day after exercise. None of the participants were involved in any regular resistance training for at least one year prior to recruitment.

The results: Exercise performance measured by muscular work output increased during exercise in the EPA/DHA group, and decreased in the placebo group. Peak torque also slightly improved in the EPA/DHA group. Exercise-induced muscle swelling and a decrease in ROM immediately after exercise was inhibited in the EPA/DHA group.

Even small doses of additional protein help build muscle mass in older adults

Background: Peak muscle mass occurs between the ages of 20 and 40 and naturally declines with aging. Sarcopenia, or the marked decline of muscle mass, can present risks to aging adults by increasing the risk of falls, injury, disability, disease, and reduced quality of life. Protein supplementation in large doses (more than 20 grams per day) has been shown to increase muscle mass regardless of age, with or without resistance training. Larger doses may be a burden to some adults due to the increase in dietary intake and costs, so the aim of this study was to evaluate the effects of smaller doses of protein supplementation (10 grams per day) on muscle mass when combined with an exercise program.

The study: This 6-month randomized controlled trial enrolled 122 healthy older adults. Participants received either a milk-protein drink containing 10 grams of protein or an isocaloric carbohydrate-based placebo drink of a similar appearance. Participants were instructed to perform structured body weight and medicine ball exercises daily and consume the drink within an hour after exercise. If exercise was not completed on a particular day for some reason, the drink could be consumed at any time. Body composition, physical performance, and blood biochemistry was measured before and after the intervention.

The results: Lean body mass (muscle) increased in the milk-protein group and decreased in the placebo group after the six-month intervention. Fat mass and uric acid levels decreased in the milk-protein group and were unchanged in the placebo group. Most of the physical performance tests results improved in both groups, with no differences found between groups.

Note: High blood uric acid levels can lead to gout, which results in painful joints. Studies have shown that low-fat dairy or milk intake reduces uric acid levels, especially when consumed in the long term.

Shocking gains for elderly skeletal muscle after supplementation and electrical stimulation

Background: Although reductions in muscle mass during the aging process are hardwired into human biology, it is possible to control whether and how it occurs. Weight training, consumption of ample high-quality protein, and adherence to a healthy lifestyle has been proven time and time again to help prevent sarcopenia and functional decline. Many people, however, due to illness or injury, are prevented from doing any weight training at all. In these cases, *electrical muscle stimulation* (EMS) has shown some promise for maintaining strength and muscle mass. This study examined whether supplementation with whey protein in the presence or absence of omega-3 fatty acids and polyphenols can increase adaptation to muscle EMS stimulation in elderly people.

The study: In this 12-week randomized controlled trial, 41 participants with restricted mobility (aged 60–90) were divided into three groups: beverage with carbohydrate and placebo capsules (CHO), beverage with 20 grams of whey protein isolate and placebo capsules (WPI), or beverage with whey protein isolate and capsules supplying 500 mg of rutin, 500 mg of curcumin, and 1.5 grams of omega-3 fatty acids (WPI + BIO). The participants ingested the protein drink once per day. On days EMS was performed (twice per week), the participants ingested the beverage immediately after EMS stimulation. The participants were fitted with belt-type electrodes around the waist and both knees and ankles for the EMS procedure.

The results: Calf muscle thickness and cross-sectional area increased in all groups, with no differences in muscle size between groups. In contrast, knee extension strength increased by 13% in the WPI + BIO group. This was significantly higher than the CHO and WPI groups, which increased by only a respective 5% and 6%.

Faster-digesting protein versus slower-digesting proteins for muscle protein synthesis

Background: Previous studies have shown that rapid increases in blood amino acid levels after exercise may enhance *muscle protein synthesis* (MPS) and anabolic signaling relative to slower increases in blood amino acid levels. This study tested this idea by using different types of milk protein supplements that caused faster or slower increases in blood amino acid levels.

The study: In this randomized controlled trial, 30 men (aged 22.5 on average) performed leg presses and leg extensions at 80% of their 1-rep maximum. After the exercises, they were randomly assigned into groups taking 25 grams of *mineral-modified milk protein concentrate* (mMPC, digested quickly), *milk protein concentrate* (MPC, digested slowly), or *calcium caseinate* (digested very slowly). Muscle biopsies were collected before and two and four hours after exercise to measure muscle protein synthesis (MPS) and anabolic signaling activation.

The results: mMPC performed as expected, causing significantly increased blood amino acid levels 45–90 minutes after ingestion. This failed to make a difference, though, since all groups had similar increases in MPS and anabolic signaling regardless of the protein supplement. The rapid increase in blood amino acid levels with mMPC was not more anabolic.

The present results contradict a previous study that found rapid increases in amino acids *do enhance* MPS and anabolic signaling. The later study used a different approach in terms of protein supplements and exercise protocol.

Avocado for autonomic amelioration

Background: The autonomic nervous system is responsible for producing cardiovascular changes like elevated blood pressure and cardiac output during exercise. Avocado has been shown to produce positive cardiovascular benefits, so this study was designed to investigate if supplementing avocado pulp improved cardiovascular and autonomic recovery after a workout.

The study: In this crossover trial, 12 women supplemented 600 mg of avocado pulp or starch (placebo) via a capsule, waited one hour, then performed a 25 minute running test at 65–70% of their max heart rate and rested for one hour afterward. After 48–72 hours, the groups were switched and the same protocol was performed. Cardiovascular (heart rate and blood pressure) and autonomic (heart rate variability and skin conductance) factors were measured once before exercise and 11 times during the 60 minute recovery period.

The results: Participants experienced a faster return to baseline systolic blood pressure, heart rate, heart rate variability, and skin conductance after supplementing avocado pulp.

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Sleep

Did you know ...Alcohol disrupts sleep by increasing resting heart rate, body temperature, respiratory rate, urge to urinate, and wake-up frequency.

Mindfulness improves insomnia, depression, and anxiety

Background: Mindfulness is the practice of being present in the moment and aware of both inner and outer experiences while maintaining a nonjudging perspective. It has been extensively studied over the last two decades, with greater mindfulness being associated with improved sleep, depression, and anxiety. This study was designed to find (1) the aspects of mindfulness most responsible for this association and (2) what makes some people more mindful than others.

The study: This observational study used data from wave 5 of the Genesis 12-19 (G1219) longitudinal twin/sibling study. In 1999, the G1219 study started collecting data from twin pairs, non-twin sibling pairs, and their parents; it included 862 participants. It was originally designed to investigate both adolescent depression and the relationship between genes and the environment. The present study used the data on gene-environment interplay in the twin models to investigate the relationship between mindfulness and insomnia, depression and anxiety. Mindfulness was divided into 5 subgroups: nonreactivity to inner experience, observing, acting with awareness, describing, and nonjudging of inner experience.

The results: Greater mindfulness (nonjudging of inner experience, especially) was associated with less insomnia, depression, and anxiety. Overall mindfulness was influenced by non-shared environmental factors (environmental influences that make members of the same family different, such as friendships or work/study environment) more than by genetic and shared environmental factors (which both had a nonsignificant effect).

Couples spend more time in REM sleep when together

Background: While sleeping in the same room as your partner can be enjoyable, it is also linked to disrupted sleep. Some objective measurements of sleep quality have been gathered by previous studies, but no data on the neurophysiological state of sleeping couples. This study investigated how sleeping with a partner affects sleep stages.

The study: In this study, 12 childless heterosexual couples visited a sleep lab for 4 nights over two consecutive weekends. On one weekend they slept alone; on the other, they slept in adjacent twin-sized beds. Polysomnography data was recorded for all nights.

The results: Sleeping in adjacent twin-sized beds was associated with more uninterrupted time in REM sleep. Total sleep time, sleep onset latency (the time needed to fall asleep), and sleep efficiency (time spent asleep while in bed) were unaffected.

Drug-free management of insomnia in cancer survivors

Background: Insomnia, a common sleep disorder, affects nearly 60% of people with cancer. If left untreated, it can become chronic, leading to severe psychological and physical impairments. The treatment for insomnia in cancer patients typically includes pharmaceuticals, whose potential side effects include performance and memory issues, worsened sleep habits, driving accidents, and falls. Acupuncture and *cognitive behavioural therapy* (CBT) are two nonpharmacological treatments available for the management of insomnia, but they are not widely used or even known by cancer patients and clinicians.

The study: In this 8-week randomized controlled trial, 160 cancer survivors received either CBT or acupuncture therapy for the treatment of insomnia. CBT included sleep restriction, stimulus control, cognitive restructuring, relaxation training, and education. Acupuncture therapy involved the use of needles to stimulate specific points of the body. Pain, fatigue, mood, insomnia severity, and overall quality of life were evaluated at week 8 (end of treatment) and week 20.

The results: CBT was more effective than acupuncture for the management of insomnia; however, both treatments produced clinically meaningful results. The average score change on the insomnia severity index was −10.91 points (−83.6%) for CBT and −8.31 points (−61.8%) for acupuncture. The insomnia reduction was lower but still present at week 20, so 12 weeks after end of treatment.

Acupuncture was more effective for the management of pain. CBT was more effective in participants who were white, male, highly educated, or pain-free at baseline. Both treatments similarly improved fatigue, mood, and overall quality of life, and similarly reduced the need for hypnotic medicines.

Mindfulness-Based Stress Reduction improves sleep, anxiety, and depression

Background: Mindfulness-Based Stress Reduction (MBSR) is an 8-week program that combines mindfulness meditation with body awareness, yoga, and behavioral exploration in order to combat insomnia, stress, anxiety, depression, pain, and other issues.

The study: This meta-analysis of 7 randomized controlled trials evaluated 497 adults with insomnia: 258 in the MBSR group and 239 in the control group. Some of the controls were on a waiting list to receive MBSR; others underwent pharmacotherapy, sleep hygiene education, or *cognitive behavioral therapy* (CBT). The outcomes measured were anxiety, depression, and sleep quality.

The results: The MBSR group reported improvements in anxiety, depression, and sleep quality. While the results favoured MBSR, some heterogeneity was found. After performing sensitivity tests, the heterogeneity was found to be within acceptable ranges and unlikely to impair the overall effect size of the MBSR group.

A summary of non-pharmaceutical treatment options for insomnia

Background: *Cognitive behavioral therapy* (CBT) is considered a first-line intervention for insomnia, but there are many other non-drug treatment options that people commonly use. This study summarized the evidence for these treatments.

The study: This was a network meta-analysis of 36 randomized controlled trials. The majority of participants across all trials were female.

The results: Melatonin and meditative movement therapies (e.g. yoga) had the greatest amount of evidence supporting their use and the largest overall effects for improving insomnia. Exercise, hypnotherapy, and transcranial magnetic resonance had less evidence and smaller reported effects. No good evidence was found to support the use of herbal pharmacotherapies, light exposure, or homeopathy. None of the investigated treatments performed better than CBT.

Zinc me to sleep

Background: *Premenstrual syndrome* (PMS) affects many women and results in mood swings, fatigue, irritability, impaired sleep, and food cravings. Women with PMS often have lower zinc levels than women without PMS, so zinc supplementation could be a potential PMS treatment.

The study: In this three-month randomized controlled trial, 57 young women with PMS, but no depression or anxiety, were assigned to supplement either 30 mg of zinc per day or placebo. Participants completed quality of life and sleep questionnaires at the beginning and end of the study.

The results: While the zinc group experienced minor improvements in quality of life and sleep quality, there were no large differences between groups. Larger, longer duration studies may help researchers better understand the role of zinc in PMS.

Note: Zinc is an important micronutrient and a component of over 300 enzymes in the human body. It is especially integral to the function of the hippocampus (a structure in the brain), which is why low zinc levels are sometimes linked to neuropsychological dysfunction, such as depression. Zinc's role in sleep is still unclear, but it may be involved in inhibiting the brain's "wakefulness" pathway. It is also required for the production of melatonin, a sleep-regulating hormone.

Can exercise improve sleep quality for older adults?

Background: Regular physical activity improves sleep quality, but it hasn't been efficiently summarized yet, so the authors of the present paper conducted a systematic review focused specifically on older adults who tend to have lower sleep quality.

The study: This was a systematic review focused on healthy adults ages 60 and older using exercise as an intervention to improve sleep. Studies deemed to be of weak quality, as opposed to moderate or strong, according to a common assessment tool, were excluded. A total of 14 studies met the inclusion criteria.

The results: All studies that measured difficulty falling back to sleep, non-REM sleep, and subjective sleep quality found positive and statistically significant effects. Eight out of 10 studies that used the Pittsburgh Sleep Quality Index found a statistically significant beneficial effect. Only 50 of the studies that assessed sleep latency, sleep disturbances, wake time after sleep onset, slow wave sleep, stage 2 sleep, and total sleep time found positive effects. Less than 50% of studies found positive effects for daytime dysfunction, sleep duration, use of sleep medication, sleep efficiency, and sleep quality, but there weren't very many studies that assessed these factors. Studies were more likely to show benefits when exercise was of moderate intensity and was performed at least three times per week over a duration of 12 weeks to 6 months.

Iron for treating restless legs syndrome

Background: Iron status is known to play a role in *restless legs syndrome* (RLS). In recent years, more randomized controlled trials have been published examining the optimal iron dosages and delivery methods (oral or via IV) for people with RLS.

The study: This was a meta-analysis of 10 randomized controlled trials with 455 participants (72% female). The primary outcome was change in RLS symptoms. For the oral studies, participants took 325 mg of iron sulfate twice a day. For the IV studies, participants took a 1,000 mg dose of iron either all at once or split across weeks. Ferric carboxymaltose was the most common form of IV iron used in the studies.

The results: Iron supplementation, either via IV or orally, significantly improved symptoms of RLS. However, there were only two studies that investigated oral iron supplementation, so confidence in the effect of this method is less certain. Participants experienced some mild stomach upset during both treatment options. The study also suggested that people with an iron deficiency may experience greater symptom improvements after supplementation, based on very limited evidence, although the improvement didn't reach statistical significance.

Six weeks of ashwagandha can improve sleep

Background: Ashwagandha (*Withania somnifera*), also known as Indian ginseng (though it isn't actually a type of ginseng), has been used in Ayurvedic medicine for thousands of years to tackle issues as varied as nerve damage, inflammation, stress, anxiety, and insomnia. Its health claims need to be rigorously tested.

The study: In this 6-week randomized controlled trial, 150 healthy adults with sleep disturbances took either a placebo or 120 mg of an ashwagandha extract. Sleep quality was evaluated using both the weekly version of the Restorative Sleep Questionnaire and the World Health Organization Quality of Life-Bref. Sleep actigraphy using a watch (similar to a Fitbit but validated for accuracy) was used to measure sleep onset latency (the time needed to fall asleep), total sleep time, sleep efficiency (time spent asleep while in bed), and wake after sleep onset (another reflection of sleep fragmentation).

The results: Only 6 people dropped out, and not due to adverse events. At the end of the study, sleep onset latency, total sleep time, sleep efficiency, and wake after sleep onset had all improved in the ashwagandha group. Self-reported sleep quality increased by 72% in the ashwagandha group (compared to 29% in the control group). Self-reported quality of life also improved more in the ashwagandha group.

Note: The trial was partially sponsored by the company that provided the placebo and (trademarked) ashwagandha extract. However, the sponsors had no role in the study design, conduct of the study, data collection, analysis, decision to publish, or preparation of the manuscript; the authors reported no conflict of interest.

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