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Editorial I

The Physiological Basis of Mind-Body Medicine

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Mind-body medicine (MBM) is a modern form of stress medicine (Esch & Stefano, 2010; Esch & Stefano, 2022). It was developed by the American cardiologist and professor of medicine at Harvard Medical School, Herbert Benson (M.D.). As a counterpart to Walter B. Cannon's discovery of the body's "fight or flight" response (Cannon, 1915), Benson coined the term relaxation response (RR), a physiological response reaction of the body to stress (Cannon, 1915). Techniques that elicit a RR are the basis of virtually all MBM interventions (MBI) (Esch et al., 2018). Together with Integrative Medicine, MBM forms Complementary and Integrative Health (Esch & Brinkhaus, 2020). According to the approach of salutogenesis, the self-healing potential is used to build up and facilitate individual resources (Esch, 2020). Thus, MBM offers the opportunity to make an important contribution to individual health care by helping people to help themselves (Dineen-Griffin et al., 2019).

Based on the idea that thoughts and emotions have an impact on health, MBM effects manifest, e.g., at the psychoneuroimmunological level (Magan & Yadav, 2022). Psychoneuroimmunology is an interdisciplinary field of research that focuses on the role of neuro-immune interactions in coping with stressors (Ader, 2007; Godoy et al., 2018). Stress results from an interplay of biological and adaptive processes (Godoy et al., 2020). These processes involve a variety of different brain areas that can interpret events as real or potential threats. This is followed by a rapid activation of the autonomic nervous system via the sympathetic-adreno-medullary (SAM) axis and the hypothalamic-pituitary-adrenal (HPA) axis (Figure 1) (Stefano et al., 2005). In addition to the classical stress mediators cortisol and (nor-) adrenaline, a wide range of neuroendocrine signaling molecules are

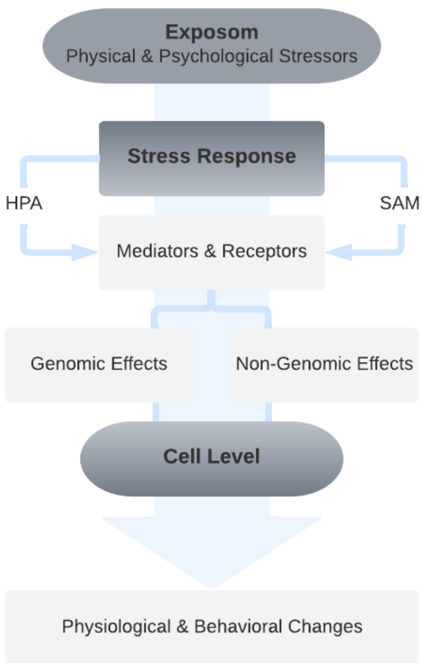

Figure 1. The stress response simplification based on Godoy et al. (2018).

SAM = sympathetic-adreno-medullary axis, HPA = hypothalamic-pituitary-adrenal axis involved. These lead to an adaptation of the cardiovascular system such as increased heart rate, blood pressure and immune response. Short-term stress seems to increase the ability to perform. Problems arise when permanent and/or excessive stress occurs (Chrousos & Gold, 1992; Esch et al., 2002; Esch & Stefano, 2010). Chronic stress can lead to suppression of protective immune responses and exacerbation of pathological immune responses (Dhabhar, 2014). The balance between type 1 and type 2 cytokines changes and chronic inflammation is induced. The number, transport, and function of immune protective cells increases. By suppressing type 1 cytokines and protective T cells and increasing function of defensive T cells, susceptibility to certain cancers may increase (Esch et al., 2002). The body's physiological stress response is also suspected to have negative effects on the disease progression of viral infections such as SARS-CoV-2 (Peters et al., 2021).

How the effects of chronic stress can drive aging processes is evident at the molecular genetic level, as seen, e.g., in our chromosomes (Dobos & Paul, 2019). In a study by Mathur et al. (2016), a minimal association was found between perceived psychological stress and a decrease in telomere length. Telomeres are regions of repetitive nucleotide sequences associated with specialized proteins at the ends of linear chromosomes. They protect the end regions of chromosomal DNA from progressive degradation and ensure the integrity of linear chromosomes via preventing DNA repair systems from confusing the outermost ends of the DNA strand with a double-strand break (Jacobs, 2013). Hence, telomeres are non-coding DNA segments that serve a protective role during DNA transcription: A small number of base pairs at the ends of a chromosome are lost during each transcription, resulting in an overall shortening of the chromosome after many duplications. Telomeres thus have a function as a bumper that prevents functional coding segments from being truncated during duplication. This buffer grows shorter during the lifetime of a cell, and its cycles of transcription and replication. Hence, although telomeres are routinely replenished by telomerase, their gradual attrition over the lifespan may contribute to aging and disease (Esch et al., 2018; Mathur et al, 2016). Thus, short-term, and chronic stress can have an impact on cell aging and chromosomal integrity. At the cellular level, this may favor age-related diseases such as Alzheimer's, cardiovascular disease, type II diabetes or even general muscular atrophy (Esch et al., 2018; Ludlow et al., 2013; Stefano et al., 2005).

It has been shown that telomere length is influenced not only by individual genetic predisposition, harmful noxae, and oxidative or psychological stress, but also by the individual's own health behavior (Bär & Blasco, 2016). At the same time, the probability of the occurrence of mental and somatic illnesses is increased (Esch, 2003). Especially the use of MBIs has proven to be particularly effective in stress reduction in this context (Bhasin et al., 2013; Black et al., 2013; Esch, 2020; Esch & Stefano, 2022; Niles et al., 2014).

MBIs contribute to the restoration of the balance between sympathetic and parasympathetic nervous system. In the process, the catecholamine and cortisol hormone equilibrium is adjusted. While psychological stress declines and a positive state of mind is re-established, both conditions, as described, are associated with an effect on telomeres (Epel et al., 2004). The length of telomeres appears positively changed already over short periods of time (Ornish et al., 2013; Puterman et al., 2015). Moreover, recent study results suggest that lifestyle interventions also have a positive effect on mitochondrial bioenergetics, insulin secretion, and a reduction in inflammatory processes (Stefano at al., 2019). Dysfunctional mitochondrial processes thus lead to impaired energy translocation in the brain and neuropsychiatric symptoms (Büttiker et al., 2022). Therefore, lifestyle interventions and MBIs include RR as a parameter of metabolic "correction", thus also causing cognitive and mental "awareness" (Stefano at al., 2019).

Taken together, the mind affects the body – and this may happen even on cellular, chromosomal, and mitochondrial levels.

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Editorial II

A Brief Account of the Very Early History of Pandemics

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The history of infectious disease outbreaks and plagues among human populations is long, as recorded in centuries-old religious and secular texts, as well as through Indigenous oral histories (Edinborough et al., 2017; Huremović, 2019; Stefano, 2021). One early account is of a plague that ravaged parts of North Africa and Greece in the late 5th century BCE. Known as the Athenian Plague, it was detailed at the time by the Greek historian, Thucydides, in his History of the Peloponnesian War. Over the course of a week or more, a series of gruesome symptoms would travel from head to toe – from "inflammation of the eyes", bloody throat, violent retching, breakouts of "pustules and ulcers", and diarrhea, among others. For those who recovered, a reported loss of memory left them not knowing "themselves or their friends" (Thucydides, 2003). Greatly devastating the population of Athens, it has been recently suggested that it may have been an ancient outbreak of the Ebola virus (Chastel, 1996).

In the late 1st century CE, the Antonine Plague, documented by the Greek physician, Galen, spread westward from the Middle East across vast swaths of the Roman Empire, including Rome. Claiming millions of lives, and setting the stage for the eventual fall of the empire, it is likely to have been a smallpox pandemic

(Fears, 2004). Later, the Justinian Plague, caused by Yersinia Pestis, ravaged 6th century populations, and is believed to have originated either in North Africa or Central Asia. Over time, it spread across the Roman Empire via well-worn trading routes. The 14th century saw the arrival of a global bubonic plague, the Black Death, which traveled along the Silk Road from China in the 1330s and into Europe in the following years. Its death toll is estimated to have been 150 million lives lost, significantly reducing the global population (Huremović, 2019). The Black Death was documented in religious texts, and greatly influenced writers and painters of the time.

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Research

The BERN Framework of Mind-Body Medicine

by Tobias Esch[1] and George B. Stefano[1,2]

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In the University Outpatient Clinic for Integrative Health Care and Naturopathy at Witten/Herdecke University, which emerged from the Institute for Integrative Health Care and Health Promotion (IGVF), the so-called BERN program has been taught to patients since 2019. The BERN concept, a health promotion program is based on the concept of Mind-Body Medicine (MBM), which was developed at Harvard Medical School in Boston. MBM focuses on enhancing our understanding of how the interactions between the brain, mind, body, and behavior can be utilized to improve health and well-being (Esch, 2020).

The evidence base of the BERN program has recently been published by Tobias Esch and George Stefano in an article in *Frontiers in Integrative Neuroscience* (Esch & Stefano, 2022). In this narrative review, the fundamental principles of MBM are outlined and a logical framework for implementing interventions based on MBM are introduced. Additionally, the impact of MBM on the brain's motivation and reward systems is explored, including potential involvement of mitochondria.

MBM can effectively enhance the health of individuals with chronic diseases, particularly those linked to lifestyle factors. It builds upon the concept of salutogenesis, which concentrates on determinants of health rather than disease and emphasizes the development of individual resilience and coherence factors to reduce stress, alleviate disease burden, and enhance quality of life. This approach incorporates well-known principles of self-healing and self-care. MBM interventions typically combine techniques for behavioral modification with cognitive strategies targeting stress regulation, exercise, relaxation, meditation, and nutrition. The acronym "BERN" (Behavior, Exercise, Relaxation, and Nutrition) is proposed as a summary of the operational framework for this approach. Various BERN techniques exert their effects through shared autoregulatory circuits in the central nervous system (CNS) responsible for reward and motivation. These circuits rely on multiple neurobiological signaling pathways that involve common effector molecules, such as nitric oxide (NO). NO plays a critical role in reward physiology, stress reduction, and self-regulation by influencing various processes within brain cells, including those involving mitochondria, nuclei, and chromosomes. Furthermore, NO has been implicated in relevant outcomes, such as the placebo response.

In summary, MBM interventions typically follow the BERN model, aiming to enhance health, build resilience, and alleviate stress. The mechanisms underlying these processes involve the CNS reward systems and are associated with placebo and self-healing pathways

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The Integration of AI in Mental Health Assessment: Leveraging Digital Biomarkers and Behavioral Data

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Current psychiatric assessment methods are resource-intensive, requiring time-consuming evaluations by trained clinicians. AI offers the potential for scalable and cost-effective assessment of psychiatric diagnosis and symptom change (Barnett et al., 2018; Ćosić et al., 2021; Jacobson et al., 2019b; Pedrelli et al., 2020). AI algorithms can analyze large datasets collected from various sources, such as wearable devices, smartphones, and online platforms, to identify patterns and extract relevant features. This enables the identification of digital biomarkers associated with mental health conditions. AI techniques, such as machine learning and deep learning, can build predictive models based on these identified digital biomarkers, process complex data and detect subtle changes in behavior or physiological signals that may indicate symptom severity or predict relapse. Based on this, AI-powered technologies enable remote monitoring of individuals' mental health. This can reduce the burden on patients and clinicians, as well as enhance accessibility to mental health care, e.g., by providing real-time insights and alerts to healthcare providers about changes in symptom severity or potential relapse. In addition, AI can support the development of personalized interventions by analyzing individual data and providing tailored recommendations or interventions based on an individual's specific needs. For example, AI algorithms can identify behavioral anomalies or changes in real-time smartphone data and, as a consequence, trigger timely interventions, such as providing reminders, coping strategies, or connecting individuals with mental health support services. Finally, AI can assist clinicians in making more informed decisions by providing them with additional information and insights.

The field of research exploring digital movement patterns as potential biomarkers for mental diseases, such as depression and schizophrenia, as well as examining online shopping behaviors and environmental radius/GPS data, is rapidly growing (e.g., Jacobson et al., 2020; Jacobson et al., 2019a; Saeb et al., 2015). Research has explored the use of smartphone sensor data, such as GPS and usage sensors, as well as social contact data, in monitoring behavioral patterns indicative of depressive symptoms (Jacobson et al., 2019b; Pedrelli et al., 2020; Saeb et al., 2015). One study investigated the use of passive movement and light data collected from wearable devices to assess depression severity in patients with major depressive disorder (Jacobson et al., 2019b). By analyzing over a week of movement data, the researchers were able to significantly evaluate depression severity with high precision, both for self-reported and clinician-rated symptom severity. Another study re-analyzed public-use actigraphy data from patients with major depressive or bipolar disorder and healthy controls, aiming to identify robust digital biomarkers for diagnostic status and changes in symptom severity (Jacobson et al., 2019a). The results indicated that participants' diagnostic group status could be predicted accurately using features extracted from actigraphy data alone. Additionally, actigraphy data were found to predict symptom change over a two-week period (Jacobson et al., 2019a). Similarly, passive sensor data acquired from smartphones have shown promise in predicting social anxiety symptom severity. By collecting data on movement and social contact, Jacobson et al. (2020) were able to develop digital biomarkers that accurately predicted social anxiety symptom severity and distinguished it from depressive symptoms and affective states. In the case of schizophrenia, relapse rates are high even with appropriate treatment. Passive smartphone behavioral data presents an underutilized opportunity to monitor patients and identify warning signs of relapse. A study involving patients with schizophrenia utilized smartphone data collected through the Beiwe app to detect changes in mobility patterns and social behavior prior to relapse (Barnett et al., 2018). The researchers observed statistically significant anomalies in patient behavior during the days preceding relapse, suggesting the potential for real-time detection and intervention before symptom escalation occurs. In the context of COVID-19 recovery, the pandemic's impact on mental health can have enduring consequences if left untreated. To address potential psychological and behavioral changes, the use of AI tools and prediction strategies in post-COVID clinics is proposed by Ćosić et al. (2021). They argue that the integration of AI into mental health recovery programs may enhance the global mental health of ex-COVID-19 patients by providing early identification of vulnerable individuals and enabling timely preventive interventions. The implementation of AI-based tools can augment existing resources and capabilities in diagnosing, preventing, and treating psychiatric disorders in the acute phase of the disease (Ćosić et al., 2021).

This body of research offers promising prospects for scalable, time-sensitive, and cost-effective strategies to improve the detection and treatment of mental diseases. However, further replication and validation studies are necessary to establish the reliability and generalizability of these findings. It is important to note that while AI shows promise in the field of mental health, it is not intended to replace human clinicians or care providers. Rather, AI technologies complement traditional clinical approaches by providing additional data-driven insights, enhancing efficiency, and enabling personalized and timely interventions.

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Antibiotics and Antiviral Agents Can Trigger Mitochondrial Dysfunction that Leads to Psychiatric Disorders

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Antibiotics and antiviral agents represent a diverse array of chemical agents that can be used to prevent and treat acute and chronic bacterial and viral infections. Unfortunately, many of these drugs have become less effective because these pathogens have developed a variety of resistance mechanisms. This requires us to develop new and different drugs that target unique aspects of bacterial and viral invasion and replication processes. By doing so, we may inadvertently create new drugs that influence other endogenous processes, including human behavior. This is because the structures of some of these new drugs may share critical shape features with naturally-occurring endogenous biochemicals and thus may interfere with their critical functions *in vivo*.

Discussion

Many antibacterial agents are inherently toxic to the host. This may be due at least in part to the unique evolutionary relationships that link molecular mechanisms of mammalian mitochondria to primordial processes that developed originally in their bacterial progenitors. Mitochondria, which are cellular organelles that generate ATP in the mammalian host cell, are the descendants of enslaved bacteria. Mitochondrial ribosomal (r)RNA in healthy cells is a critical target for new drug development. Mitochondrial rRNA has a similar structure and function to that found in bacteria and incorporates mutations more rapidly than mammalian nuclear rRNA. Given its propensity to incorporate mutations, the mitochondrial rRNA and mitochondria themselves become prone to dysfunction. Antibiotics designed to target pathogens may also exhibit high-affinity interactions with mammalian mitochondria that result in adverse effects. Minocycline is an example of a drug that promotes ATP synthesis and calcium retention in brain cell mitochondria that may have a direct impact on one or more psychiatric disorders. Antimicrobial-induced mania, or antibiomania, is a term used to address changes in mental health status that result directly from the administration of antibiotic agents.

With this in mind, we and others have proposed that mitochondrial dysfunction may be among the core issues leading to psychiatric dysfunction induced by antibiotic treatment, including depression and autism. Antibiotic-induced dysfunctional mitochondria have recently emerged as one of the root causes of several psychiatric disorders. For example, a small percentage of patients treated with ciprofloxacin ultimately develop psychosis. Behavioral changes have also been observed in response to metronidazole, ofloxacin, procaine penicillin, and clarithromycin. These findings suggest that translation-targeting antibiotics should be used with extreme caution, especially in patients diagnosed with mitochondrial translation defects. The long-term effects of antibiotics on mitochondrial function and integrity have yet to be determined.

Although eukaryotic cells can recognize bacteria and respond with rudimentary host defense, the bacterium typically has the advantage. The prokaryotic bacterial organism has been evolving for millions of years and is capable of subverting the innate immune response. This capacity may in part be based on conserved common molecular mechanisms and intracellular components.

Antibiotic-mediated behavioral perturbations provide us with significant insight into the nature of mitochondria and their evolutionary history as enslaved bacteria. The large amount of oxygen consumed in the brain testifies to their ongoing critical activities. Given that bacterial pathogens and host cell mitochondria share common chemical communication mechanisms, antibiotic-induced mitochondrial dysfunction may be a critical feature of both micro-environmental and organism-level survival. Microbial colonization in the brain and/or comparatively high levels of antibiotics may ultimately alter the cellular energy supply and thus the frequency of antibiotic-induced behavioral disorders. Once the potential to initiate mitochondrial dysfunction has been achieved, the resulting cascading action may generate and support ongoing abnormal behaviors. Nonetheless, and despite the risk of damage to the host, antibiotics continue to serve important roles in the treatment of infectious diseases and medicine in general. In this scenario, alterations in behavior may emerge as a result of dysfunctional high-energy nerve cells. We speculate that, in susceptible individuals, as well as those maintained on high doses for extended periods, antibiotic use may convert an acute stress response into one that is more chronic in nature.

Antiviral Drugs

Most antiviral drugs inhibit replication via their actions that target specific enzyme activities (e.g., reverse transcriptase and polymerases). Several of these enzymes are similar to those involved in mitochondrial replication. This may result in dysfunction associated with energy-producing symbionts secondary to drug exposure as is the case for antibacterial agents as described above. Furthermore, several of these antiviral agents (e.g., azidothymidine, didanosine, nevirapine, trimethoprim-sulfamethoxazole, efavirenz, and tenofovir, to name a few) may directly target mitochondrial respiration, thus reducing ATP levels. The dual targeting activity of these antiviral and antibacterial compounds (i.e., interactions with both viruses and mitochondria) may be due to complementary stereospecific matching (shape) of the shared genetic material and their long evolutionary relationship with one another.

Similar to what we have described regarding antibacterial mitochondrial targeting, we might expect that some antiviral drugs may be capable of disrupting mitochondria. Thus, their capacity to alter cognitive function might also be surmised because of the associated high energy demands. Therefore, given these insights, additional studies will be needed to understand the impact of these drugs on human mitochondria and the implications with respect to human health. Importantly, the shared influence of these drugs on bacteria, viruses, and eukaryotic host cells may be based on the fact that these molecules have complementary shapes and use a shared biochemical language that has evolved simultaneously in different organisms. In and of itself, this intriguing finding may stimulate further inquiries designed to determine if pharmacological agents designed for one disorder may be efficacious in another. Additionally, this phenomenon offers novel insights into processes that contribute to the development and potential treatments for critical mental health issues, since they also have the potential to remain hidden in the affected host organism. Indeed, it may be ascertained they may also contribute to normal behavior.

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NEW: Student's corner

PhD Project: Digital Mindfulness Interventions in Oncology Work Environments

by Jil Herker[1]

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Background

Medical technologists in radiology (MTR) are exposed to high work demands. In an international double-blind study (Beschoner et al., 2022), 97% of German MTRs and employees in imaging technology reported experiencing moderate to severe stress. As a cause, 95% of respondents mentioned the level of workload. The shortage of specialists, as evidenced by the immediate need for 840 MTR positions nationwide, feeds into the stress factor workload. This shortage is unlikely to be alleviated in the near future since 25% of currently practicing MTRs will retire by 2030 for age reasons (Blum, 2019). Specifically, staff shortages, overtime, and direct contact with Covid-19 infected individuals/materials are considered as drivers of work stress for MTRs during the pandemic. Investigations and improvements of the stress experience are essential to conquer this potential health hazard (Koninklijke Philips, 2019).

MTRs in radiotherapy encounter numerous cancer patients every day to perform radiotherapy with them. This not only entails a high level of coordination and the resulting organizational stress. The emotional stress of the cancer patients also presents a challenge to the mental health of the MTRs. The skills of stress and emotion regulation as well as self-care are therefore important resources for MTRs to cope with everyday work and to stay healthy.

Research aim and method

The study "Mindfulness Interventions in Oncology Work Environments" is designed, first, to determine whether digital health promotion interventions are effective in reducing the experience of stress in MTRs. On the other hand, two apps – a digital, modern meditation intervention (7Mind app) and a digital, traditional breathing exercise intervention (Pranayama app) – will be used to explore effects on stress experience and health promotion, among other outcomes, in MTRs to draw conclusions on the feasibility and effectiveness of the components.

Prior to the intervention, all MTRs are made aware of the relevance of self-care in an approximately half-hour awareness-raising intervention during working hours, e.g. as part of an internal meeting. The intervention is offered twice per facility in order to ensure that work operations are maintained. Since no person-level randomization can take place due to structural conditions, the MTRs will be assigned to the intervention groups (7Mind app or Pranayama app) according to quasi-experimental designs by location.

Both groups are then given access to one of the two apps and are instructed to use it daily for 12 weeks. We recommended to use the app three times a day for 5-10 minutes, and allow practice at least once a day during working hours. Exclusion criteria include use of another meditation app, severe mental illness and sleep disorders requiring treatment. Included are MTRs who agree to app use (informed consent) and have access to their own smartphone.

The evaluation will be conducted through a mixed-methods design. Participating MTRs will be asked to answer standardized questionnaires about their stress experience, health behaviors, and other outcomes before and after the intervention. Prior to the intervention, experience with breathing/meditation exercises and app use experience will be collected in addition to demographic variables (age, gender, work experience). Similarly, participants will have a hair sample taken before and after the intervention. Likewise, a 15-minute heart rate variability (HRV) measurement will be taken via chest strap before and after the intervention. After the intervention, a qualitative survey about the experience with the intervention and the evaluation of its (long-term) effectiveness is conducted in individual interviews.

Expected results

Expected results are improvements in mindfulness, stress experience, resilience and work-related factors, job satisfaction and emotion regulation, as well as in the physiological measures HRV and hair cortisol.

Planned research following this intervention

a) Extension of the evaluation to patients - e.g.: Do patients perceive a change in the MTRs and how does it affect them (train-the-trainer approach)?

b) Expansion of the target group to include patients: Breast cancer patients (stress, high anxiety potential) receive daily radiation for 4 weeks and accompanying training (app).

c) Change of existing offers to focus on the more effective component (breathing/meditation), development of breathing and/or meditation measures for integration into health behavior change interventions

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Mind-Body Exercise Corner

Bodyscan

by Maja Figura[1]

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Description

Compared to other relaxation methods, the body scan method is considered an entry-level exercise (Kabat-Zinn, 2005). In body scan, you direct the focus of attention to the different parts of the body, feel any sensation therein without judging them. When you let go of the sensations of each region, as well as all the thoughts associated with them, the tension decreases. If thoughts wander, attention is gently directed back to the body.

Exercise

Lie comfortably on your back and cover yourself. With a conscious deep breath, direct your attention to your body. Notice the breath movements of the body. Begin to focus your attention on your left foot and then slowly move your awareness up the leg. Guide the breath in and out of the different regions, noticing the sensations. From the pelvis, switch to the right foot and move back to the pelvis. From there, focus your attention on the torso, moving through the lower back and abdomen, upper back, and chest to the shoulders. Next, focus on both of your hands and simultaneously move up both arms, back to the shoulders. Then notice the neck and all regions of the head. Finally, let the attention linger in the entire body. End this exercise with a conscious long exhalation.

Efficacy

With this systematic journey through the body, you develop your ability for focused self-awareness (Kabat-Zinn, 2005). Improvements in mindfulness and effectiveness against disturbing feelings could be demonstrated (D'Antoni et al., 2022; Gan et al., 2022) Further research is ongoing (e.g., Karunayake et al., 2022).

Practicing several times a week favors the course of conscious relaxation.

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The Mind-Body Medicine Research Council (MBMRC)

At the present time, the council consists of the following members:

Tobias Esch, M.D. (Co-Chair)
George B. Stefano, Ph.D. (Co-Chair)
Radek Ptáček, Ph.D., MBA
Maren M. Michaelsen, Dr. rer. oec. Dr. rer. medic. (Project Lead)

How to become a member of MBMRC

As the MBMRC has been founded in 2022, and due to its dedication to rigorous contributions on the basic research foundations of Mind-Body Medicine, the number of members is yet small. In the future, the council aims to invite outstanding researchers in the field to become MBMRC members. Membership implies no fee.

Call for Papers / Events

First Announcement: International Congress on Mind-Body Medicine Research

Explore the fascinating field of Mind-Body Medicine Research at the upcoming international congress, presented by the MBMRC! What to expect: The congress will bring together leading experts and renowned institutions. It promises to be an engaging event that sheds light on the latest developments in Mind-Body Medicine Research. Attendees can anticipate high-profile lectures, interactive panel discussions, and valuable networking opportunities in hybrid format.

Save the Date: Exact schedule and location of this exciting congress will be announced by end of the year. Through funds provided by the EDEN Foundation, our team is working diligently to ensure an accessible experience for all participants.

Further updates and information will follow in the upcoming editions of the newsletter and at the-mind.org. Be part of this congress, where we collectively explore the frontiers of Mind-Body Medicine and chart new horizons.

EDEN STIFTUNG

- **18. Mind-Body Medicine Summer School**, Essen, Germany, August 24-27, 2023

  The 18th Mind-Body Medicine Summer School will present Mind-Body Medicine interventions in a compact form as they are applied in the context of modern integrative medicine. All lectures and presentations of the Summer School are designed to promote dialogue and discussion and are not limited to the one-dimensional communication of the contents. Further instruments of mind-body medicine can be obtained in the workshops on site, which are designed for the active participation of all participants.

  https://www.nhk-fortbildungen.de/16-0-Mind-Body-Medicine-Summer-School-Aktive-Fortbildung-fuer-Mediziner-und-Therapeuten.html

- **6. Berlin Summer School for Integrative Medicine**, Berlin, Germany, August 24-27, 2023

  The 6th Berlin Summerschool for Integrative Medicine offers a diverse and practice-oriented program as well as an exciting insight into the various therapies of integrative medicine. The focus lies on providing practical experience and scientific background for physicians, nurses, health care professionals and students in the clinical field. The basic aim is to present and critically discuss the current state of research in all lectures and workshops. They are held by lecturers with many years of experience.

  https://www.charite.de/service/veranstaltung/veranstaltung/details/6_berlin_summerschool_fuer_integrative_medizin/

Recent publications of MBMRC members

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