

Wolf Spirit



The Brain/Mind and YOU!

How you can
improve your
Brain and your
LIFE!

Medical Disclaimer: The information in this presentation is not intended to replace a one-on-one relationship with a qualified health care professional and is not intended as medical advice. It is intended as a sharing of knowledge and information from the research and experience of Mary M Wolf, Dr. Ritamarie Loscalzo, drritamarie.com, and the experts who have contributed. We encourage you to make your own health care decisions based upon your research and in partnership with a qualified health care professional.

Brain or Mind?



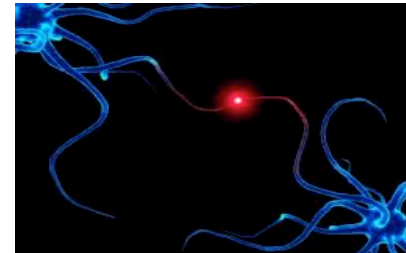
The practice of meditation is of prehistoric origin, and is found throughout history.



Santiago Ramon y Cajal in a paper in 1894 wrote: A conclusion was reached that intellectual power does not depend on the size or number of cerebral neurons, but on the richness of their connective processes, adaptation and professional dexterity were explained by a progressive thickening of the nervous pathways, excited by the passage of the impulse or the formation of new cell processes capable of improving the suitability and the extension of the contacts, and even of making entirely new connections between neurons primitively independent

Neuroplasticity and Meditation

- **Neuroplasticity** is a term that is used to describe the brain changes that occur in response to experience. There are many different mechanisms of neuroplasticity ranging from the growth of new connections to the creation of new neurons.



- **Meditation** is stilling the fluctuations of the mind through pointed focus. Think of moments when you find yourself in a clear and relaxed state of mind where the external chatter seems to quiet. Perhaps it's when you exercise (run, walk, bike), soak in a bath, listen to music, or relax on the beach. This enjoyment is rooted in a state of meditation. **Through meditation, our mind moves from the actively thinking state (beta), to a slower more creative state (alpha), and then to a meditative state of relaxed attention and healing (theta).** Slowing the mind through meditation has numerous benefits!



- **Applying Meditation to Neuroplasticity**
the skill used to induce the plastic changes in the brain



Research showing Neuroplasticity in Meditators.

- Meditation practice has been shown not only to benefit higher-order cognitive functions but also to alter brain activity. Expert meditators showed greater activation in multiple attentional and other regions including frontoparietal regions, cerebellar, temporal, parahippocampal and posterior occipital cortex. Where as Novices meditators show more activation in medial frontal gyrus,/anterior cingulate and others areas that negatively correlate with performance in a sustained attention task. 4, 5,6
- Thicker callosal regions and enhanced FA (fractional anisotropy) in meditators might indicate greater connectivity, possibly reflecting increased hemispheric integration during cerebral processes involving (pre)frontal regions. Such a brain organization might be linked to achieving characteristic mental states and skills as associated with meditation, though this hypothesis requires behavioral confirmation. Moreover, longitudinal studies are required to address whether the observed callosal effects are induced by meditation or constitute an innate prerequisite for the start or successful continuation of meditation. 10



Research showing Neuroplasticity in Meditators.

- We detected significantly larger gray matter volumes in meditators in the right orbito-frontal cortex (as well as in the right thalamus and left inferior temporal gyrus when co-varying for age and/or lowering applied statistical thresholds). In addition, meditators showed significantly larger volumes of the right hippocampus. Both orbito-frontal and hippocampal regions have been implicated in emotional regulation and response control. Thus, larger volumes in these regions might account for meditators' singular abilities and habits to cultivate positive emotions, retain emotional stability, and engage in mindful behavior. We further suggest that these regional alterations in brain structures constitute part of the underlying neurological correlate of long-term meditation independent of a specific style and practice.



Research showing Neuroplasticity in Meditators.

- Cognitive event-related potential evaluation of meditation implies that practice changes attentional allocation. Neuroimaging studies indicate increased regional cerebral blood flow measures during meditation. Taken together, meditation appears to reflect changes in anterior cingulate cortex and dorsolateral prefrontal areas. 8
- Larger hippocampal dimensions in long-term meditators may constitute part of the underlying neurological substrate for cognitive skills, mental capacities, and/or personal traits associated with the practice of meditation. Alternatively, given that meditation positively affects autonomic regulation and immune activity, altered hippocampal dimensions may be one result of meditation-induced stress reduction. 11

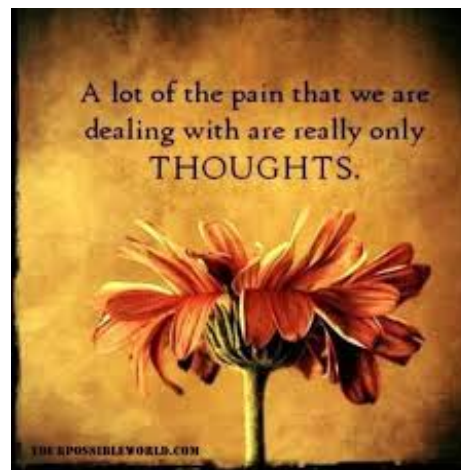
Self-Directed Neuroplasticity

One of the enduring changes in the brain of those who routinely meditate is that the brain becomes thicker. In other words, those who routinely meditate build synapses, synaptic networks, and layers of capillaries (the tiny blood vessels that bring metabolic supplies such as glucose or oxygen to busy regions), which an MRI shows is measurably thicker in two major regions of the brain.

One is in the pre-frontal cortex, located right behind the forehead. It's involved in the executive control of attention – of deliberately paying attention to something. This change makes sense because that's what you're doing when you meditate or engage in a contemplative activity.

The second brain area that gets bigger is a very important part called the insula. The insula tracks both the interior state of the body and the feelings of other people, which is fundamental to empathy. So, people who routinely tune into their own bodies – through some kind of mindfulness practice – make their insula thicker, which helps them become more self-aware and empathic.

This is a good illustration of *neuroplasticity*, which is the idea that *as the mind changes, the brain changes*, or as Canadian psychologist Donald Hebb put it, *neurons that fire together wire together*.





Meditation is stilling the fluctuations of the mind through pointed focus

Through meditation, our mind moves from the actively thinking state (beta), to a slower more creative state (alpha), and then to a meditative state of relaxed attention and healing (theta).

Slowing the mind through meditation has numerous benefits:

- Reverse your stress response, reducing the effects of chronic stress.
- Improve attention, sustain concentration, speedup cognitive processing, improve working memory.
- Physical/biological balance, heart rate and breathing slow down, Blood pressure normalizes, use oxygen more efficiently, and sweat less!
- Anti-aging! Adrenal glands produce less cortisol, the mind ages at a slower rate, and immune function improves.
- Increased creativity
- Break habits: Give up Life-Damaging Habits.

Methods of Meditation

GRATITUDE

- **Practice Gratitude:**
 - **Commit: Keep a Daily Calendar of Gratitude**
 - **Begin: Write a daily gratitude**
 - **Write your Gratitude Down: Little notes to yourself or others**
 - **Feel It: Express your Thankfulness for the Hard Stuff**
 - **Share the Gratitude: Thank the People behind the Service**
 - **Practice Present-Moment Gratitude: Start Gatherings with Celebrations or Write a Letter of Gratitude when bored**
 - **Don't stop once results begin to manifest: Say "Thank You" and continue on**
 - **Allow yourself to be Human: Appreciate a Force Bigger than Yourself**

i will be
grateful
→ for this day



Methods of Meditation continued

- **Heart Math**

- **Notice and Ease:** Gently focus and breath in the heart area and e-a-s-e out the feeling.
- **Quick Coherence:** Heart focus, Heart breathing and activation of genuine heart feelings such as caring, loving, gratefulness, and serenity.
- **Appreciation:** Focus on Heart area and breathe a little deeper than normal counting to 5 in and to 5 out, Imagine yourself slowly breathing in and out through your heart, Activate a positive feeling (experience/place/person) as you maintain this heart focus and breathing.
- **Take many appreciation breaks**

Methods of Meditation continued

- Sit quietly and comfortably.
- Close your eyes.
- Start by relaxing the muscles of your feet and work up your body relaxing muscles (a technique like Progressive Muscular Relaxation can be useful).
- Focus your attention on your breathing, object, sound, image, or by listening to a meditation script (tape/talk).
- Breathe in deeply and then let your breath out. Count your breaths, and say the number of the breath as you let it out (this gives you something to do with your mind, helping you to avoid distraction).
- Do this for ten or twenty minutes or as long as you would like.

Final Meditation Practice!

- **To begin, bring your awareness to the sensations of breathing. If there's anything about paying attention to your breathing that makes you uncomfortable, rest your attention instead on something you find mildly pleasant or simply neutral, such as the sensations in your feet or a phrase such as "May I be happy" or "May my family be well."**
- **Now, set an intention to stay with the object of your attention for the next few minutes while doing this practice. You could either set this intention top down by using words such as "I'm going to stay attentive here" or set your intention from the bottom up by getting a felt sense inside yourself of mindfulness.**
- **The second step or suggestion is to relax. Take some long exhalations, longer than your inhalations, and take care to relax your tongue.**
- **The third suggestion is to feel as safe as you reasonably can. Get a sense of the good people who support you in your life, as well as a sense of your own strengths that enable you to deal with whatever life brings. With this basis, explore lowering your guard and being less braced against life.**
- **Moving on to the fourth suggestion, open to feelings of simple well-being. Without straining or forcing anything, encourage gentle feelings of happiness and gratitude. For example, forests make me happy, and I am grateful for the smell of oranges. Whatever works for you, allow a sense of positive emotion to fill you. There may well be other feelings, even negative feelings; don't resist them. Let them come and let them go, as you keep bringing your attention back to feeling as good as you can in the moment.**
- **The fifth suggestion is to get a sense of your awareness being like boundless space. Notice that awareness has no edges, no bounds. In a sense, it is infinite, like the sky or space. In that vast space, different experiences come and go, and you now have a panoramic sense of experiences arising and passing in the vast space of your awareness. You have a kind of bird's-eye view of thoughts, sensations, sounds, feelings, desires, memories, whatever, coming and going in boundless, open space. Feel free to enjoy whatever is worthwhile in whatever you're feeling.**

References:

1. **Berger A, Kofman O, Livneh U, Henik A. Multidisciplinary perspectives on attention and the development of self-regulation. *Progress in Neurobiology*. 2007;82:256–286.**
2. **Poldrack RA. Neural systems for perceptual skill learning. *Behavioral and Cognitive Neuroscience Reviews*. 2002;1:76–83.**
3. **Lutz A, Dunne JP, Davidson RJ. Meditation and the neuroscience of consciousness: An Introduction. In: Zelazo PD, Thompson E, editors. *The Cambridge Handbook of Consciousness*. Cambridge University Press; 2006.**
4. **Brefczynski-Lewis JA, Lutz A, Schaefer HS, Levinson DB, Davidson RJ. Neural correlates of attentional expertise in long-term meditation practitioners. *Proceedings of the National Academy of Sciences*. 2007;104:11483–11488.**
5. **Slagter HA, Lutz A, Greischar LL, Francis AD, Nieuwenhuis S, Davis JM, Davidson RJ. Mental training affects use of limited brain resources. *PLoS Biology*. 2007;5(6):e138.**
6. **Lutz A, Greischar L, Rawlings NB, Ricard M, Davidson RJ. Long-term meditators self-induce high-amplitude synchrony during mental practice. *Proceedings of the National Academy of Sciences*. 2004;101:16369–16373.**
7. **Perlmutter D, and Villoldo A. *Power Up Your Brain: The Neuroscience of Enlightenment*. 2011. Hay House, INC**
8. **Cahn, B.R.; Polich, John. Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bulletin*, Vol 132(2), Mar 2006, 180-211.**
9. **Luders, E; Toga, AW; Lepore, N; & Gaser, C. The Underlying anatomical correlates of long-term meditation: Larger hippocampal and frontal volumes of gray matter. *NeuroImage*, Vol 45 (3), Apr 2009, 672-678.**
10. **Luders, E; Phillips, OR; Clark, K; Kurth, F; Toga, AW; & Narr, KL. Bridging the hemispheres in meditation: Thicker callosal regions and enhanced fractional anisotropy (FA) in long-term practitioners. *NeuroImage*, Vol 61 (1), May 2012, 181-187.**
11. **Luders, E., Thompson, P. M., Kurth, F., Hong, J.-Y., Phillips, O. R., Wang, Y., Gutman, B. A., Chou, Y.-Y., Narr, K. L. and Toga, A. W. (2013), Global and regional alterations of hippocampal anatomy in long-term meditation practitioners. *Hum. Brain Mapp.*, 34: 3369–3375.**