EAST MEETS WEST

Integrative Neuroscience: Translating Acupuncture Into Western Medical Terms (Pt. 1)

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How ancient Eastern medicine of acupuncture affects the nervous system in terms of Western medical science is a growing field of study in the global medical community. Medicines from different cultures, ages, backgrounds and languages are all benefiting from each other to provide the highest level of healing available by improving and defining their translations.

In other words, the more parallels between different kinds of medicine that can be identified, the easier it is for integration to occur and for the optimal success of treating patients to be achieved. The field of integrative medicine is an increasingly popular model in the Western world that seeks to bring medical modalities together, rather than working separately or against each other.

Acupuncture and Neuroscience

In ancient times, there was no language to describe concepts and ideas we now understand in modern medical science. By studying the effects of acupuncture on the human brain, we can better understand how the esoteric concepts of traditional Chinese medicine and acupuncture translate into modern Western medicine. This translation is a key component of successfully integrating acupuncture and Western neurological fields of medicine.

According to Hauck M, et al. (2017), "Recent studies support the view that cortical sensory, limbic and executive networks and the autonomic nervous system might interact in distinct manners under the influence of acupuncture to modulate pain." This was a double-blinded study conducted in Hamburg, Germany using a 128 EEG on 26 subjects. The study authors concluded: "These findings highlight the influence of the insula in integrating activity in limbic-saliency networks with vagally mediated homeostatic control to mediate antinociception under the influence of acupuncture."

This study provides evidence of how acupuncture affects the brain's ability to process pain stimuli in the body. These findings provide a translation between acupuncture and neuroscience, and support the integration of the two fields.

Acupuncture for Pain: Western Explanations & Eastern Concepts:

There are a variety of different explanations as to how acupuncture treats pain, depending on which field of medicine and perspective one chooses. From the Chinese medicine perspective, acupuncture relieves pain by treating *qi* and blood stagnation, and promotes the body's natural and innate ability to heal itself. By invigorating and moving the stasis of blood, the body is able to heal itself and pain will naturally subside.

When looking through a Western medical view, the answer involves many different systemic

physiological and neurological processes and responses. Hauck M, et al. (2017) eloquently state: "Although the specificity and mechanisms of acupuncture effects are under debate, some evidence is available suggesting an involvement of different processes at all levels of pain processing including peripheral tissue reactions, modulation of spinal cord processes, as well as subcortical and cortical modulations."

The authors later explain that "Local transmitter release has been made responsible for the acupuncture effect in the periphery"; how "Central mechanisms include a modulation of μ-opioid receptors which has been observed in cingulate cortex, caudate, insula, thalamus and amygdala"; and that "evidence is available that acupuncture can modulate the autonomic nervous system."

It is important to identify exactly what is happening in the brain and nervous system in order to support the integration of acupuncture and neuroscience. This will help to legitimize the potential and efficacy of acupuncture as an evidence-based form of medicine; and enable the translation of a four-thousand-year-old medicine from east Asia to be understood and respected by the modern Western medical community.

Perhaps one of the largest stigmas to overcome on the path to an integrated and evidence-based medical world involves mutual respect and understanding. Finding a common language and mutually understandable ways to express the mechanisms of how acupuncture works provides the backbone to the future of how Chinese medical theory will be integrated with modern medicine.

Overall, there are several main mechanisms of pain reduction upon which to focus. These include the measurement of behavioral data, heart rate variability (HRV), Gamma oscillations, and a connectivity analysis. There are many specific details on how these mechanisms function and their direct correlations to acupuncture. However, in summary, according to Hauck, et al., "We were able to show that pain induced gamma oscillations in pain-related brain areas are more strongly reduced by verum than sham acupuncture. Furthermore, vagally-mediated high-frequency ECG power and other short-term HRV-parameters derived from time-domain and non-linear analysis decreased also more strongly during verum than sham acupuncture treatment. Reduction of pain ratings and vmHRV parameters were significantly correlated with increase of connectivity between the insula and the mid-cingulate cortex." The study later continues to express that "overall, these findings suggest that the insula may play a key role in regulating the interplay between limbic-saliency networks and homeostatic autonomic control to mediate antinociception under the influence of exteroceptive signals triggered by acupuncture."

This research is by far among the top tier of in-depth, evidence-based studies to strengthen the evidence which illustrates acupunctures efficacy and mechanistic actions to the neurological world.

Another study by K.H. Choi, et al. (2016) dives into both physical and sensory responses to acupuncture point stimulation (APS); as well as the responses of non-acupuncture point stimulation (NAPS) and no stimulation (NS). By measuring the differences between these different areas stimulated, the study sets up a control and measures the effects of set acupuncture points versus areas that are not actual points recognized by Chinese medicine.

Electroencephalography (EEG) was used to measure changes in the high-frequency power spectrum before and after stimulation was evaluated. This was important to see the contrast between the electrical activity of the brain before and after acupuncture was given.

According to Choi, et al., "A total of 37 healthy subjects received APS at the LI4 point, NAPS, or NS with their eyes closed. Background brain waves were measured before, during, and after stimulation using 8 channels. Changes in the power spectra of gamma waves and high beta waves

before, during, and after stimulation were comparatively analyzed." This study later continued to conclude that "NAPS is believed to cause temporary reactions to stress, tension, and sensory responses of the human body, while APS responds stably compared to stimulation of other parts of the body."

This research suggests random acupoints on the body will still have the ability to create a temporary response to reduce pain, whereas a point such as LI 4 (*Hegu*), which is used in acupuncture theory to treat pain, will have stable effects.

These findings suggest the set points of the meridians in Chinese medicine which are indicated to be able to treat pain actually have a scientific basis of efficacy when using a metric of monitoring as an EEG device. By using the EEG, the researchers were able to see that LI 4 actually does do what Chinese medicine has been claiming it does for thousands of years. This is advancement in integrating the Eastern and Western medical worlds.

Editor's Note: This article concludes in the August digital edition. Part 2 includes references / resources for both parts.

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