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A Virtual Roundtable Discussion Highlighting the Latest Acupuncture Research and Practice

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LIBIN JIA: Since the National Institutes of Health [NIH] workshop on the study of acupuncture in February 2019, we have seen new progress and developments in basic research and clinical trials in the field. In addition, the U.S. government (Centers for Medicare & Medicaid Services [CMS]) announced a new policy in January of this year to have insurance coverage for patients with low-back pain. In order to overview the current status of acupuncture research and applications in certain areas, it is my pleasure to host this roundtable discussion organized by the journal, *Medical Acupuncture*. Thank you all for attending this special event during this unprecedented coronavirus pandemic.

The purpose of this roundtable is to overview some essential aspects of acupuncture research and practice. This roundtable should be of interest based on expert opinions. We will consider the terminology definitions, acupoints specificity, physiologic effects and mechanisms, neural pathways, barriers to clinical research, and current developments in acupuncture for substance-abuse control. In addition, we will also comment on the new Medicare government policy for acupuncture treatment.

In order to proceed with this discussion, first, how should we define the term *acupuncture*? Would it be biologically based or functionally based? As a corollary, there are more than 400 acupuncture points that have been described, the majority located on the meridians. Hence, we can consider the roots of acupuncture based on both Traditional Chinese Medicine [TCM], and research-based medicine, or a combination thereof. Therefore, I would like to hear from the experts.

Dr. Lu, would you like to offer some comments and then Dr. Niemtzow. ''How can we define the terminology for acupuncture?''

WEIDONG LU: This is Dr. Lu, and thank you. I am from Dana-Farber. This is a big question. Defining acupuncture terminology from a traditional perspective and a biologic one, is a big challenge.

However, essentially, I am thinking about the 2 systems of terminology: (1) We need to preserve the classical acupuncture terminology from TCM; (2) We are concerned with the names of the acupuncture points, classically.

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As you may know, the acupuncture points have been named by the World Health Organisation, and such a system has been well-defined and discussed. So, I think that this was very good work, and should be preserved.

Yet, meanwhile, there is—behind the names—a classical aspect of the so-called classical names of the points. On these points, the names sometime do provide some sort of subtle philosophical reasons for the practitioners—particularly for traditionally trained practitioners—the way to think and to execute their clinical treatments. That is one aspect of the current situation among the practitioners, and many practitioners are trained in the traditional way. And so, those point names, I think, necessarily need to be kept.

However, we have more research-based, biologically based discoveries regarding some aspects of acupuncture—probably regarding physiologic and neurologic properties—that is a new frontier, and a lot of research has been generated. Yet, there is no definitive answer on each acupuncture point at the present time and nor on how they correlate with the neurologic properties. Yet, there are some promising findings that can lead to the right direction with respect to naming points. I think that this is the correct direction to pursue, but we are not there yet. We cannot completely disregard the traditional naming system and embrace the new system because the new point names are not completely defined yet.

This is the next frontier of research—to look at what acupoints truly are, and if the *meridians theory* is accurate, or is it just simply another way to describe the neurologic system that we feel confident with?

This is something new, but I think this should be incorporated into our discussion here. In addition, we should introduce this concept to practitioners. My understanding is that *Medical Acupuncture*, the journal, is meant for practitioners, and that most are traditionally trained practitioners, who truly need to understand the connection between the traditional terminology of acupuncture and its relationship with current biomedicine properties and discoveries. That is my perspective here.

DR. JIA: Thank you, Dr. Lu and Dr. Niemtzow, do you have any comments?

RICHARD C. NIEMTZOW: Dr. Niemtzow from Joint Base Andrews. There is a movement among some people—for instance, with ear acupuncture—to form a database for each point. Each point will have physiologic effects or benefits described, and this would be substantiated by what is found in the literature by clinical trials.

For instance, for points in the ear, there will be an acceptable cartography to locate these points. Then the physiologic, biologic attributes of that point will not be based on historical information but will be based on what is found in the research.

I wonder, if we also look at body points, would there be a value for establishing, perhaps, a database respecting the classical description of these points, with their attributes—the biologic and physiologic characteristics based on the literature?

DR. JIA: Thank you, Dr. Niemtzow. Would anybody else like to add some comments?

PAUL CRAWFORD: There is value for such a database, based on work that we have done regarding communication between physicians and patients about acupuncture. This is a very important aspect of providing acupuncture to patients, because, if we cannot communicate in a cohesive fashion with our patients, they will not accept acupuncture as a treatment, no matter how effective we have found it to be.

Coming up with uniform nomenclature that we can describe simply and succinctly to our patients is very important to practitioners, because the main reason for that is these patients we might be treating with acupuncture did not come to us thinking that they wanted acupuncture for their pain or nausea or whatever it was. They came in thinking: ''I want treatment for …,'' and, when we bring up acupuncture as a potential treatment, they need an explanation that resonates with them. Whereas, if they go to a traditional acupuncturist, they have already decided they want acupuncture, right? They already say to themselves: ''Oh, I am going there for acupuncture.'' However, if they come to a medical acupuncturist—a physician who is trained in acupuncture—they just want to be treated. Acupuncture might not be in their minds as a possible treatment.

Coming up with nomenclature that is easy to explain within a layperson's knowledge base, perhaps at a 6th- or 8th-grade level, will be very important as time goes on, because up until now, each physician is left to come up with his or her own explanation, and that can be very different from physician to physician.

Yet, there are certain phrases that resonate, at least with our patients. *Balance* and *natural healing* are important to these patients. This is less about the acupuncture points when it comes to the patients. The practitioners want to know exactly where to put the needles. There has to be specificity, but there also has to be a balance with patient communication.

DR. JIA: Thank you, Dr. Crawford. I appreciate it. I think it is a big issue, as Dr. Lu said. It is important as Drs. Niemtzow and Crawford mentioned. We definitely have to consider how to improve consistency and acceptance by the research community and the practitioners. In addition, more work has to be done. How shall we use the current system to define the terminology? This is a challenging area that we are continuously working on.

HEATHER GREENLEE: Dr. Jia, can I jump in here for a second? I really like what Dr. Crawford said about developing language that can be understood easily by patients. I think that is one of the barriers we have with rolling out acupuncture in the conventional clinical setting—at least in the oncology setting where I work.

I am wondering, Dr. Crawford, if you—it sounds like you have given this some thought—if you have any suggestions on how we would go about doing that. It sounds to me that we probably need to bring together a group of traditional acupuncturists, physicians, and patient advocates to start developing that language. In addition, some of that language might be discipline-specific.

Do you think we need to develop a discipline-specific language? Or can this transcend disciplines? Do the pain specialists need to have their language? Do the oncology specialists need to have their language? Or, does everybody use the same language?

DR. CRAWFORD: We have published 4 studies—all qualitative research—asking patients what they think and asking physicians what they think about communicating acupuncture. The vast majority of our work is centered around pain.

Certainly, there are some specifics around the conditions, but, in general, what we are finding is that patients just want to know that the doctors believe in acupuncture and that the doctors think it will help; and the patients want just a little bit of communication about it.

This area is very ripe for qualitative inquiries of both traditional and medical acupuncturists, to ask them what terms they use, and then expanding the patient pool to conditions, such as you mentioned, Dr. Greenlee. If we could find the right questions to ask patients who have specific conditions what they want to hear, that would be most important.

This is because it does not matter what we in this roundtable think about communication. What matters is what the patients want to hear. And, as I said, repeatedly, the patients said they just want their doctors to be confident about acupuncture and to communicate about it clearly.

We have not traditionally done a good job of telling—or careful scripting—to practitioners so that they can enunciate clearly the benefits and treatment courses and things such as that. Perhaps, Dr. Greenlee, you and I can talk some other time offline about doing some qualitative inquiries regarding this issue, because I think it is an area that needs to be explored so that we—the people on the roundtable and the researchers—can find out that this is what our stakeholders (the stakeholders being the patients) really want to hear from us. Then, we can do a little bit more patient-centered research.

DR. JIA: This is great. Thank you, Drs. Crawford and Greenlee. We can discuss this more. Now, we will move on. We have many other topics to discuss.

The second question is about the specificity of acupuncture points, locations, physiologic effects, and the mechanisms. I would like to hear from you—definitely. Let us proceed. Dr. Ma, do you have any comments?

QIUFU MA: My laboratory has been studying pain pathways or somatosensory pathways. We try to think how we can bring a certain modern neuroanatomic basis for the questions related to acupuncture.

For example, when we talk about acupoint selectivity or specificity, is there any neuroanatomic basis for that? I will start by highlighting classic studies done in the 1970s, by Sato and Schmidt in Germany.[1] They used a pinch, to stimulate different body regions and then measured the impact on gastrointestinal [GI] motility.

These researchers revealed certain organizational rules that could be very interesting for a lot of acupuncture doctors who might or might not be aware of these rules. For example, when the pinching stimulation was applied to the limb regions of animals—such as the ST 36 acupoint—it drove vagal reflexes to promote gastric motility. When the stimulation was done in the abdominal region—such as the ST 25 acupoint—it drove spinal sympathetic reflexes to inhibit gastric motility.

This is the example: There is some sort of somatotopic organization or acupoint selectivity in driving different autonomic pathways.

Sato and Schmidt's work[1] also showed that activation of the same acupoint could drive different pathways. For example, stimulation at the abdominal ST 25 drove noradrenergic sympathetic neuron pathways to inhibit GI motility; via supraspinal circuits, this stimulation also drove sacral cholinergic parasympathetic neurons to promote colorectal motility, thereby producing opposing effects at different parts of the GI tract.

In the past few years, my own laboratory has been studying the somatoautonomic pathways associated with systemic inflammation control. We have also revealed some degrees of somatotopic organization. For example, the vagal–adrenal anti-inflammatory pathway can be evoked by electroacupuncture [EA] stimulation at the hindlimb ST 36 acupoint, but not at the abdominal ST 25 acupoint. We also found that different stimulation intensities drove different autonomic pathways. For example, low intensity was sufficient for driving the vagal–adrenal pathways, but high-intensity stimulation was required to drive the splenic sympathetic pathways.

By revealing these neuroanatomical bases, we will be in a better position to explain why and how acupuncture works to the general audience. This is one of the directions in which we are moving forward.

DR. JIA: Thank you, Dr. Ma. Are there any other comments, Dr. Lu?

DR. LU: I agree with Dr. Ma's work, because we work in the same organization. I totally agree that we have many discoveries regarding the specificity of acupuncture points.

For instance, Dr. Niemtzow, regarding your ear acupuncture, Battlefield Acupuncture [BFA], and with some anatomical understanding, in particular, now they have this—the neurogenic inflammations and their relationships with traditional acupuncture points. These are very exciting areas.

However, on the neurologic side, I also agree with Dr. Crawford. You were just mentioning that in your comments about how we communicate between patients and practitioners. There are huge barriers among current practitioners—the languages they use, the explanations to their patients. That leads to many frustrations and misunderstandings between practitioners and patients.

I agree with you that we do need some sort of communication format so we can explain the mechanism of action of acupuncture clearly to our patients.

Yet, the key here is that we need to retrain our practitioners, besides medical acupuncturists. The latter have an advantage and understand biologic mechanisms. However, there is a huge group of traditionally trained practitioners. They also need to be retrained as well.

I am looking forward to the possibility that some organization might produce some material that can be disseminated and become training material on the educational aspect for practitioners. Then, our patients can receive a consistent message.

DR. JIA: Thank you, Dr. Lu. Now, we will try to move on to the other question. If you have some others, you still can send your comments later. We are try to control the time we are spending.

This is the third question: ''Will the physiologic effects of acupuncture points be based on the literature or will database creation be necessary? I would like to ask Dr. Mao to comment first. Then, others can join in to discuss this.

JUN J. MAO: I think this question is related to the question above. I personally think there has been almost 40 years of research on the basic mechanism of acupuncture. However, even for an active clinical researcher such as I am, the data are not organized in a way that we can really translate that basic finding into clinical-trial designs, let alone clinical practice. Thus, more effort has to be put forward to organize that information better, so a clinical and translational researcher like me can use the information.

For example, per Dr. Ma's discussion, we need to define what some of the clinical trials are that can be designed to begin addressing some of the biologic discoveries in the laboratory, right? For instance, the level of stimulation, the intensity of the stimulation, is it electric versus nonelectric, or is this certainly regional versus distal? However, ideally, those trials should be based on biologic discoveries rather than on just wishful thinking. We are more likely to drive the field in more-specific directions.

As a field, we cannot answer every single question. The more-productive way for us to move forward is to define, based on the current methodology available. Also, based on the current biologic discoveries, what are the biggest questions that we can organize around and focus and tackle? Then, gradually, over the years, we can make more-substantive progress.

I also think, as a clinical researcher, we already have built acupuncture evidence in a way to show that it is effective and that it is efficacious, at least for addressing many chronic-pain conditions, and it is even covered by insurance.

However, what we do not have is how to leverage the empirical clinical experience precisely as well as biologic insights to deliver more-targeted and personalized acupuncture to truly help every single patient.

That is where, just like the rest of the medicine is moving, the area of acupuncture research is where we can really be strategically focused on using the physiology to improve our clinical research designs.

I am not certain if *database* is the right term, but there has to be a better structure to organize our basic discoveries in acupuncture so that clinical researchers and clinicians and the public can be educated better. Thank you.

DR. JIA: Sure. Thank you, Dr. Mao. Are there any other comments?

DR. GREENLEE: I would like to add-on to that. In addition to everything that Dr. Mao said, we need to improve our understanding of effective doses and durations of treatment. We have very scant guiding evidence on how long needles should be retained, on what the frequency of treatments should be, and if the duration of treatments should be in terms of weeks or months.

Having a database where we can observe patterns over time for all of the different acupuncture studies that are in progress would be really helpful for understanding the optimal way to deliver acupuncture.

Something that Dr. Mao did not mention was about outcome expectations. He has done some interesting work in this area that ties into the physiology of acupuncture. We know that acupuncture does not act the same way in all human beings. Trying to truly understand any of the baseline conditions in a patient, whether they be biologic or psychologic or both is important so that we can understand the patient populations who are going to benefit the most from acupuncture. Developing this information will be very valuable.

DR. JIA: Thank you, Dr. Greenlee. Are there any other comments?

DR. NIEMTZOW: I think what is important is how we are reporting, how we are doing acupuncture techniques. I think

all of you probably know I was one of the authors of the first STRICTA [*ST*andards for *R*eporting *I*nterventions in *C*linical *T*rials of *A*cupuncture] guidelines. Even if you follow the STRICTA guidelines on the latest publications and look at EA, the way it is reported, patients were stimulated at 5 Hz for 30 minutes, and the researchers might describe the stimulator used, but the researchers do not describe the parameters—how much current was used, what type of waveform was used, and those kinds of information, which are very important.

As we look at how we are redefining or how we look at what acupuncture points are capable of doing, it is so important that our techniques/reporting are somewhat standardized, and that we have a good idea of what people are doing to stimulate the points, and that we know the parameters, so that we are very consistent with the research.

DR. JIA: Thank you, Dr. Niemtzow. Are there any other comments? If not, we shall move on.

The next question concerns the new progress in developments regarding acupuncture research and policy, such as insurance coverage. I would like to comment on this topic and provide information—and you probably already know about it—given that you are doing the research and the practicing.

Actually, on January 21, 2020, the CMS, a U.S. government office, announced that it had decided to cover acupuncture for chronic low-back pain in section of 1862(a)(1)(a) of the Social Security Act.

Up to 12 visits in 90 days are covered for Medicare beneficiaries under the following circumstances. This is for the purpose of treating chronic low-back pain. This lasts 12 weeks or longer, and it is not specific in that it has no identifiable systematic cause, and it is not associated with surgery nor with pregnancy. For this condition, the insurance will cover the treatment with acupuncture for low-back pain.

Then, also an additional 8 sessions will be covered for patients who are experiencing improvement. It means that, if the low-back pain after treatment with acupuncture is reduced, a patient can continue to have an additional 8 sessions. The total will be 20 acupuncture treatments, and this treatment may be administered annually.

This is very good news for acupuncture practitioners, and the acupuncture community, and also for the research community in acupuncture.

This is a very good development after our workshop last year. Then, regarding some other new findings and new discoveries, Dr. Niemtzow and others, would you like to offer some comments?

DR. NIEMTZOW: I could talk a little bit about Medicare. It is wonderful that there is a recognition that acupuncture will be helpful. The only situation that concerns me to a certain extent is this: Why are people looking at acupuncture? Perhaps one of the reasons is to circumvent the problem that we are having with the opioid crisis. Thus, this has merit.

However, what disturbs me to a certain extent is the fact that treatment for chronic pain is limited, because there are people with conditions—for instance, spinal cord stenosis—they are always going to have pain unless there is a surgical solution.

These patients have acupuncture, and they obtain relief. They perhaps are no longer taking opioids. However, because there is a limitation on how many treatments they are able to receive, the acupuncture stops, and these patients go back to the opioid situation, which, in the long run, can be very expensive—because of the side effects of the opioids and the costs of taking opioids in general.

DR. JIA: Thank you, Dr. Niemtzow. Is there anything else regarding some new developments in acupuncture research and applications?

DR. GREENLEE: I think it is wonderful that CMS is covering acupuncture now. I am also a little concerned that it took decades of research for this one change in CMS policy. What I am wondering is this: Where do we go from here?

Again, I work in oncology. For each oncology condition where acupuncture might be useful, are we going to require the same level of research and large-scale trials? Or, will there eventually be a blanket statement stating that acupuncture can be used for pain in general? Or, do we need to have multiple large-scale trials for each specific pain scenario?

I think it would be useful for us to engage in those discussions with CMS sooner rather than later, so those of us who are designing trials can know which kinds of trials will be the most useful to inform policy.

We have now seen that acupuncture can be effective for treating oncology pain in quite a few different scenarios. We are conducting trials as fast as we can. However, we do not want to have to wait 20 years before the CMS is going to cover those services.

DR. JIA: Thank you, Dr. Greenlee. Definitely, I think the application area of acupuncture will be not only just low-back pain, but also beyond this specific condition. We are looking forward to seeing the developments.

For the specific effects of interventions, such as the neuromechanisms and the pathways, what is new? Dr. Ma, would you please offer some comments?

DR. MA: To study the neural basis, we have been using genetic tools. We can remove different kinds of neural pathways and test how this removal will influence the effects of acupuncture.

I will just tell you one story we are close to publishing soon, I hope. We do find that, for example, acupuncture can treat some systemic inflammation. As I have mentioned

above, EA can drive different autonomic pathways from different acupoints or different stimulation intensities. Activation of some pathways, such as the vagal–adrenal axis, can reduce systemic inflammation persistently in a disease state–independent manner. For other pathways, such as splenic sympathetic neurons, EA can have bidirectional effects, dependent on disease states. In early stage disease, acupuncture can reduce systemic inflammation.

Yet, as disease progresses, the neurotransmitter receptors in immune cells can be changed, and thus, acupuncture can now make inflammation worse and become detrimental for animals. Thus, there is some safety issue people are not aware of that is occurring.

During this workshop, a researcher (Rick Harris) also reported that, for some patients with fibromyalgia with sensitized pressure-evoked pain, acupuncture at regular acupoints can increase pain, whereas sham acupuncture can relieve pain.

With a deeper understanding of the underlying biologic basis of acupuncture, we hope we can improve acupuncture's efficacy or safety.

DR. JIA: Thank you, Dr. Ma. I would definitely like to learn more from your publication. Are there any other comments or items to discuss on this topic?

DR. NIEMTZOW: Another area of research that appears to be opening up with acupuncture (when I was talking to Dr. Michael Chopp from Rochester, MN, regarding the mechanisms of acupuncture) is helping to release exosomes, which are extracellular vesicles that contain some DNA and RNA. Certain cells secrete them and these exosomes are taken up by distant cells, where they can affect cellular function.

Chopp also said to me that acupuncture might influence these exosomes like switches: It turns them off or turns them on. Thus, he stated that he finds this to be a very exciting area to explore, especially with respect to acupuncture, in the area of oncology.

DR. JIA: Great. Thank you, Dr. Niemtzow. We can see more new findings in acupuncture research. We would like to learn more about these or can add-on more information later.

The next question concerns overcoming barriers to clinical research of acupuncture, clinical observations, and case studies with placebos. I would like to ask Dr. Greenlee to comment first, then perhaps, Dr. Mao, you can also comment. Dr. Greenlee, do you have some comments?

DR. GREENLEE: Sure. The first thing we need is funding. We need funding to be able to conduct our trials. There has been clear direction coming out of the National Center for Complementary and Integrative Health (NCCIH) about what type of trials this agency is interested in funding—it might be useful for the National Cancer Institute [NCI] to do something similar, to outline the gaps in oncology research, where we need to see progress in order to advance improvements in patient outcomes and to be able to change public policy. I assume this might also be useful for other nononcology conditions, for example pain research.

One of the resources we have been able to leverage to conduct our acupuncture research is the NCI Cancer Clinical Trials Network. At my previous institution, we conducted 2 small pilot studies on the use of acupuncture to treat aromatase inhibitor–induced arthralgias, and based on our provocative pilot data, we were able to use the Southwest Oncology Group clinical trial infrastructure to conduct a more-definitive large-scale clinical trial fairly rapidly.

It would be useful to develop similar research pipelines to be able to conduct these trials and move the science forward. It would be great if we could have some assistance in developing those pipelines.

I know a lot of groups are working on opioid-related pain and the use of acupuncture to decrease the use of opioids or to prevent the initiation of opioids. It could be very helpful for the NCI to issue some targeted funding mechanisms to support this work.

In addition to needing to conduct trials to understand acupuncture efficacy, we also need to conduct the trials to understand how to implement and disseminate acupuncture protocols nationally. We also need to have a clear understanding of the kinds of practitioners who can implement those protocols.

For example, once we have a very clear protocol on how to treat a condition with acupuncture effectively, how do we implement the protocol in the community setting? Do we need traditionally trained licensed acupuncturists, to implement the protocols? Do we use medical acupuncturists? Do we use advanced-practice providers within conventional medical settings? We need to consider our options, because, currently, there are not enough acupuncturists working within conventional medical settings to be able to roll out these protocols.

Being able to conduct acupuncture dissemination and implementation research, I think, would be very useful. Thank you.

DR. JIA: Thank you. Dr. Mao, so would you like to add some comments?

DR. MAO: This is a very exciting time for acupuncture research, because we are learning more about the basic mechanisms. I would like to see several large clinical studies incorporating some biologic correlates to understand for whom acupuncture is effective. In addition, understanding why, for some patients, acupuncture it is not effective might help inform new innovations.

I do not feel like acupuncture is a homogeneous, one type of thing. It is just like we will never say chemotherapy is good for cancer or chemotherapy is not good for cancer. It is what type of chemotherapy is good for what type of cancer. Thus, we need to move our field toward that.

Another level that I notice—as I have been in the field now for a while—that there still needs to be a rigorous acupuncture clinical protocol-developing process. I often see acupuncture clinical trials offered by experienced conventional researchers with very little thought about the actual acupuncture protocol.

For a drug study, you are never not spending enough time in drug development before putting the agent into a clinical trial. Just because it is acupuncture, we feel like we can just randomly throw together a protocol in a week. We can call it a valid therapy. That can potentially lead to a lot of negative trials.

We need to both emphasize what Dr. Greenlee emphasized, a large trial, but we also need to emphasize developing truly efficacious acupuncture protocols for specific indications.

By doing both, we are going to able to truly move the field forward. In addition we need to still have a mechanism to attract more acupuncturists—whether they be physician–acupuncturists or licensed acupuncturists—to become trained researchers, so we can have acupuncture trials to make sure we have both the rigor of clinical trials and the rigor of the acupuncture development and execution. By doing both we can move the field forward. Thank you.

DR. JIA: Thank you, Dr. Mao. Are there any other comments?

DR. GREENLEE: I have follow-up questions for Dr. Mao: Do we have the funding mechanisms in place to be able to conduct the preliminary studies to identify the best clinical protocols? Or do we need development mechanisms to be able to do that work before we launch the large-scale trials?

DR. MAO: I feel like NCCIH has those nice R34 mechanisms, but they are. … Often, when I approach that agency, to do it for cancer, the agency representatives say that they are not interested. If you are interested in just pain, for generic pain and other things, that is a good mechanism.

Just as a physician–acupuncturist, I do feel that, if we are even thinking about acupuncture—how to optimize delivery of acupuncture to support patients during chemotherapy—we still face many questions. We do not know the dosage, right? That is a question we do not know the answer to, whether we do it 2 days before the chemotherapy, the day of the chemotherapy, or 2 days after chemotherapy. There are a lot of questions, and, like clinicians, patients struggle.

However, there is no clear funding mechanism for those nuanced questions that guide the intervention delivery. People want to see a trial that can show acupuncture improves chemotherapy, acupuncture does this and does that. Yet, nobody is really interested in the early part. I do think philosophy or early phase trials, and investments from various sources—both federal and nonfederal—are important.

DR. JIA: Thank you, Drs. Mao and Greenlee. Are there any other comments?

DR. NIEMTZOW: Although we all here appreciate the benefits of acupuncture, there are still many people that do not believe in acupuncture, and that resistance is still present.

When I think back about the introduction of Battlefield Acupuncture in 2002, it has taken almost 18 years for it to spread through the Department of Defense and the Veterans Administration. In the beginning, there were people saying: ''Acupuncture is voodoo, Dr. Niemtzow is a charlatan, he is practicing witchcraft,'' and so forth.

What overcame this resistance was the fact that clinicians observed that acupuncture worked for pain. Then most importantly, as we gathered more evidence and our research was evidence-based, that began to help.

Yet, I have to say, I still feel that, with many of the alternative and complementary medicines, there is still resistance when we speak to our allopathic physicians, for example.

To overcome this, or maybe a lack of interest or disbelief in what acupuncture can do, it is so important that we do research that is evidence-based in order to explain the benefits of acupuncture.

When I got involved in acupuncture, I definitely was not a believer in acupuncture. In fact, when I attended the acupuncture course, I actually walked out of the course because I thought some of the theory was nonsense. I would never have believed that here I would be now, appreciating what acupuncture was about. Thus, I can understand why there is resistance in the field.

DR. JIA: Thank you, Dr. Niemtzow. The next question concerns acupuncture applications, substance abuse control, successful cases, and examples. Dr. Crawford would you like to comment?

DR. CRAWFORD: Acupuncture for substance abuse and opioid reduction is actually a sweet spot for where we can do both research to help our patients and show the value of acupuncture.

I have seen several studies out over the last year that have shown reduction in opioid use and prescribing related to acupuncture.

Here, again, though, it goes back to Dr. Mao's perspective that testing specific protocols, dosages, and durations are important for trying to figure out the best way to reduce opioids. Is it just a specific protocol effect that certain protocols reduce opioids? or is it a class effect that all acupuncture reduces the need for opioids?

We do not know this right now. In our work at Nellis Air Force Base [in NV], we have shown that it is a class effect, but we have not been able to test specific protocols that are associated with it, because we have been doing mostly retrospective work. We do have a trial in *progress* testing a

specific protocol, but it is just starting. I think this is going to be an area ripe for research, as several people have mentioned.

DR. JIA: Thank you, Dr. Crawford. This is very exciting. We are looking forward to hearing about your trial. Are there any other comments? [Pause]

Given that there aren't any more comments on this topic, I would like to move to the last question: NIH resources support acupuncture research, and offer clinical resources for different diseases or conditions to address the opioid crisis. I would like to comment about this.

I did some searches recently, using the NIH Research Portfolio Online Reporting Tools (RePORT) site. You can search this U.S. government source for NIH-supported acupuncture research online. I just searched for the U.S. studies.

From 2016 to 2020, this month [July], the RePORT search showed that there are at least 73 NIH-funded grants for acupuncture, including acupressure-related research from the different Institutes of the NCI, the NCCIH, the National Institute of Nursing Research [NINR], the National Institute of Drug Abuse [NIDA], the National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], the National Heart, Lung, and Blood Institute [NHLBI], the National Institute for Aging [NIA], the Office of the Director (OD), and so on and so forth. The funding mechanism covers R01, P01, P30, F32, R21, K mechanisms such as K23, K24 and K99, and also R25, R33 and the U mechanism in U1, U24.

The funding covered research areas related to acupuncture, acupressure for cancer, cancer-related cognitive impairment, fatigue, xerostomia, pain, definitely low-back pain, drugs, opioid-abuse disorder, mechanisms of the central nervous system, autonomic regulation, neuroimaging, neuromodulation, neuroinflammation, genetic dissection of neural pathways, post-traumatic stress disorder, blood pressure, analgesic response, arginine deficiency, psychosocial aspects, stable angina and fibromyalgia. In addition some acupuncture training involved funding. You can see many areas are covered by just this search in more than 73 areas of funding from the NIH.

The NCCIH definitely plays a bigger role; thus, that agency provides strong support in this area.

Here, I just want to mention 2 acupuncture studies funded by NIH. The first one, I believe that you have probably already heard about, in which Dr. Greenlee was involved: the effect of acupuncture versus sham acupuncture, and wait-list control in joint pain-related aromatase inhibitors among women with early stage breast cancer.[2]

The researchers in this study definitely found different outcomes among postmenopausal women with early stage breast cancer and aromatase inhibitor–related arthralgias, when they underwent verum acupuncture, compared with sham acupuncture or remained as wait-list controls. There was a statistically significant reduction in joint pain in patients who received verum acupuncture at 6 weeks.[2] This is great achievement on the acupuncture study, just one example.

Another example is the article published by Garcia and colleagues[3] from the University of Texas, MD Anderson Cancer Center, in Houston. They found that inpatient acupuncture at a major cancer center—I believe it was the MD Anderson Cancer Center—the patients who received the inpatient acupuncture experienced significant improvements after treatment for pain, sleep disorders, anxiety, drowsiness, nausea, and fatigue.

Just to give you more examples, I believe some studies at Sloan–Kettering Cancer Center, in New York City, the Dana-Farber Cancer Institute, in Boston, and other cancer centers also have some interesting and new findings.

In terms of the NIH funding for the opiate-abuse crisis, Dr. Lin, please comment.

YU LIN: Thank you, Dr. Jia for this opportunity to participate in this roundtable discussion. Dr. Jia gave a good overview of what acupuncture research has been funded by different institutes at NIH. I am aware that the acupuncture community and therapists believe that the intervention of acupuncture is effective in coping with a variety of pain symptoms. I was told that acupuncture is also effective in mitigating opioid withdrawal symptoms. A few research teams are involved in these areas of research. The mission of National Institute on Drug Abuse (NIDA) is advancing addiction science by supporting scientific research on drug use and its consequences.

I did a quick search in NIH database before coming to this meeting. Under NIDA's current program portfolio I didn't find active grants studying opioid abuse or opioid epidemic in the context of acupuncture research. There were a few applications proposed using acupuncture as intervention for possible reduction of opioid use in pain management. That said, my search in the database went only back to past 5 years. At NIH, each institute has its mission and research priority. Acupuncture research is largely funded by NCCIH and NCI. Given that we are still learning how the intervention works, we would probably need to first understand the mechanism of acupuncture. That itself certainly requires a good level of efforts in research.

In addition to scientific questions proposed, a compelling research project such as a R01 study would need support by good pilot data. For researchers seeking NIH funding, they are encouraged to start by contacting NIH program staff before the application is submitted formally. They are encouraged to send in a research concept about their application to determine whether it is a good fit to the mission and priority of NCI, NCCIH, NIDA or other NIH institutes.

DR. JIA: Thank you Dr. Lin. We have had very good discussions on acupuncture research, recent U.S. government policies, and NIH funding, as well as some challenges and issues in the field. I truly appreciate your participation. Are

there any other comments, Dr. Niemtzow, and others? Please speak up if you wish.

DR. NIEMTZOW: I want to thank everybody for spending their time here, and I look forward to having the roundtable in print. I think it will be well-received internationally. In addition, there is much appreciation to all of you for, again, taking time out from your busy schedules to do this.

DR. JIA: Thank you, Dr. Niemtzow. Are there any other comments?

OLUWADAMILOLA OLAKU: Hello, Dr. Jia. I would like to thank everybody. I think that we at the NCI have to be creative and explore with the leadership some of the issues that were raised by Drs. Greenlee and Mao in terms of clinical trials and translational research. Hopefully, we will be able to work together to broaden acupuncture research. But we will have to continue that discussion internally. Thank you.

DR. JIA: Sure, thank you, Dr. Olaku, for your comments. Now I will wrap up our discussions for this roundtable. I really appreciate all the participants for your views and comments on the current acupuncture research and practice on topics we consider important and of interest to the community. The advancements we discussed and learned are very encouraging; the issues motivate us to have further thoughts; and the challenges we face for the future development of acupuncture will stimulate us to pursue even more scientific understanding.

Thank you all again.

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