SANUWAVE Technology Shown to Promote Fracture Healing by Affecting Growth of New Blood Vessels and Bone

ALPHARETTA, Ga.--SANUWAVE Health, Inc. (OTCBB: SNWV) today announced the publication of preclinical data demonstrating that the Company’s Extracorporeal Shock Wave Technology (ESWT) promoted fracture healing by eliciting the production of specific growth factors (proteins) involved in angiogenesis (creation of new blood vessels) and osteogenesis (creation of new bone).

“VEGF Modulates Angiogenesis and Osteogenesis in Shockwave-Promoted Fracture Healing in Rabbits”

Publication of the blinded study entitled, “VEGF Modulates Angiogenesis and Osteogenesis in Shockwave-Promoted Fracture Healing in Rabbits,” appeared in a recent issue of the Journal of Surgical Research. Vascular Endothelial Growth Factor (VEGF) plays a crucial role in modulating fracture healing and regeneration of other tissues, including cartilage and skin. The study aimed to determine ESWT’s affect on fracture healing when applied to two groups – one having normal VEGF levels and the other having suppressed VEGF levels. Both groups were compared to non-ESWT treated controls.

Visit [http://www.journalofsurgicalresearch.com/article/S0022-4804(10)00095-8/abstract](http://www.journalofsurgicalresearch.com/article/S0022-4804(10)00095-8/abstract) to view an online abstract of the publication.

Summary of Key Study Findings

- Bone mineral density at 8 weeks was significantly greater in normal specimens treated with ESWT than controls (p=0.03), indicating callus (bony healing tissue) formation at the fracture site.
- Production of all angiogenic and osteogenic growth factors, as well as quantities of bone and fibrous (connective) tissue formation, were significantly increased versus controls (p<0.05) for normal specimens treated with ESWT.
- Suppressed VEGF specimens treated with ESWT maintained the bone mineral density of controls, demonstrating beneficial effects of shock wave in biologically compromised animals.
- X-rays of normal specimens treated with ESWT showed considerably better bone healing.
The authors concluded that ESWT significantly promoted bone healing in fractures through VEGF-modulated angiogenic and osteogenic mechanisms.

Discussing the study results, lead author Ching-Jen Wang, MD of Chang Gung Memorial Hospital in Kaohsiung, Taiwan, concluded, “It is theorized that bone tissues convert physical stimulation from shock waves into biological signals that positively influence fracture repair. There is a large body of research reporting that ESWT-promoted bone healing is associated with significant elevations of angiogenic and osteogenic growth factors. We showed that in this study as well, but we also demonstrated that VEGF may play an important role in modulating the processes of angiogenesis and osteogenesis. This understanding of the molecular effects of ESWT can be used to further optimize ESWT treatment for fracture healing in the clinical setting.”

Christopher M. Cashman, President and CEO of SANUWAVE, said, “This research further defines the underlying science and biological mechanisms of PACE® technology. As Dr. Wang and others have demonstrated in the past, our proprietary ESWT technology positively and significantly affects the complex processes involved in fracture repair, leading to improved bone healing. We know from previous animal studies that PACE has a direct influence on VEGF expression and angiogenesis in wound healing, so it is not surprising to learn that similar biological effects are seen in fracture healing.”

Mr. Cashman concluded, “The biological effects of ESWT even benefited animals whose VEGF expression was inhibited, suggesting a robust and multifaceted mechanism of action of ESWT. This outcome, combined with improved bone healing and remodeling of fractures treated with ESWT in this study, strengthens our belief that PACE technology has the potential to be a value-added part of the orthopedic surgeon’s available treatment options.”

About PACE

PACE, defined as Pulsed Acoustic Cellular Expression, delivers high-energy acoustic pressure waves in the shock wave spectrum to produce compressive and tensile stresses on cells and tissue structures which are designed to promote angiogenic and positive inflammatory responses, and quickly initiate the healing cascade. This is thought to result in microcirculatory improvement, including increased perfusion and blood vessel widening (arteriogenesis), the production of angiogenic growth factors, enhanced new blood vessel formation (angiogenesis) and the subsequent regeneration of tissue such as skin, musculoskeletal and vascular structures. PACE procedures trigger the initiation of an accelerated inflammatory response that speeds wounds into proliferation phases of healing and subsequently returns a chronic condition to an acute condition to help reinitiate the body’s own healing response.

About SANUWAVE Health, Inc.

SANUWAVE Health, Inc. (www.sanuwave.com) is an emerging regenerative medicine
company focused on the development and commercialization of noninvasive, biological response activating devices for the repair and regeneration of tissue, musculoskeletal and vascular structures. SANUWAVE’s portfolio of products and product candidates activate biologic signaling and angiogenic responses, including new vascularization and microcirculatory improvement, helping to restore the body’s normal healing processes and regeneration. SANUWAVE intends to apply its PACE technology in wound healing, orthopedic/spine, plastic/cosmetic and cardiac conditions. Its lead product candidate for the global wound care market, dermaPACE®, is CE marked and has Canadian device license approval for the treatment of the skin and subcutaneous soft tissue and recently completed its pivotal Phase III, Investigational Device Exemption (IDE) clinical trial in the U.S. for the treatment of diabetic foot ulcers. SANUWAVE researches, designs, manufactures, markets and services its products worldwide, and believes it has demonstrated that its technology is safe and effective in stimulating healing in chronic conditions of the foot (plantar fasciitis) and the elbow (lateral epicondylitis) through its U.S. Class III PMA approved Ossatron® device, as well as stimulating bone and chronic tendinitis regeneration in the musculoskeletal environment through the utilization of its Ossatron, Evotron™ and orthoPACE® devices in Europe.

**Forward-Looking Statements**

This press release may contain “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995, such as statements relating to financial results and plans for future business development activities, and are thus prospective. Forward-looking statements include all statements that are not statements of historical fact regarding intent, belief or current expectations of the Company, its directors or its officers. Investors are cautioned that any such forward-looking statements are not guarantees of future performance and involve risks and uncertainties, many of which are beyond the Company’s ability to control. Actual results may differ materially from those projected in the forward-looking statements. Among the key risks, assumptions and factors that may affect operating results, performance and financial condition are risks associated with the marketing of the Company’s product candidates and products, unproven pre-clinical and clinical development activities, regulatory oversight, the Company’s ability to manage its capital resource issues, competition, and the other factors discussed in detail in the Company’s periodic filings with the Securities and Exchange Commission. The Company undertakes no obligation to update any forward-looking statement.

For additional information about the Company, visit [www.sanuwave.com](http://www.sanuwave.com).