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FOR IMMEDIATE RELEASE

**SANUWAVE Extracorporeal Shock Wave Technology Shown to Prevent and Repair Osteoarthritis Damage in Preclinical Model**

ALPHARETTA, GA, June 9, 2011 – SANUWAVE Health, Inc. (OTC/BB: SNWV) ([www.sanuwave.com](http://www.sanuwave.com)), an emerging medical technology company focused on the development and commercialization of non-invasive, biological response activating devices in regenerative medicine, today reported the results of published preclinical osteoarthritis research conducted in Taiwan utilizing extracorporeal shock wave technology (ESWT) to prevent and repair osteoarthritis damage. The study, entitled “Extracorporeal Shockwave Therapy Shows Chondroprotective Effects in Osteoarthritic Rat Knee,” by Wang, C.J. et al., is available in the online edition of *Archives of Orthopedic Trauma Surgery* as an ePublication ahead of print.

The abstract of the publication can be viewed online at the *Archives of Orthopedic Trauma Surgery* website: <http://www.springerlink.com/content/2864k21r4785v832/>

**Summary of Key Study Findings**

- ▶ A single ESWT procedure prevented or significantly improved surgically induced osteoarthritis damage to the knee in an animal model.
- ▶ A single ESWT procedure significantly decreased articular cartilage degradation and improved subchondral bone remodeling.
- ▶ When treated with ESWT, surgically compromised knees displayed comparable data to the control group of normal, healthy knees at 12 weeks post-treatment.
- ▶ Multiple analyses of articular cartilage, subchondral bone, and blood and urine protein markers suggest that early application of ESWT provides a chondroprotective effect to prevent osteoarthritis onset.
- ▶ The authors concluded that ESWT acts as a mechanotransduction catalyst that initiates complex biological pathways that lead to tissue regeneration in the knee joint.

Christopher M. Cashman, President and CEO of SANUWAVE, said, “Osteoarthritis is no longer considered primarily a cartilage disease. It is a painful, crippling disease of the cartilage, subchondral and periarticular bone. This progressive disease is primarily treated with pharmaceutical regimens and surgery, including NSAIDs, steroids, synovial injections and joint replacement. Long-term pharmaceutical use and surgery can be expensive and carries inherent risks to the patient.”

Christopher M. Cashman continued, "Several preclinical studies have shown that ESWT has a direct and positive effect on pre-existing joint diseases, including osteoarthritis. This latest study is important because it addresses prevention of disease onset and proves that ESWT is a viable early intervention to protect joints from the effects of osteoarthritis."

### **Study Design and Results**

The study utilized three groups of Sprague-Dawley rats, each containing nine animals. The animals in the first group (control) did not have their anterior cruciate ligaments (ACL) surgically cut, whereas animals in the other two groups had surgical transection of their ACL (ACLT) in order to induce osteoarthritis. Of the two ACLT groups, one group received a single ESWT procedure immediately following ACLT, while the other group received no treatment of any kind after ACLT.

All animals underwent evaluations including radiograph, bone mineral density, serum levels of cartilage oligomeric protein and osteocalcin, and urinary concentration of C-telopeptide of type II collagen (CTXII), and histomorphological examination before experiments began and then again at 12 weeks post-treatment for comparison. Statistical significance was set at  $p < 0.05$ .

The two ACLT groups should have displayed significant increases in cartilage degradation by 12 weeks. However, the ACLT knee joints treated with ESWT showed improved, statistically significant levels of cartilage fissuring ( $p = 0.039$ ), chondrocyte concentrations ( $p = 0.007$ ) and chondrocyte activity ( $p = 0.006$ ) when compared to ACLT animals that did not receive ESWT.

Similarly, the subchondral bone of the two ACLT groups should have displayed osteoarthritic changes, but again the ACLT knee joints treated with ESWT showed improved, statistically significant percentages of trabecular bone ( $p = 0.047$ ) and fibrous tissue ( $p = 0.001$ ), as well as improved numbers of osteocytes ( $p < 0.001$ ), when compared to ACLT animals that did not receive ESWT. Bone mineral density ( $p = 0.036$ ), blood serum ( $p = 0.002$ ) and urine collagen levels ( $p = 0.005$ ) were all improved in the ACLT knee joints treated with ESWT compared to ACLT animals that did not receive ESWT.

Importantly, across all study parameters of articular cartilage, subchondral bone, and blood and urine protein markers, the ACLT knee joints treated with ESWT showed comparable data to the non-ACLT control group of normal, healthy knees at 12 weeks post-treatment. This strongly suggests that early application of ESWT provides a chondroprotective effect to prevent osteoarthritis onset.

A previous preclinical osteoarthritis study was performed by the same research group headed by Ching-Jen Wang, M.D., an orthopedic surgeon at Kaohsiung Chang Gung Memorial Hospital in Taiwan and a prominent researcher in the field of shock wave treatment. That study, which utilized surgically compromised knee joints in an animal model that mimicked fully developed osteoarthritis, revealed that ESWT treatment can reverse existing osteoarthritis joint damage. The results showed that osteoarthritic symptoms were reversed within 12 weeks of ESWT treatment. Based on these positive results, the research team proposed that early application of ESWT should have a chondroprotective effect and prevent osteoarthritic changes to the joint. This hypothesis formed the basis for this follow-up study, and Dr. Wang served as lead investigator.

Dr. Wang said, "Based on these positive study results, ESWT treatment may offer an effective, low-cost treatment option in humans that carries little risk compared with other treatments. This study is clinically relevant because it validates our original theory that ESWT treatment has a chondroprotective effect that repairs and prevents osteoarthritic changes in the knee joint."

Mr. Cashman concluded, “We plan to continue supporting osteoarthritis research. If proven viable in later-stage clinical research, ESWT treatment could improve quality of life and return mobility to an ever growing, active, aging population suffering from the effects of osteoarthritis. Osteoarthritis affects 33 million people in the U.S. alone, and the market for treatments is estimated to grow to \$7 billion globally by 2015. We currently offer orthoPACE<sup>®</sup> for orthopedic treatment in Europe as part of our Pulsed Acoustic Cellular Expression (PACE<sup>®</sup>) platform of proprietary ESWT devices, and orthoPACE is ideally suited for further research of osteoarthritis treatment in humans.”

### **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 to promote angiogenic and positive inflammatory responses, and quickly initiate the healing cascade. This results in revascularization and microcirculatory improvement, including 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 treatment triggers 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 re-initiate the body’s own healing response.

### **About SANUWAVE Health, Inc.**

SANUWAVE Health, Inc. ([www.sanuwave.com](http://www.sanuwave.com)) is an emerging regenerative medicine company focused on the development and commercialization of non-invasive, 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<sup>®</sup>, is CE marked for treatment of the skin and subcutaneous soft tissue and recently completed its highly positive pivotal Phase III, Investigational Device Exemption (IDE) 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 this 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<sup>®</sup> device, as well as stimulating bone and chronic tendonitis regeneration in the musculoskeletal environment through the utilization of its Ossatron, Evotron<sup>™</sup> 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.*

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