

Dr Jorge N. Artaza

Vitamin D is called the sunshine vitamin. Its role in bone health has been studied extensively, and now recent research is linking this important prohormone to a whole host of health concerns. Lack of vitamin D, scientists and physicians are finding, could contribute to cancer, cardiovascular disease, kidney disease and a weakened immune system.



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Dr. Jorge N. Artaza, a translational researcher and faculty member at Charles Drew University, is investigating the effects of vitamin D on health. His studies have shown that the active form of vitamin D promotes muscle cell differentiation.

“It is well-known that skeletal muscle wasting is a very important public health problem associated with several pathological conditions such as aging, chronic disease, cancer, and HIV/AIDS,” Dr. Artaza said. “At the same time it has been described from a clinical point of view that vitamin D administration improved muscle performance and reduced falls in vitamin

D-deficient older adults. But little was known of the underlying mechanism and the role that vitamin D played in promoting myogenic (muscle) cell differentiation.”

Dr. Artaza first became interested in vitamin D during conversations with Dr. Keith Norris, Vice President of Research at CDU. “I was working on the pro-fibrotic effect of myostatin, the only known negative regulator of muscle mass in a multipotent cell line,” Dr. Artaza said. “After having several conversations with Dr. Norris, about the properties of vitamin D, I found that it was really interesting to investigate whether vitamin D can act as an anti-fibrotic drug in the same multipotent cells system.” Later, as Dr. Artaza learned more, his research evolved to include the vitamin’s effect on growth and differentiation in cardiac and skeletal muscle cells.

“In research, you usually have a general idea about what to expect,” he explained. “But in the end it always surprises you and takes you to new paths, it is the never-ending story, one door opens another door.”

Vitamin D is produced in the skin after exposure to rays of ultraviolet light. The vitamin is also available in fish and a few other food sources. In the United States and other countries foods like milk, orange juice and flour are artificially fortified with vitamin D. Levels of Vitamin D in the blood below 20 ng/ml are considered a deficiency; levels between 21-29 ng/ml are considered insufficient, while adequate levels are those of 30 ng/ml or more. People at higher latitudes who are not exposed to enough sunlight and people with darker pigmentation have a higher risk for

vitamin D deficiency. Studies of African Americans have found lower levels of vitamin D, possibly because melanin in the skin interferes with vitamin D production, or because of interactions with parathyroid hormone, which is higher in those of African descent.

The two major forms of vitamin D are vitamin D₂ or ergocalciferol, and vitamin D₃ or cholecalciferol. Both are converted twice, once in the liver and once in the kidneys, to become the biologically active form of vitamin D, or calcitriol. Dr. Artaza is searching for the mechanism that calcitriol uses to promote cell differentiation. Scientists suspect that vitamin D is closely linked to the action of parathyroid hormone, but exactly how remains unclear.

Dr. Artaza is using cultures of myocardial cells and an animal model of myocardial fibrosis to investigate this biochemical pathway. In another set of experiments, he found that skeletal muscle cells treated with the active form of vitamin D increased muscle myotubes' size and diameter. His results suggest exciting possibilities of using vitamin D as a treatment for muscle wasting diseases. He has also found that the vitamin contributes to muscle differentiation and suppresses proliferation. This may suggest use in treatment of diseases that involve uncontrolled cell proliferation, such as fibrosis and cancer.

Vitamin D has also been shown to have an anti-inflammatory effect, which suggests a use for treatment of chronic diseases like cardiovascular disease and fibrosis, the uncontrolled growth of connective tissues. Dr. Artaza found that biologically active vitamin D promotes an anti-inflammatory phenotype in multipotent cells. His goal is to develop a treatment using vitamin D that is more easily translatable to the clinic.

Dr. Artaza's work extends beyond the lab bench.

"I consider myself very lucky, and at the same time I am glad that CDU gave me the opportunity to expand my horizons and to give back 15 years of experience in the hematology and immunology field," Dr. Artaza said. "Thanks to my background in hematology, I am able to give lectures about diagnostics of anemias to 3rd and 4th year medical students from the CDU / UCLA medical program and based on my immunology background I am teaching basic and clinical immunology to undergraduates and post-baccalaureate students at the College of Science and Health (COSH), CDU."