



Dr. Marcas Bamman is one of the country's leading exercise medicine researchers, and directs UAB's Center for Exercise Medicine.

A Prescription for Better Health

Exercise Medicine Takes the Lead

Marcas M. Bamman, PhD, foresees a day when a physician hands a patient a prescription that replaces or supplements medication—a prescription for exercise. “We’re learning more and more about the potent role of exercise in medicine,” says Dr. Bamman, professor in the Department of Cell, Developmental and Integrative Biology and director of the UAB Center for Exercise Medicine. “Exercise needs to be treated like any other medicine with an optimal dose prescribed founded on evidence-based research.”

Dr. Bamman was among a few of the world’s leading exercise medicine experts featured in a 2016 *Time* magazine cover story, “The Exercise Cure: The Surprising Science of a Life-Changing Workout,” which is an indication of the increasing interest in exercise medicine not only among biomedical researchers, but also in the public at large. There is no disputing exercise is beneficial to health, but Dr. Bamman says the key question the UAB Center for Exercise Medicine seeks to answer is how exercise can be dosed to best affect human health. “This is not about exercise for weight loss or simply feeling better,” he says. “We are striving to understand the role of exercise as medicine at the molecular, cellular, and clinical levels.”

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“It’s not enough to simply tell someone they should exercise more. We need to present precise exercise prescriptions to patients that include evidence-based dosing—frequency, intensity, and type of exercise—which will be most effective in helping that patient improve health, reduce disease burden, or recover from an event such as trauma or surgery. We need to determine the optimal exercise prescription for a 70-year-old woman with osteoporosis versus a 30-year-old man with a traumatic brain injury. We don’t have all those answers yet, so it’s an exciting time for research.”

A New Concept of Care

Dr. Bamman refers to exercise as regenerative medicine, often defined as the process of replacing or repairing human cells, tissues, or organs to restore or establish normal function. “We are learning that exercise affects every organ system in the body by activating stem cells and molecular pathways that serve as agents of change and recovery. Exercise can activate numerous internal mechanisms, which can then regenerate dysfunctional tissues.”

Exercise medicine as a distinct field of study came of age in 2007 with a joint initiative of the American College of Sports Medicine and the American Medical Association to create public awareness of the role of exercise. Dr. Bamman proposed the creation of the

— Marcas Bamman, PhD

Center for Exercise Medicine within the School of Medicine in 2010. Following approval from the University of Alabama Board of Trustees in February 2011, UAB became one of the first major academic medical centers to establish a center devoted to understanding the benefits of exercise. The center achieved university-wide status later that same year. In addition to conducting its own research, the center has rapidly become a national powerhouse in exercise medicine and serves as an expert resource frequently tapped by other institutions.

Partnerships in Health

The center manages two national networks devoted to research in medical rehabilitation. One is the National Institutes of Health-funded Medical Rehabilitation Research Resource Network (MR3 Network), working to foster advances in medical rehabilitation research. UAB's REACT Center—Rehabilitation Research Resource to Enhance Clinical Trials—is one of six partner centers making up the MR3 Network, and serves as the network's coordinating center.

The center also founded and maintains NExTNet, the National Exercise Clinical Trials Network. NExTNet is a 70-member consortium of institutions involved in exercise research. Member institutions are looking at exercise in the context of nearly every major disease or condition, from heart disease and diabetes to aging and cancer.

At UAB, some of the center's first clinical studies were in Parkinson's disease, in collaboration with the School of Medicine's leading researchers. Dr. Bamman and his colleagues first published the results of an exercise therapy trial in January 2014 in the *Journal of Applied Physiology*. In that study, high-intensity strength training produced significant improvements in quality of life, mood, motor function, and cellular improvements in skeletal muscle tissue in older patients with Parkinson's disease.

William R. Carroll, MD, Department of Otolaryngology, and Sharon A. Spencer, MD, Department of Radiation Oncology, are also conducting a pilot study testing intensive strength training in head and neck cancer patients. "This study is a great example of how exercise can dovetail with therapy," Dr. Bamman says. "Exercise is often recommended for cancer patients but is usually delayed until after their cancer therapies. This study is looking to see if exercise done concurrently with radiation and chemotherapy will reverse or mitigate some of the adverse effects on stem cells that are known to occur following radiation therapy."

UAB EXERCISE CLINICAL TRIALS FACILITY

4,200 SQ FT EXERCISE TRAINING SPACE

2,800 SQ FT ADMINISTRATIVE SPACE

2 LABORATORIES

1 EXAMINATION/PROCEDURE ROOM

Dr. Bamman also heads a clinical trial on aging and frailty to determine whether the addition of metformin, a drug typically used to treat Type 2 diabetes, will improve the effectiveness of strength training in older adults by reducing muscle inflammation. Other projects in development include studies on the role of exercise in patients with multiple sclerosis, HIV, or depression, and in women with pelvic pain syndrome.

Next Steps

The center recently moved into a state-of-the-art Exercise Clinical Trials Facility with over 7,000 square feet of space, including an exercise training room, cardiorespiratory function and neuromuscular function laboratories, a clinic, and conference and office space. It offers a full range of exercise equipment and staff with expertise to facilitate clinical testing invaluable to exercise researchers.

"Exercise is now getting the rigorous study we apply to any advance in medicine, be it drug development or new surgical techniques," Dr. Bamman says. "It needs to follow the same consistent path from initial Phase 1 studies—which look at safety and tolerability—to large-scale, multiple-institution Phase 3 studies that can lead to translation of the knowledge learned to clinical practice. We're doing this at the Center for Exercise Medicine."

Prescribing Parks

Dr. Bamman's dream of exercise medicine becoming a normally prescribed part of disease treatment is reflected in a pilot program that launched in September 2016. Led by the UAB Minority Health and Health Disparities Research Center, Parks Rx is modeled after successful national initiatives in which health care providers prescribe exercise for their patients and direct them to outdoor spaces to exercise.

Parks Rx is a project of Birmingham REACH for Better Health, a Centers for Disease Control and Prevention-funded initiative to reduce the gap in chronic diseases between African-Americans and whites in Birmingham by improving access to fresh foods and increasing opportunities for physical activity in two underserved African-American communities in north Birmingham. A partnership among UAB, the Jefferson County Department of Health, United Way of Central Alabama, Freshwater Land Trust, Birmingham YMCA, REV Birmingham, and Safe Routes to School, Birmingham REACH for Better Health is expected to reach over 116,000 people.

"Only 25 percent of American adults get the recommended amount of physical activity, and 29 percent don't engage in any leisure time physical activity," says Mona N. Fouad, MD, principal investigator for REACH, director of the UAB Division of Preventive Medicine, and director of the UAB Minority Health and Health Disparities Research Center. "This sedentary lifestyle contributes to an increased incidence of obesity that leads to chronic diseases such as high blood pressure, diabetes, heart disease, stroke, and some cancers." Studies show access to the outdoors and green spaces reduces stress, promotes physical activity, and results in a nearly 50-percent increase in exercise.

AMERICANS & EXERCISE FAST FACTS



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29% OF AMERICANS DON'T ENGAGE IN ANY LEISURE TIME PHYSICAL ACTIVITY

LESS THAN 5% OF ADULTS PARTICIPATE IN 30 MINUTES OF PHYSICAL ACTIVITY EACH DAY

ACCESS TO OUTDOOR GREEN SPACES RESULTS IN A NEARLY 50% INCREASE IN EXERCISE



UAB investigators Drs. Monica Baskin (left) and Mona Fouad (right) are searching for ways to reduce the gap in chronic diseases between African-Americans and whites in Birmingham through programs like Parks Rx.

After receiving a healthy living prescription from their health care providers, patients are directed to the Parks Rx website (www.reachforbetterhealth.com/parksrx) where they can search an interactive map for local parks and green spaces in their ZIP codes. The map pinpoints area parks and has links to park details such as amenities, safety, trail lengths, and hours of operation.

The Jefferson County Department of Health piloted Parks Rx in its pediatric clinics over the summer. According to Mark E. Wilson, MD, health officer for Jefferson County, the program has been well received by pediatric patients, their parents, and physicians.

"One parent said she would be placing the prescription on her refrigerator as a reminder to her family about daily exercise and healthy eating," Dr. Wilson says. "Another parent said she would use the prescription to increase her own physical activity."

"We have the perfect recipe for Parks Rx in Birmingham," says Libba Vaughan, executive director at the Freshwater Land Trust. "Just in the city of Birmingham, we have more than 100 parks for people to enjoy and have one of the country's leading universities working in preventive medicine, exercise medicine, and health disparities." ■



Visitors can enter their ZIP codes into the Parks Rx website to see a map of Birmingham area parks where they can engage in outdoor activity.

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