

This article was originally written by an intern for the university's web news page. Designed to reach a wide audience of university alumni and supporters, she emphasized the biography and personal struggle of Charles Baldinger. For the university's College of Pharmacy & Health Sciences magazine, the article needed to highlight more of the kinesiology department's role in helping Baldinger document the effects of his illness. It also needed to be much shorter, so I cut much of the biographical elements and focused on the illness, the treatments and the science and research elements for this health-focused audience.

Kinesiology and alumnus collaborate to fight brain cancer

Lipscomb University alumnus **Charles Baldinger** ~~applies his heart to serve to his war on brain cancer. Baldinger~~ is in a fight for his life, and he's using the university's human performance laboratory as a weapon for future brain cancer patients—and himself—to fight even harder.

Baldinger, a 2014 graduate of the exercise and nutrition science master's program, was diagnosed in 2010 with anaplastic astrocytoma, a rare Stage 3 malignant brain tumor affecting his speech and motor skills on his right side.

A ~~USMA-West Point~~ graduate, Baldinger commissioned as an ~~i~~Infantry ~~o~~Officer before medically retiring. ~~He later~~ Later he attended Lipscomb ~~University, earning a master's in exercise and nutrition science in 2014 and then entered the security industry before~~ .In 2017, the tumor evolved to Stage 4 brain cancer, glioblastoma multiforme. Baldinger is currently stable, but his fight continues with a new clinical trial in Washington D.C.

After a recurrence of his cancer, Baldinger decided to refocus on academia, and he became a research assistant in biomedical and bioengineering at Vanderbilt University in Nashville, where he works today. He also became interested in documenting the physical changes occurring in his body due to the brain tumor, so he reached out to the faculty at Lipscomb to see if he could use the human performance lab for that documentation.

"He was interested in some bilateral comparisons between the right and left side. We started doing various measurements in our bod pod and then we measured bone mineral densitometry with our dual-energy x-ray absorptiometry machine," said Kent Johnson, chair of the Department of Kinesiology, who arranged for Baldinger to use the lab.

"We all knew Charles and where his heart was. That's what we are here for. We have allowed other people to use the human performance lab as well, especially military

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veterans. That is part of our mission,” Johnson said. “That’s how we are a little different than other schools, and it was a very small thing considering all of his challenges.”

As a West PointUSMA cadet, Baldinger fell while rock climbing. During a bouldering set his arm locked up while 20 feet high and he plummeted to the floor. “When you’re bouldering, you don’t have any ropes. When I hit the ground I went into a grand mal seizure,” he explained.

“I woke up in the hospital, and the doctor told me she had good and bad news. The good news was that I hadn’t broken anything;~~they thought I’d broken my neck.~~ The bad news was that I had a tumor in my brain the size of a golf ball that needed to be removed ASAP.”

~~Metaphorical to Baldinger’s bouldering experience is his war on cancer. There is no “rope” with limited research, knowledge and treatments existent today.~~ “We’ve gone through steps A, B, C, D...E, and now we’re into experimental treatments. We’re attacking it from all angles, to beat the cancer,” he said. For example, Baldinger wears an Optune™ device that sends signals through his brain to stop the cancer from progressing.

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“The idea is that it destroys dividing cells. Brain cells don’t divide very fast or at all. So, if it is dividinged fast, it’s a tumor,” he explained. “That’s the principle, but it only works on a certain subset of cancers.”

With the Department of Kinesiology, Baldinger is: ~~“conducts measurements with Lipscomb’s Department of Kinesiology within the College of Pharmacy & Health Sciences to record his body composition.~~ “I’m...keeping track of a lot of different factors that could be influencing cancer ~~research~~ growth,” he said.

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“There has to be a reason why standard survival time for glioblastomas is typically six months. I’ve been doing this for eight years. If anyone gets this far, I want to have a record.”

His record includes his exercise plan, body composition measurements, diet, levels on the Optune™ device, and types of chemotherapy and radiation treatment he’s received. The data is not currently part of a formal research project, but Baldinger, who is hoping to be accepted into a Vanderbilt neuroscience and bioengineering doctoral program, said it could be used in the future as a case study to increase scientific knowledge.

“We’re trying to tease out what is working and how we can duplicate it. The only way to do that is by measurement,” he said.

Baldinger visits Lipscomb quarterly to measure circumference, assess skin folds, conduct ~~dual energy x-ray absorptiometryDXA (DXA)~~ scans to measure bone mineral density, and assess fat and lean body mass via sessions in the bod pod.

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~~“Once we’re done collecting data, someone is going to do a study which will be published and that’s going to increase scientific knowledge. It’s all connected,” he said.~~

~~Baldinger’s tumor made the transformation from challenge to blessing. “It’s led me down a path I would not have taken before,” he said. “While at Lipscomb, I was fully recovered from the first iteration of the cancer. I did exercise science and nutrition concurrently, then ended up running human resources and training management,” he explained.~~

~~He had not accomplished the biomedical engineering goals he made while at Lipscomb. The cancers’ return summoned Baldinger’s attention. “Suddenly I’m in a fight for my life, again,” he said.~~

~~Prayer chains, phone calls, a letter from **Joe Biden**, house calls and food abounded for Baldinger. His faith grew from the first diagnosis; however, it was a struggle. “I was angry for a long time when I first had this happen. I went through the stages of grief and ended up stuck at anger,” he said.~~

~~“For about six months I was just furious. I was 20. I was young and healthy and did everything right. I thought, ‘Why is this happening to me?’ Eventually, I calmed down and a lot of people helped me understand that this is another challenge both of faith and of me as a person. Once I accepted that, everything else fell into place,” he said.~~

~~Baldinger was more receptive to matters of faith and healing during the cancer’s second recurrence. Modern medicine provided him with no answers, only theory. He chose to make his disease a tool to serve others.~~

~~“I’m going to continue fighting, working and praying so cancer, particularly brain cancer, can’t do this for much longer to anybody else,” said Baldinger. “This third recurrence gives me the ability and time to pursue this goal. I couldn’t, and wouldn’t have had the motivation to beat this had it not impacted my life so much. God called me to do this through this challenge.”~~

~~“I don’t think anything would have caught his attention otherwise,” said his mom, **Kim Baldinger**. “He’s just hard headed! But I tell Charlie that God’s not going to take him until he does what he’s meant to do.” With tears in her eyes, she turned to Baldinger and said, “So don’t do it for a while.”~~

~~Baldinger’s mom emphasized the foundation which faith based education provides amid disaster. “You don’t necessarily circle the wagons and point the guns outward. You circle the wagons and hold on to each other, and hold on to God. That’s what we did with Charlie.”~~

~~Baldinger’s research contributions transcend medicine and include participation in studies on innovative handicapped aids and equipment. Baldinger **currently serves** as~~

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a test subject for an ongoing Department of Veterans Affairs (VA) study to develop communication technology for the speech impaired.

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“He talks all the time and is very articulate,” said his mom, Kim Baldinger. “His speech has improved since the radiation, but it was almost painful to watch him because he could not talk. His tumor does not affect cognitive abilities at all, but it does affect his speech and his right side.”

~~“I’m working with the VA hospital as a test subject in two studies now. It’s more gathering data now, and they’ll extrapolate the data later on. I know one of the students who is doing her Ph.D. and she needed test subjects, so I volunteered.”~~

~~In addition to assisting others with pursuing their Ph.D., Baldinger anxiously awaits approval to begin his own at Vanderbilt University in a joint program in neuroscience, biomedical engineering and medical school through the Medical Scientist Training Program (MSTP). Meanwhile, he works as a research associate in Vanderbilt’s Social Emotional Neuroscience Endocrinology (S.E.N.S.E.) lab. His dedication to productively use his disease stems from his desire to serve beginning in high school.~~

~~Although aspiring to be a Marine, Baldinger’s military service began at USMA. “Honestly, I really didn’t want to go at first,” he laughed. “Incorporated into the Delayed Enlistment Program, which allows recruits to train on inactive status before shipping out to boot camp at a later date, Baldinger trained with the marines during his senior year of high school.~~

~~“My gunny had told me that with my Armed Services Vocational Aptitude Battery (ASVAB) scores I needed to apply to all of the service academies. Lo and behold, I got into West Point,” said Baldinger.~~

~~“I was really torn. Being a dumb kid, I really didn’t want to go to school. I wanted to serve. I didn’t realize that at USMA, it’s the same thing,” he said. “I took this issue to my gunny, and he gave me a commiserating look. Then, with a cuff to the head, he said, ‘Take the free college —!’ He tore up my paperwork right then, shook my hand, and sent me out the door.”~~

~~Baldinger fondly remembers his time at USMA. The physicality of the Army fit Baldinger’s goals leading to his participation in the climbing club, an act which led to the tumor’s discovery.~~

~~Admitted to At the time of his first treatment at Walter-Reed National Military Medical Center merely days after his fall, Baldinger faced the decision of whether to stay awake during the surgery or undergo general anesthesia. “My surgeon did an excellent job from the start. His first challenge was convincing me to stay awake for the procedure. They get a much better feel for the tumor when they can shock your brain and see the response if you’re awake. If you’re under, they’re really just guessing,” Baldinger explained.~~

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The tumor, located on the motor strip, affects Baldinger's extremities. While in the operating room, the surgical team periodically poked his toe with a pin to check his sense of touch. His job was to let them know what he could feel. Part way through the surgery, the team stopped to discuss their progress; Baldinger was no longer responsive to the pin.

The ~~deliberation rested with ending~~ medical team decided to end the operation; they had removed as much of the tumor as was safe. ~~"The surgeon emphasized the profoundly huge difference between paralyzing someone who is 70 years old versus someone who is 20,"~~ said Baldinger's mom.

"I was disappointed. We are a faith-based family. I had this vision of going in, taking everything out, and everything being great and it would be the end of it," she said Kim Baldinger. "All of this was on my birthday. So, it was rough to have the surgeon come out and say they'll have to get the rest of the tumor another way," she said.

~~Baldinger returned home to a Nashville submerged. The 2010 flood impacted his ability to receive radiation treatment. "They had to keep moving his radiation site because radiation facilities are always on the bottom floor and they were all flooded,"~~ his mom explained.

~~"I must have driven back and forth to Knoxville 20 times that break. Luckily, Baldinger received a call from his West Point mentor. They had a spot for his treatment and wanted him there without delay. "He asked if I could be back in two days,"~~ said Baldinger. ~~"So I drove without stop back to West Point."~~

~~Baldinger's work on the initial bionic foot at West Point led to his current studies in bioengineering, biomedicine and neurology.~~

"In those ensuing years since 2010, the tumor was at rest and he started doing other things," she said Baldinger's mom. "Life got in the way of him pursuing his interest in medicine. Well now, life isn't in the way and he's doing what he always wanted to do back at West Point."

~~Baldinger looks to the future, hopeful for his doctoral endeavors and his mission to beat cancer. "God has a plan and a purpose,"~~ his mom said. ~~"It's not filled yet. Little by little things keep falling into place. It could all end tomorrow, but I don't think it's going to."~~

"I'm waiting to see what the purpose is. Along the way, he's helping people. I think that's part of the plan and purpose, so we're just along for the ride," she said.

Baldinger's faith grew from the first diagnosis; however, it was a struggle. "I was angry for a long time when I first had this happen. I went through the stages of grief and ended up stuck at anger," he said.

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"I've always been of the opinion that my mom, dad, brothers and sister are bothered a whole lot more than I am by this," said Baldinger. "I'm fighting it every day and so far, I'm winning."

"I think the real heroes are the supporters. I'm too consumed by the daily tasks required to survive. I am focused on my goals," he explained. "They don't get to fight it. They have to worry. I realize that it's mostly a fight for them."

Lipscomb's Department of Kinesiology has hopes of helping even more people through its human performance lab in the future, said Johnson. Equipment for cardiovascular and metabolic testing could someday be provided for community use, as well as equipment that tests balance issues, especially valuable for seniors, said Johnson.

For more information about Lipscomb's Department of Kinesiology, [click here](#).