Eyes Wide Open: UGA researchers search for solutions to sleep apnea
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Editor’s Note: This is an ongoing Red & Black series analyzing students’ struggles with sleep disorders and the options available for those seeking treatment and relief. If you struggle with sleep and would like to tell your story, please email news@randb.com.

Some who struggle with sleep disorders can find solace in medicine or reflection. But for sufferers of sleep apnea, the only reliable treatment is to wear a plastic mask to sleep.

“The treatment for obstructive sleep apnea is continuous positive airway pressure from masks,” said Brad Phillips, a University of Georgia College of Pharmacy professor who has spent 20 years studying sleep disorders. “There is currently no medicine to treat sleep apnea.”

Sufferers of sleep apnea often say they wake up tired and don’t feel well rested. With sleep apnea, they wake up repeatedly throughout the night — often times without ever realizing it. As a result, their sleep cycle gets interrupted countless times.

“They’re called micro-arousals,” Phillips said. “Obstructive sleep apnea, the hallmark, as you kind of mentioned, is waking up abruptly and kind of gasping.”

The mask, called a CPAP machine, covers the patient's nose, and sometimes, the mouth as well. “It’s like holding your head out the car window. Everyone's done that,” Phillips said. “You get that blast of air, except you have that during sleep.”

Though CPAP machines only mask the effects of sleep apnea, they are the best option available. However, some patients aren’t comfortable with the machines and this complicates treatment.

“So probably 20 to 30 percent either can’t wear the mask or they just can’t tolerate it, so they are left untreated,” Phillips said. “And if you have sleep apnea, and it’s untreated, it’s very difficult to maintain or achieve blood pressure control.

And since sleep apnea is dangerously tied to obesity — a vicious cycle in which sleep deprivation contributes to weight gain — Phillips teamed up with epigenetics expert Richard Meagher, as part of UGA’s new obesity initiative, to determine the genes related to the two conditions, and eventually provide a pharmaceutical solution.

“Dr. Meagher is really looking at the epigenetics of obesity,” Phillips said. “So epigenetics is influenced by
external environments — what you were exposed to growing up and all that kind of stuff."

Epigenetics is the study of how genes are affected, and sometimes changed, by outside influence. While DNA never gets altered, some genes adapt over time. Meagher’s contribution in the study will be to figure out which genes are “turned on” by sleep apnea or obesity.

“What’s novel about the research Richard and I are doing is that no one’s really looked at how sleep apnea might influence epigenetics,” Phillips said. “No one has really studied if that change within the body, does that affect epigenetics?”

The study will observe 40 people — 20 with sleep apnea and 20 without. It is expected to be a short study, lasting until the end of the spring semester — about a year and a half after the initial plans were made. Meagher’s background is in plant biology, but he has also become known internationally through his work on epigenetics.

If it can be determined that sleep apnea affects a patient’s epigenetics, then those specific genes can be targeted and possibly turned off through pharmaceutical means, Meagher said.

“When you get to be obese, quite often you build up fat deposits in your neck, and when you lay back it disrupts your breathing and you get sleep apnea — so that one is easy to figure out,” Meagher said.

He said the link between sleep apnea and cardiovascular disease is surprising.

“When you have sleep apnea, you’re not getting enough oxygen,” Meagher said. “Your body gets really stressed, [your heart gets] even more inflamed, and it can cause most typically cardiovascular disease. You think of diabetes, but cardiovascular disease is the most common reason why people who are obese or have sleep apnea are going to get sick fatally and die.”

The research strives to combat the many health risks posed by sleep apnea.

Patients with untreated sleep apnea are at higher risk to develop cardiovascular disease, hypertension, diabetes and obesity, according to the Centers for Disease Control and Prevention in Atlanta.

“Sleep apnea is an independent risk factor for the development of hypertension, so just having sleep apnea you are at a threefold risk of developing hypertension,” Phillips said. “There have been a couple of areas of research, but really nothing that has come to market to actually treat sleep apnea.”

Meredith Petry, a sleep lab administrator at the Athens Sleep & Wellness Center, said there are some treatments to help patients find more restful sleep, even if the condition itself cannot be medically treated.

“Some things you can’t test in the lab. But here in the sleep lab itself, we have a four-bed lab and we do diagnostic studies mostly looking for breathing issues [related to sleep apnea],” Petry said.

The center conducts overnight sleep tests and focuses on treating sleep apnea. The test can help diagnose common causes of sleep apnea, such as restricted upper airways or restless leg syndrome, which manifests itself with tingling within the calves, thighs or feet.

While the center can diagnose sleep apnea, the CPAP machine remains the only available treatment. In the future, patients may be able to eschew the plastic mask for a pharmaceutical solution.

“If we can find out what genes, or groups of genes, are important, than that really gives an opportunity to do drug development and see if we can change the epigenetic profile, so you don’t have the associated cardiovascular disease or hypertension,” Phillips said.

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