

Translational Medicine



Florida Hospital
Burnham Institute

Translational
Research Institute
for Metabolism and
Diabetes (TRI)

The battle against
obesity and diabetes

Florida Hospital creates the Translational Research Institute for Metabolism and Diabetes and builds a dedicated facility in order to reverse one of today's most significant public health challenges.

a Cause, a Call, a Building

The battle against obesity and diabetes isn't waged only in the gym and at the dinner table. If it were as simple as equipping our suburbs with fitness centers and labeling our foods with calorie counts, none of us would be overweight. Yet despite all we know, many of us are too heavy.

The Centers for Disease Control report that nearly two-thirds of adults are either overweight or obese. Approximately 17 percent of children are obese, and some of them are developing insulin-resistant forms of diabetes that were almost exclusive to adults as recently as ten years ago. And the statistics get worse every year.

Most of us will be affected in some way. Obesity is a contributor to a host of deadly diseases, including many cancers as well as diabetes, and its related medical expenses totaled nearly \$150 billion in 2008. The social and economic costs are simply staggering.

No one would question that obesity is a big problem. The questions come with what to do about it. And if advocating sound diets and ample exercise isn't enough, **then what is the answer?**

Florida Hospital intends to find out.

In a bold move that involved significant investment and dramatic reinvention, Florida Hospital set out to change the course of the obesity epidemic. Just six years later the efforts resulted in the Translational Research Institute for Metabolism and Diabetes (TRI), a unique bench-to-bedside research center operated as a joint venture with the Sanford-Burnham Medical Research Institute. The TRI building, a modern, three-story, 54,000-square-foot facility, opened in Orlando in March 2012.

The Vision

Florida Hospital is the largest of 47 hospitals in the Adventist Health System. Twenty-two hospitals in Florida carry the Florida Hospital name. With more than 18,000 employees spread across eight campuses in the metropolitan Orlando area, Florida Hospital is the third largest employer in central Florida. It has more than 110,000 admissions and 350,000 emergency-department visits each year.

Six years ago, hospital leadership began planning for a future in a changing healthcare landscape. The Affordable Care Act, a product of the Obama presidency, had not yet emerged. However, healthcare administrators knew reform was on the way. Even without ACA, Florida Hospital leaders were growing increasingly concerned over the mandates that would emerge.

TRI Administrative Director Robert Deiningger says Florida Hospital management knew that they could not sustain the "current state" solely by searching for greater efficiencies. They needed to make some

kind of fundamental change to create a new future within their healing mission. What they decided was to re-envision what their organization could do for its patients, its community, and medicine as a whole.

“We decided we weren’t just going to be a large community hospital any longer. We were going to make a significant commitment to research, training, innovation, and education.”

Robert Deiningger

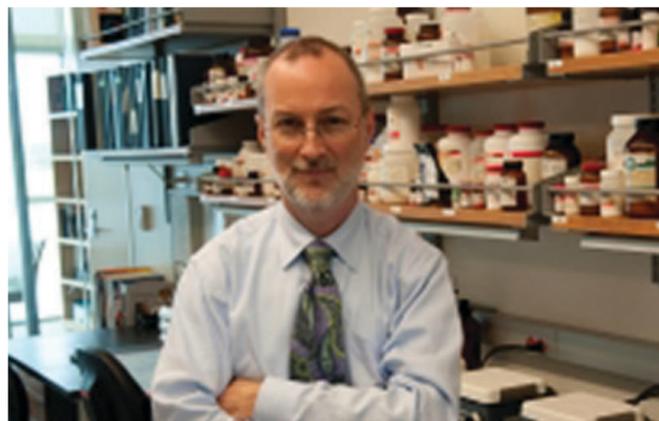
While Florida Hospital was not modeling itself on any particular non-academic research hospital, St. Jude's Children's Research Hospital became a common point of comparison. But instead of childhood disease, Florida Hospital would focus on metabolic conditions, including diabetes and obesity.

This decision was a deliberate response to what hospital leaders saw as a growing public health concern locally

a Cause

and nationally—one that has our society growing even heavier and sicker still in the years to come. In this obesity epidemic, Florida Hospital saw not only a public health emergency, but also an opportunity.

“It was no accident that we chose to focus on obesity and diabetes,” Deiningger says. “We wanted to make an impact, make a mark on science.”



Dr. Steven Smith



{ a Call

The Visionary

It was also no accident that Florida Hospital chose Dr. Steven Smith as its scientific director. Dr. Smith came to TRI after 15 years at the Pennington Biomedical Research Center in Louisiana. His research there focused on obesity, diabetes, and the metabolic origins of cardiovascular disease. He had been widely published and, as president-elect of the Obesity Society, was a renowned national expert in his field.

Dr. Smith's pedigree also offered something else that Florida Hospital sought. With a long history in patient care, Florida Hospital wanted a scientific director committed to bridging the divide between laboratory science and clinical care. This approach, known as translational medicine, helps move discoveries from the bench to the bedside and also channels clinical discoveries back to the lab to inform research there. Dr. Smith was not only a champion but also a pioneer of translational research, where he learned that some

people's inability to burn fat is programmed into muscle cells.

In the past ten to fifteen years, researchers have begun to acknowledge that weight loss is not always a matter of calories in and calories out. They have also begun to uncover some of the mysteries of obesity, yet many questions remain. Why can some people eat badly and stay thin? Why do others struggle to lose weight? Why do some overweight people develop diabetes while others don't? Which individual genetic variations make a difference when it comes to weight, obesity, and metabolic disease? The answers still elude researchers.

TRI scientists and doctors will endeavor to solve these riddles. And it is in the realm of these pursuits that Florida Hospital—via TRI and Dr. Smith—hopes to make a name for itself.

It all comes down to the research.

The Facility

Human-subject research is not something that Florida Hospital had done before—not in an early phase—and there really wasn't anywhere else within Florida Hospital where we could do outpatient research," Deininger says. "Early-phase research is specialized and highly regulated. It requires more than the kind of equipment that you can place on a countertop or wheel into the room. That, really, necessitated the building."

Florida Hospital chose Flad Architects to create a research facility that could put TRI at the fore of diabetes and metabolic research. To do that, the building needed to house cutting-edge research facilities that would position TRI for medical breakthroughs and distance it from its competition. The building also had to convey an important message to the local community and the healthcare community at large: That Florida Hospital was taking a new turn as a research institution as well as a community hospital.

"We saw in Flad that same ability to be creative, to express the excitement and discovery in the building [in] the same way we felt about this project," Dr. Smith says.

Yet in a time of great flux for the healthcare industry, with operating models rapidly evolving and federal insurance laws and regulations dramatically changing, it was critical for Florida Hospital to find an architecture firm that understood the business of healthcare as well as the design of medical facilities. Dr. Smith says Flad was the right choice because it brought to the project the right balance of technical expertise, compelling design, and industry knowledge. More than that, he says, Flad promised to be a true partner in bringing Florida Hospital's bold vision to life.

"One of the unique aspects Flad brings to the table is the ability to listen," Dr. Smith says. "It's to ask the right questions, listen carefully, dig a little deeper, and really internalize what the project is all about. So often it's a race to the design, a race to the detail . . . and those are ultimately the easy parts."

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Dr. Steven Smith



Because of the partnership with Sanford-Burnham, TRI did not need to house every aspect of medical science under its roof. There was no need to recreate any high-

throughput screening and even some genomics research; those could be housed at Sanford-Burnham. That kept the scale of the building manageable—or as Deinger put it, “54,000 instead of 500,000 square feet.”

a Building {

What TRI does offer, though, is truly cutting edge not only for central Florida but also for any translational metabolic research center. For example, the facility has two whole-room calorimeters as well as two small-room calorimeters. Flad designer Jeffrey Raasch says he's aware of only a few similar whole-room calorimeters in the country, and the smaller calorimeters are the first of their kind. "There are not many facilities at the level we're talking about here," Raasch says. "They expect to unravel the mysteries of diabetes in the next 20 years, and I think they can do it—but they couldn't do it without these calorimeters."

The whole-room calorimeters provide an incredibly accurate data stream of numerous parameters in minute-by-minute sampling. Previous facilities could gather data only in 15- or 20-minute intervals, and fewer measures were available. Here volunteers can stay in the chamber for 24 hours. They eat, sleep, walk on a treadmill, or read at a desk. Everything is recorded. "We can measure calories burned within one or two percent and determine whether those calories are fat or protein," Deininger says.

"This kind of information is what will enable us to determine what makes two people's metabolisms different. When you combine the calorimeters with the MRI on the first floor and the blood sampling and DNA

we can do, you can build this incredibly robust picture of everyone who comes through our study."

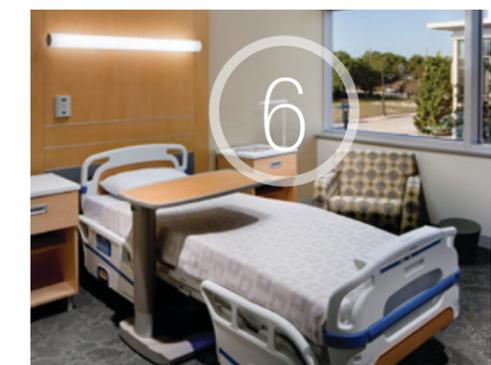
It is this kind of detail that will not only answer lingering questions but will also facilitate personalized medicine or individual interventions and responses to disease.

The small-room calorimeters also offer improvement over existing technology. These rooms can, for example, accommodate a stationary bike or treadmill for VO₂-max measurements. Most of us have seen footage of these tests: someone runs on a treadmill while breathing into a tube that's held in place with some apparatus around the head with straps to hold the tube in place.

Not so in the small-room calorimeters.

"You just sit on the bike and you ride to your heart's content until you can't ride any harder," Deininger says. "People are able to perform to their peak because they're not distracted by the equipment they're wearing. We get better volunteer performance and better data as well."

Then there is the 3T MRI that enables researchers to conduct noninvasive, in-vivo nuclear magnetic resonance spectroscopy to study muscle metabolism without taking actual biopsies. It's at the fore of research, and TRI has the only one in central Florida.



- 1) 3T MRI
- 2) Small-room Calorimeters
- 3) Kitchen
- 4) Molecular Lab
- 5) Tissue Culture Lab
- 6) Patient Room

The building also has the capability for a wide range of other phenotypic testing, including DEXA (to measure bone density and body composition), as well as DNA extraction and some clinical chemistry. The facility has a kitchen, a research pharmacy, procedure rooms that resemble outpatient surgery suites and overnight rooms that are a cross between hotel and hospital rooms.

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It was an important message to get out to the medical community, too. “We have seen a noticeable increase in the interest of physicians, surgeons, people with an interest in research and innovation,” Deininger says. “It is

“The CEO and the rest of us on the team wanted this building to express something externally that was more innovative, that had more heart and energy than the standard hospital building.”

Dr. Steven Smith

Ultimately, the TRI facility contains all the diagnostic and clinical components of a small hospital, but it isn't a hospital. “TRI is the only dedicated research building that Florida Hospital has built,” Deininger says. “Everything that occurs at TRI is research.”

But there was more at stake than the research space. Florida Hospital wanted the TRI building to send a message; it had to convey that Florida Hospital was serious about its new mission as a research institute. The building had to do more than house the labs and the scientists; it had to make a statement.

“This building has special significance on our campus because it is the first stand-alone research building in a very large hospital system that knows how to do the hospital side of the equation pretty well,” Dr. Smith says. “The CEO and the rest of us on the team wanted this

certainly easier for the organization to recruit them today than it was five years ago when we had no assets, only promises that we were going to do it. Now we've done it, and we're going to do more of it.”

Deininger expects to see an impact on research funding as well. “Florida Hospital has made a major investment in altering the course of diabetes and obesity care in central Florida and the region,” he says. “I think it would be very difficult to change the course of diabetes without buildings like TRI.”

Raasch agrees. “You need a dedicated building to do this kind of research,” he says, “it reflects the Florida Hospital philosophy and their mission to find a cure for diabetes. They expect to unravel the mystery within the next twenty years, and it's entirely possible.”



Flad Architects



Flad Architects has earned a reputation for outstanding client service, fiscal responsibility, and design excellence over its 85-year history. Specializing in the planning and design of innovative science facilities for academic, healthcare, government, and corporate science and technology clients, Flad is nationally known and honored for its planning and design expertise. In addition to traditional architectural services, Flad provides strategic facility planning and programming, laboratory planning, interior design, landscape architecture, and structural engineering.