COLUMBIA DAILY TRIBUNE

MU chancellor keeps eye on travel costs

By Janese Silvey

Friday, July 22, 2011

Overseeing a flagship land-grant university can require plenty of travel, but University of Missouri Chancellor Brady Deaton said he has been watching his trip budgets lately.

"Our budget situation calls our attention to every detail," he said. "We scrutinize everything."

Records indicate Deaton has curtailed some travel expenses over the past few years. Last year, he was reimbursed $14,545 for trip expenses, up slightly from 2009, when expenses totaled $14,110. Those totals were down from 2007 and 2008, when he was reimbursed $18,082 and $18,550 respectively.

As of June 6, when the Tribune made an open-records request, Deaton had been reimbursed $9,252 for university trips since Jan. 1.

The lion's share of that — $4,652 — was spent on a trip in February to Shanghai University in China, where he and his wife, Anne, met with dignitaries to form the Confucius Institute on the MU campus this spring. The institute aims to give students and residents a better understanding of Chinese culture.

Other trips included out-of-town meetings of the Association of American Universities and the Association of Public and Land-grant Universities. Anne Deaton also attends those meetings because she represents MU on association committees.

The numbers are based only on trip expense detail forms submitted to the UM System office for reimbursements. They do not include some travel paid out of development accounts or spending charged directly to university credit cards. In other cases, non-MU groups pay for Deaton to attend academic conferences. It would be tough to piece together all documents relating to trip expenses, spokeswoman Mary Jo Banken said.

Although Deaton acknowledged it's difficult to draw conclusions based on the available reports, he said he has been more careful with trips during the economic downturn. "I try to be very travel-conscious," he said. "Minimizing it but also not doing that in a way that cheats the university. Doing what we do requires representation at national meetings."

Traveling to AAU and APLU meetings ensures Deaton is abreast of trends and pressing issues in higher education, he said, and allows him to recruit nationally recognized faculty.

Harry Tyrer, who becomes chairman of MU's Faculty Council next week, said the expenses sounded reasonable. A presence at national meetings ensures others know MU's name and impact, he said.

"He needs to leave Columbia," Tyrer said. "Certainly he needs to take care of the state and travel within the state, but he also needs to represent the campus at various national meetings that are important to us. When he represents the university, people take notice, so there really is a need to show the University of Missouri outside of Missouri."

Deaton also has been reimbursed for out-of-state meetings with alumni or other potential donors.

"Some of these trips, I come back with commitments that amount to millions," he said. "It happens more than once."

In addition to airfare, rental cars and other travel-related fees, Deaton is allowed as much as $42 a day for meals. He is allowed to forgo meals to build credit for more expensive meal charges later. That was the case in June 2010, when, during a fundraising trip to California, he skipped reimbursement for four other meals to charge $116 for a dinner with a potential donor. During the meal, "alcohol was served to promote socialization," according to the trip form.

"The university will reimburse for purchase of alcohol at functions when it is customary and normal for a situation and makes sense," Banken said. "Having a glass of wine with dinner is a component of interactions for many and is seen as a reasonable expense when university administrators are meeting with constituents or potential donors."

COLUMBIA DAILY TRIBUNE

Research 101: Pursuit of knowledge key on campus

By Janese Silvey

Sunday, July 24, 2011

Randall Prather doesn't blame people who might question the purpose of research.

"I read about some studies and cringe," he said.

But he knows not to judge too quickly. Sometimes it takes decades before discoveries have practical purpose.

Take the green fluorescent proteins discovered in jellyfish in the 1960s. A Japanese researcher, Osamu Shimomura, wanted to know what gave jellyfish their glow. In 1962, he reported they have a specific protein that glows bright green under ultraviolet light.

Fast-forward 50 years. Prather is a curators' professor of reproductive physiology and molecular biology at the University of Missouri. He's using those green fluorescent proteins, or GFPs, from jellyfish as genetic markers. By giving stem cells a fluorescent tag, scientists can track them to know whether they can treat specific health problems. Today, Prather's lab sends GFP-marked cells to researchers all over the world who are using them to study eye repair, heart surgery and skin wounds. In the future, the markers could be used in research on heart transplants and cystic fibrosis.

That little green protein discovered in jellyfish decades ago "opened up everything else we've done," Prather said.

Who could have imagined that back in 1962? Had the study been funded in the United States with public grants, who would have criticized it?

"Would I have said the same thing about green fluorescent proteins?" Prather said, referring to today's science critics. "I don't know."

The pursuit of knowledge is a primary mission at MU. Faculty members are expected to spend 40 percent of their time on research or, for those in non-sciences, similar endeavors related to their field. Research brings millions of federal dollars to campus, too, although the funding isn't always enough to cover the work that goes on in labs.

"Research is not a money maker," said Rob Duncan, vice chancellor of research. "But it's a huge opportunity maker."

SHOW ME THE JOBS

When Gary Forsee was president of the UM System, he emphasized the role the university plays in economic development. He often talked about moving discoveries from the lab to the marketplace.

It's a message lawmakers like to hear.

A group of legislators recently took a tour of MU that included a stop at the Bond Life Sciences Center. That's where 36 researchers from a dozen departments are collaborating on projects, Director Jack Schultz said. There are scientists in the building interested in agricultural advances, others trying to find medical breakthroughs and, he said, the engineers who are always trying to turn research into "something practical."

"Shame on them," Rep. Glen Klippenstein, R-Maysville, joked, nudging a colleague.

Like most lawmakers looking for immediate ways to boost the economy, Klippenstein is interested in research with practical application. Although he knows there has to be some basic research, "there has not been enough applied research," he told the Tribune. "Now they're utilizing some of the raw research they've had over the years and putting some teeth into it."

But scientists aren't out to turn a profit, Schultz told the legislative group. It's sometimes hard to grasp why taxpayers should fund studies that don't translate into marketable ideas, he said, but "the chain of economic development starts on the bottom with what you know."

In other words, you can't get green fluorescent biomarkers without first knowing what makes a jellyfish glow.

It took centuries of research into the practice of flying before the Wright brothers' aircraft got off the ground in 1903. And further research led to commercial airplanes and space travel.

"How did we go from powered flight to the moon?" Duncan asked. "It would have been impossible had it not been for a simple application of the scientific method over and over again."

The scientific method — that multi-step process learned in middle school — is the basis of all scientific work. It goes something like this: Ask a question, do a little background work, form a hypothesis and conduct an experiment to test it. More than likely, that experiment will lead to a new discovery that will alter the hypothesis and require more experimentation.

That simple process led to the discovery of penicillin, a finding that modernized medicine. Or, Duncan said, think about the discovery of lasers in the mid-20th century, which revolutionized technology.

Duncan has been thinking about lasers a lot lately: They're the backbone of the Lasik surgery that recently improved his eyesight.

FINDING THE UNEXPECTED

Some people are starting to think twice about grabbing a plastic water bottle. That's because researchers have found that bisphenol A, the chemical used to make those and other common plastics, can have harmful effects on a body.

Frederick vom Saal wasn't out to give the plastic a bad rap when he first saw evidence that bisphenol A, or BPA, is harmful. Vom Saal, a curators' professor of biological sciences at MU, was researching the role of proteins in blood as a protective barrier to natural hormones. Basically, the proteins keep hormones from entering cells.

When testing the process on synthetic hormones, vom Saal noticed BPA doesn't bind to blood proteins like their natural counterparts but instead can get into cells and cause physical harm.

Thousands of studies since have linked BPA to diabetes, obesity, prostate and breast cancers, and asthma. When fetuses are exposed to it in the womb, some studies have suggested it causes boys to act like girls and girls to act like boys.

The industry has fought back. The American Chemistry Council, which represents plastic companies, has funded its own studies in an attempt to debunk the scientific findings.

Vom Saal compares the fight against BPA in food containers to the decadeslong fights to prove tobacco and lead aren't safe. Like the plastics companies, industries marketing tobacco and lead-based products continued to assure the public the substances were harmless, despite scientific evidence.

"The chemical industry, like the tobacco industry, is run by people only interested in how much they make this quarter," vom Saal said.

The Food and Drug Administration can't do much about regulating BPA because the chemical was being used before FDA's regulatory authority kicked in. But some companies are starting to heed the warnings and find alternatives to BPA.

The public, too, is starting to pay more attention.

The changes can be traced back to vom Saal's accidental discovery.

"This is an example of an outcome that led in a direction that had nothing to do with what we initially started out thinking about," he said. "The consequences of this little study led to a paradigm shift in the entire field of toxicology. Toxicology is not being done the same way because of this little study. And that is science."

STUDYING SOCIETY

Studies that lead to technological and medical advances are relatively easy to explain when compared with their social science counterparts.

Sen. Scott Rupp, R-St. Charles, is all for the former, he said in a committee meeting this past legislative session. "But someone who is out studying the migration habits of the Hopi Indian tribes is not going to bring any jobs to Missouri," he said.

While the Hopi Indians did little migrating — they spent centuries in northeast Arizona — the comment was clearly meant to challenge the impact of social science research.

Craig Palmer, an associate professor in MU's Department of Anthropology, has researched the tradition of mummering. Several years ago, he released a study showing the activity was a way for villagers in the northern peninsula of Newfoundland to build trust and cooperation with one another.

Here's how it worked: At Christmas, a small group of people would disguise themselves in costumes and masks and then go to people's homes, where they would engage in what they called "rough" behavior, or acting as though they were making threats of violence.

The hosts were expected to remain calm and try to guess the identity of the mummer. If they guessed right, the mummer would remove the mask and have a friendly drink with the host. If the identity wasn't guessed, the mummer left. Palmer found in his study that the game was intended to build trust, with the host demonstrating he trusted the mummer not to harm him. Guessing the identity of the mummer also provided a way for the host to prove he really knew the person behind the mask.

"It's like our practice of giving gifts. You get something to show you've been paying attention to the other person," Palmer said.

The tradition, which dates back some 500 years, essentially died in the 1960s when roads were built to connect the formerly isolated communities and residents started worrying that strangers would disguise as mummers.

So why study a tradition that has gone by the wayside?

For one, traditions in general are dying after playing key roles in human evolution, Palmer said. "Traditions are no longer being passed down. It's important to learn about them — what they were like and why they existed — before they're completely gone."

And lessons learned from human nature have applications to the way people interact today, he said. If roads ended the tradition of mummering, Palmer wonders how online networks will shape societal relationships.

"Humans are designed and evolved to deal in certain social environments, and now we're in a different one," he said.

If traditions such as mummering were able to promote social cooperation, "they have important consequences and applications for today," Palmer said. "One of the challenges of the modern world is trying to get economic efficiency, companies working together. Anything that promotes cooperation and trust is inherently important."

COMMUNICATING SCIENCE

Prather, the researcher using fluorescent proteins, withholds judgment about studies when he reads about them in news reports. He knows it's tough to translate scientific jargon into language the public can understand.

Scientists sometimes have to fight the fact that to communicate their work, precise terms have to be translated into broader, more understandable language.

So, for instance, "the production of LIF-dependent, so called naive type, pluripotent stem cells from the inner cell mass of porcine blastocysts" — using language from one of Prather's abstracts — would simply become "stem cell research" in news reports.

For journalists eager to make stories interesting, there's also a temptation to make science a little more exciting.

A recent MU study showed male deer mice lost their sense of direction and attractiveness to females when exposed to BPA in the womb. The researcher, Cheryl Rosenfeld, an associate professor in biomedical sciences, said in the news release announcing her work that the findings, presumably, could have broader implications to other species, including humans.

Subsequent news headlines included: "Can BPA make guys sexual misfits?" and "Is chemical in plastic robbing men of sex appeal?"

The Bond Life Sciences Center is trying to help young scientists and reporters get on the same page, or at least closer. The center got a $1.5 million grant last year from the Howard Hughes Medical Institute to teach students from both fields how to talk to one another.

This summer, 14 life science undergraduates have spent eight weeks learning how to explain research to a nonscientific audience, said Lauren Kitchen, coordinator of the program. They've been blogging about research and have translated scientific abstracts into everyday language.

"You walk a fine line between dumbing down enough for people to understand but also keeping the integrity of the science," Kitchen said.

BACK TO BASICS

Although the public needs a better understanding of research, researchers also must remember to stick to basics, Duncan said.

Climate change research, he said, has been an example of science inappropriately mingling with political agendas.

"It's good science hanging out with bad company," he said.

Organizers of the sixth International Conference on Climate Change last month in Washington, D.C., apparently agreed. They titled the conference "Restoring the Scientific Method" to address problems of scientists abandoning basic science.

And basic research cannot be abandoned, vom Saal said.

"Without a vigorous basic science establishment, then everything is eventually going to come to a halt," he said.

Lose the basic scientific community, and the United States loses its place as a leader in the world.

"We have to invest in basic science," vom Saal said, "or we are doomed."

COLUMBIA DAILY TRIBUNE

Owens sticks close to home

By Janese Silvey

Columbia Daily Tribune Friday, July 22, 2011

Other than a quick trip to the nation's capital, interim University of Missouri System President Steve Owens has kept travel expenses to a minimum since taking the helm in January.

On March 1, Owens traveled to Washington, D.C., to meet with Missouri's congressional delegation. He spent the previous night in St. Louis for $117 before catching an early flight to get to Capitol Hill for a morning meeting, spokeswoman Jennifer Hollingshead said. In Washington, D.C., Owens spent the night at a hotel for $548, which included nearly $70 in taxes, and then caught a flight back to St. Louis in time for a 9:30 a.m. university meeting the next day.

"The reason he chose that hotel is because it was in the location he needed to be," Hollingshead said. "He would have much preferred to have flown to D.C. on Feb. 28, but he stayed in St. Louis to avoid the cost of a second night in D.C."

In late March, Owens took a trip to an academic conference in California. He combined the trip with a visit to his parents and paid for all expenses out of pocket.

Since taking the helm, Owens also has been reimbursed $161 for a dinner with administrators and overnight stay in February in Rolla and $98 for a dinner with Chancellor Brady Deaton and his wife, Anne, and MU Athletic Director Mike Alden and his wife, Rockie, in March.

Board of Curators meetings are preplanned by the system office, so those costs don't show up in reimbursement forms. Curators can ask for coverage of mileage costs, but they rarely do. Wayne Goode received $296 for mileage after a trip that took him to Jefferson City, then to Rolla for a university meeting and back to St. Louis. David Bradley was reimbursed $872 for an April trip to Los Angeles for an Association of Governing Boards meeting.

Associated Press

University of Missouri charges for documents, emails

Associated Press, Updated Saturday, Jul 23 at 4:46 PM

COLUMBIA, Mo. (AP) -- **The University of Missouri system twice sought to charge a couple thousand dollars for a newspaper's request for emails and the travel records of administrators.**

The Columbia Daily Tribune reported that it sought the travel reports since 2009 for administrators of the four-campus University of Missouri system and for administrators at the University of Missouri-Columbia. Earlier this year, the newspaper requested a month's worth of emails from the university system's interim president, Steve Owens.

University officials reported that providing the travel records would cost $2,281 and that producing the emails would cost $2,000.

University officials said part of the cost for the emails comes because an attorney would be needed to sift through the emails to determine which records were open under the state's Sunshine Law. The school said that would cost $100 per hour.

Officials said the travel reports request would have produced 400 records, including some that are archived on microfilm. Kathy Miller, the custodian of records, said it would cost $5.54 per page to retrieve those records. Miller said it was not feasible to allow someone to simply view the records because a staff member would need to sit with a reporter to make sure employee identification numbers were out of view. Those numbers are personal identification numbers but are not Social Security numbers. They are allowed to be closed under Missouri's Sunshine Law.

Jean Maneke, an open records expert and an attorney for the Missouri Press Association, said university officials should only have charged for locating the microfilm rolls and should have allowed them to be viewed. Maneke said the Sunshine Law also requires government bodies that opt to redact information in public records do so without charging those who are requesting the information.

Attorneys for the University of Missouri system disagree.

Ultimately, the newspaper pared down the request for travel records made in early June. It sought trip expense records for Owens, the curators who serve on the system's governing board and Brady Deaton, who is the chancellor of the University of Missouri-Columbia. The records were provided earlier this month for $97.70.

COLUMBIA DAILY TRIBUNE

UM cites high cost for access to microfilms

Travel records use old system.

By Janese Silvey

Columbia Daily Tribune Friday, July 22, 2011

Obtaining public records from the University of Missouri System can be costly these days, and in some cases just taking a glance at those records isn't allowed.

The Tribune last month requested travel reports for all system-level administrators, curators and top administrators at MU dating back to Jan. 1, 2009.

The cost to obtain those public records would have been $2,281, said Kathy Miller, custodian of records. That's because the request would have resulted in 400 records, some of which are archived on microfilm, she said. She estimated it would cost $5.54 per page to retrieve requested documents.

The university was using microfilm to archive travel reports before 2004, so it is essentially exempt from a section of the Sunshine Law, the state's Open Meetings and Records Law, that requires public bodies to store data in user-friendly electronic formats. The UM System is in the process of switching to a different imaging system to archive these reports.

Miller denied a request to simply view the microfilm, saying it wasn't feasible. Someone would have had to sit with the reporter to make sure employee identification numbers were out of view, she said.

Employee ID numbers are not Social Security numbers, but personal identification numbers are allowed to be closed under the Sunshine Law.

Jean Maneke, a Sunshine Law attorney for the Missouri Press Association, said the university should have only attempted to charge for locating the correct rolls of microfilm and should have allowed for viewing those records.

"I understand there might be search time to locate those records and get them up on the screen, but once they had them, they could have shown you which buttons to push," to scroll through the film, she said. "Locating the microfiche shouldn't take but a couple of minutes."

It's up to the university to figure out how to redact any closed portion of the record, she said. Maneke said she thinks the Sunshine Law clearly requires public bodies to redact any exempt information without charging, although UM System attorneys disagree.

Earlier this year, the system blocked an open-records request by trying to charge the Tribune $2,000 for a month's worth of emails to and from interim President Steve Owens. The system argued an in-house attorney would need to sort through each email to deem which were open records at a cost of $100 an hour.

The Tribune made the original request for trip expenses June 6 and did not receive a cost estimate for the records until June 27. The newspaper ultimately revised the request to include only trip reports for Owens, curators and MU Chancellor Brady Deaton and paid $97.70 for those records on June 29.

The reports were provided a week later.

COLUMBIA DAILY TRIBUNE

Changes coming to MU investment plans

By Janese Silvey

Saturday, July 23, 2011

University of Missouri System administrators are considering a change that would affect the way employees now voluntarily invest their wages.

Yesterday, Betsy Rodriguez, vice president of human resources, told the Board of Curators that limiting the number of vendors offering investment plans would help the system get more companies interested in managing a defined contributions plan in the future.

Right now, faculty and staff can opt to save for retirement on top of their defined benefits from the university by investing in 403(b), 457 and other voluntary savings plans. Currently, those plans are offered by 10 different companies. The UM System is looking to whittle that down to between one and three vendors.

Rodriguez stressed that the discussions are preliminary.

The talk comes on the heels of the Board of Curators' vote last month to change retirement packages for employees who are hired after Sept. 30, 2012. While the specifics of that plan are being worked out, new hires will be expected to contribute a portion of their salaries in addition to being guaranteed post-employment income.

That change has been in the works for two years and administrators have routinely said it wouldn't affect current employees.

But changing investment managers would affect current workers. Although they would not be asked to move money they've already invested with a vendor, "what we might do is no longer allow new money to go into that fund," Rodriguez said.

The system is eyeing this change because administrators are getting ready to ask for proposals from companies to manage the defined contributions side of the new retirement plan. Knowing that as much as $830 million in current employee savings could be part of the deal might attract more vendors to bid with competitive fees.

"If vendors know that they're only going to get a piece of the pie, typically expenses are higher," said Kelley Stuck, associate vice president for compensation. "We might be able to get lower expense fees" for those who now save "and attract better vendors."

Curator Wayne Goode said he has mixed feelings about such change. Although 10 different vendors might seem like a lot, he said, "we got there because employees or employee groups wanted to use particular vendors for whatever reasons that may or may not still exist. I guess I have a concern that employees have adequate vendors to select from so they can invest in the type of vehicles they would like to invest in."

After the meeting, Rodriguez said any change would only affect the 24 percent of employees who are currently voluntarily saving money. Plus, she said, the majority of those are now invested in just three of the 10 vendors.

The Board of Curators is expected to hear more about any proposed vendor change at an Aug. 19 meeting.

"We are in the exploratory stage right now to determine if this is appropriate and would financially benefit both those in the new plan and employees who currently invest," Stuck said.

COLUMBIA MISSOURIAN

UM System Finance Committee requests campus improvements, updated faculty salaries

By Megan Cassidy
July 23, 2011 | 6:22 p.m. CDT

COLUMBIA — **The UM System Board of Curators' Finance Committee conceded Friday that lingering economic obstacles would make it difficult for the state to fill much of the financial void in the near future.**

There is a backlog of more than a $1 billion in facility maintenance and repairs at all four campuses, and the system offers one of the lowest faculty salaries compared to universities similar to those in the UM System.

"We present our requests to keep our needs in front of the General Assembly," said Nikki Krawitz, vice president of finance and administration at the UM System. "We do understand how difficult this is for the state."

Curators are requesting more than $516 million in capital appropriations to go toward facility repairs and construction.

To put the issue into perspective, the committee broke down the appropriations request into three tiers of urgency.

Those in the first tier represent the system's top priorities, including more than $67 million for improvements for the MU College of Engineering's Lafferre Hall and another $67 million for the optometry and nursing colleges at the St. Louis campus.

Altogether, the committee is asking the state to fund more than $261 million in first-tier needs.

"I don't think any of us believe we'll get all of these needs met," said Finance Committee Chairman Don Downing. "But (the state) needs to know what the highest priorities are."

As part of its state appropriations request for operations, the university system is requesting $40.3 million from the state to help bring UM faculty salaries in line with peer competitors.

Krawitz said faculty salaries at the system's four campuses have continued to languish at the bottom in comparison to similar university systems. Many institutions in other states have continued to increase faculty salaries while the UM System has not had a salary increase in two years, she said.

The committee agreed this issue should remain at the top of the agenda to maintain the state's standards in quality education.

"The biggest ticket item there is getting faculty compensation up to competition," Downing said.

Associated Press

ST. LOUIS POST-DISPATCH MISSOURIAN

Farmers protest scientist's hiring

PETA is funding research work at university.

11:00 PM, Jul. 24, 2011 | Written by The Associated Press

COLUMBIA -- **Some Missouri farm groups are crying foul over the recent hiring of a University of Missouri scientist whose research is paid for by animal rights activists.**

The St. Louis Post-Dispatch reports that Nicholas Genovese joined the university's flagship campus in Columbia as a visiting scholar earlier this month. His research involves artificial meat created in laboratories from animal tissues.

Genovese previously worked at the Medical University of South Carolina but left when his mentor took a job in South America. At Missouri, he is paid through a three-year grant from People for the Ethical Treatment of Animals.

"This is the wave of the future," said PETA president Ingrid Newkirk. "People who are environmentally aware are keen on this, animal rights advocates are keen on this, health advocates are keen on this. The only people who aren't keen are in a business that this will affect."

That includes members of the Missouri Farm Bureau, the state's most powerful agricultural lobbying group.

"Let me tell you," said Blake Hurst, the bureau's president. "My farmer friends are exercised."

R. Michael Roberts, a prominent university biologist and stem cell researcher who is supervising Genovese, emphasized that the scientist is not a university employee. Genovese declined to comment.

"He's essentially a private citizen who chose to work with me," Roberts said. "I'm getting a well-trained young scientist to work in an area that interests me."

Roberts hopes that Genovese's research will help the lab create cultured tissue for human and livestock medical research.

Roberts' recent work has focused on the transformation of animal cells into embryonic stem cells. Two years ago, his research team used pigs' connective tissue to create "induced" stem cells that act like embryonic cells and can potentially be converted into tissue cells without using actual embryos.

"I'm interested in these cells to get them to differentiate toward muscles," Roberts said. "That's the primary component of most meat."

Roberts said that Genovese sought him out several months ago after his mentor, Vladimir Mironov, moved to Brazil to work for a large meat company. He is known for his efforts to grow in vitro meat from animal stem cells.

Newkirk said the artificial meat research -- which has yet to be proven commercially viable -- "has put the wind up the skirts of these farmers who are getting all panicky and apparently haven't been following trends in eating."

The★Star.
THE KANSAS CITY STAR

Meat from petri dish to plate: Credible or inedible?

By SCOTT CANON

COLUMBIA | Nicholas Genovese is a lab-coated collection of incongruities.

He's being bankrolled by an animal-rights group to make meat.

The molecular biologist is working in a lab at a land-grant university that pulls in millions in grants for its research on livestock. Yet the money backing him pushes the desire to end the use of animals as food.

And the guy he answers to at the University of Missouri makes clear that he sees just three reasons for a cow to exist: breakfast, lunch and dinner.

Genovese's work explores a hope — certainly distant, perhaps fanciful — to grow muscle meat separate from an animal. It would start in a laboratory and move to a factory. It aims for a world that would leave both meat lover and animal lover with a satisfied burp.

"One of the interesting things about being a human being is that we advance things," Genovese said. "Think of what we've done in the last several years with computers and cellphones. ... Why can't we make the same kind of advances with food?"

Whether you refuse to eat anything with a face or can't enjoy a patio party without indulging your carnivorous side, Genovese thinks the petri dishes he's toying with now may yield part of an answer to make you guilt-free and satiated. The technology is touted by those concerned about animal cruelty, energy shortages and climate change.

But the path to meat without feet won't be easy. It would rework Midwestern agriculture, which is centered on raising grain that feeds livestock. And it won't come without resistance that starts, for many, in the gut.

"We really need to figure out what we're putting in our bodies rather than making something bigger and cheaper," said Michael Foust, the owner and chef at The Farmhouse restaurant in Kansas City's River Market. "If I served it, I'd be out of business in a week."

Nobody will be serving it anytime soon. And the work Genovese is doing at Columbia isn't directly about making meat. Rather it involves research about self-replicating cells that might solve just one of the many technological and industrial obstacles that stand between you and animal-free meat.

But if he and the handful of other scientists can overcome the herd of practical problems, so-called cultured meat could end what some people consider mass animal cruelty — eliminating the need for operations that jam cattle in feed lots, stuff hogs in massive containment barns or crowd chickens in places where they never see the sun.

"There's the potential to continue to produce meat while you reduce an enormous amount of factory farming," said Paul Shapiro, who advocates farm animal protection for the Humane Society of the United States.

The goal would be facilities that grow muscle tissue, multiplying endlessly a single cow, pig or chicken cell to create ton after ton of meat. And just the meat. No hooves, snouts, beaks and other things that make an animal an animal — but don't land on the dinner table.

That increased efficiency could allow more people to eat higher on the food chain even as the planet struggles to meet its growing appetite for meat.

The impact

Such futuristic in vitro meat technology might also more gently coax protein from an ever more crowded planet.

Consider that animals raised for our dinner tables now use 30 percent of the world's ice-free land. They consume 8 percent of the Earth's fresh water. They produce — in ways that go far beyond flatulence — 18 percent of the planet's greenhouse gases. That's more than all forms of transportation.

One Oxford University study concluded the factory flesh route might require slightly more energy per bite than poultry but would offer savings on all other key measures. Compared with conventional beef production, cultured meat would take barely half the energy, belch out less than 4 percent as much in greenhouse gases, use 4 percent as much water and tie up about 1 percent as much land.

Building the new burger should be possible. Scientists already grow individual organs in vitro for transplants. With meat, that work shifts to making muscle tissue.

But in labs across the world — the small field of research is concentrated in the Netherlands — only matchstick-size bits of cultured muscle tissue have been grown.

There are but two reports of consumption. One by a performance artist in Australia who gulped a small bit of frog flesh. The second was a Russian TV reporter who ate a sample before a researcher could object. He pronounced it tasteless.

Much more is left to be done. Scientists will have to identify the right cells to serve as seed stock — stuff that will grow easily and prove tasty. Everything grown so far has been sustained by animal products, typically fetal bovine serum. A replacement needs to be found first, to get the efficiencies that make the new meat worth the bother, and to gain consistency and safety from pathogens.

Meat makers will also need to find a way to essentially exercise the tissue. They might use electrical stimulation or add neurotransmitters. And a sort of meat scaffolding will have to be devised so the tissue has texture and form. Hot dogs, rather than being pieced together from the less romantic parts of a farm animal, could simply be grown as hot dogs.

Government also will need to sort out how to regulate a new class of food.

"There would have to be a pretty long list of things to do to figure out if this is safe and wholesome," said Patty Lovera, a spokeswoman for the consumer advocacy group Food and Water Watch.

Genovese and others think a commercial product might be only a decade away. The first meats will probably be akin to ground beef or chicken nuggets. It'll be harder to grow something that resembles a steak or a pork chop, but scientists imagine millions of identical cuts of meat with the marbling of fat made just so.

He was awarded a fellowship by People for the Ethical Treatment of Animals for three years of research. He started that work at the University of South Carolina until that laboratory shut down for reasons unrelated to the research. He came to Missouri this month to lab facilities run by R. Michael Roberts, a professor of animal science and biochemistry.

Roberts has made advances with induced pluripotent stem cells — technology that takes an adult cell and transforms it into something with the regenerative qualities of embryonic stem cells. He's clear that he doesn't much care for PETA or its goals and that he thinks commercialization of artificial meat is "far-fetched." But the PETA money isn't coming to the university, just to Genovese, and Roberts sees him as a promising researcher.

"He and I," Roberts said, "have similar scientific goals."

Future farms

If this meat of the future were a success, it would certainly upend the lives of cattle ranchers and pig and poultry farmers.

"You would no longer need a feed yard. You wouldn't need a processing plant," said Glynn Tonsor, a livestock economist at Kansas State University. "If you remove the need for a traditional live animal, you lose the need for the operators in those segments. ... That doesn't mean it's necessarily bad for society."

The need for agriculture would hardly disappear. Grains, perhaps even the same corn and soybeans grown for livestock today, would be a likely source of the raw materials that would be fed into a meat plant.

But there would be less waste — a pound of grain would produce nearly a pound of meat. In today's agriculture, various estimates suggest three to 16 pounds of feed are needed to grow a pound of meat.

Do we really need to shift? Marion Nestle, a professor of nutrition at New York University and the author of "What to Eat," declared the idea of manufactured meat "revolting."

"What's wrong with food? Food seems just fine to me," she said. "Maybe it's what the world's coming to, but I don't want it."

Tom Field, a cattle production specialist for the National Cattlemen's Beef Association, said that "of all the things I'm worried about, it's not even on my list. The majority of consumers ... like a product that comes from the farm."

Still, consider the reaction of Jonathan Justus. He created the Justus Drug Store restaurant in Smithville in the spirit of the locavore movement, which puts a premium on knowing where and how food is raised and getting supplies nearby.

The idea of steak without steers twists him in knots.

He sees a real upside — more food for a malnourished world and a way to produce meat on a large scale without subjecting animals to inhumane conditions. And some argue it could be safer, because the problems of fecal contamination would be eliminated.

Then he worries about potential downsides. Isn't this, he said, bound to be left to the biggest of corporations, which would force out family farmers? How long, he wonders, will it take to know what such meat would do to our bodies?

"There are issues on both sides of this," he said. "It would take an ethicist, or teams of ethicists, to figure it all out."

COLUMBIA DAILY TRIBUNE

Teachers honing science skills

QUEST allows them to work with kids.

By Catherine Martin

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While most MU students are away, about 130 elementary school students took over Townsend Hall yesterday afternoon as they showed off their recent science experiments to their parents as they wrapped up a week-long camp.

Older students, which included rising fifth and sixth graders, explained the mechanics behind their inventions, including an old-fashioned wooden lawn mower made from recycled materials, while rising kindergarten and first graders tried simpler experiments, such as testing the speed of toy cars on different surfaces.

All projects used the concept of simple machines, which the K-6 students had learned throughout the week. But the kids weren't the only ones learning. Teachers from across the state attended the camp, called QUEST, or Quality Elementary Science Teaching.

The program provides professional development for elementary teachers that focuses on and strengthens their knowledge of elementary science instruction and teaches them new methods, such as instruction that lets students ask questions instead of simply having the teacher lecture. The four-year-old project is funded through a grant program and received notice this year it will be funded until 2013.

"The reason it's been so successful is because each teacher comes here because they are on their own quest to improve themselves," said Deborah Hanuscin, project director and associate professor of science education and physics in the University of Missouri College of Education.

Teachers spend the first portion of the two-week program learning techniques for science teaching and then try out the new tools on elementary children the next week.

"It's great because I can take this information back to the classroom and use it to the fullest extent on my students," said Sonya Volk, a teacher from the Hazelwood school district.

The program is especially relevant for Benton Elementary School teachers this year as they prepare to open as a science, technology, engineering and math school in the fall.

"It's perfect for us. ... Now, we can take back this information and share it with the faculty," said Bethany Morris, one of three Benton teachers at QUEST.

For the kids, the camp served as an enriching activity to fill their summer mornings.

"I think the quality is just incredible. Some of the best and brightest teachers come here," said Beth Cunningham, whose 11-year-old son, Quinn, has been attending QUEST for four years.

This week was fun and educational, Quinn said, as he explained the difference between fixed and movable pulleys.

"They really help you, and they really try to help you understand what you're learning and they encourage you to ask questions when you're doing a project," he said of the teachers.