

HOW RNA INTERFERENCE WORKS

RNA interference is a natural defense mechanism against viruses that insert their own genetic material into a body's cells.

Genetically modified plants that contain the necessary genetic material introduce RNA interference genes to pest populations.

By introducing genetic material to a pest that matches its own genes, the pest's natural defense against foreign RNA turns against itself, resulting in the death of the pest.

Source: Science Magazine



Seat belt use is a personal freedom



Parker Moyer

“Click it or Ticket” — most students probably have heard this phrase through one medium or another. Wearing a seatbelt has been promoted heavily in Missouri during recent years, but the decision to wear a seatbelt is a personal right that only should carry the consequence of bodily harm or death, not a monetary fine.

In Missouri, a police officer cannot pull over a driver simply for not wearing a seatbelt. The officer must pull over the operator for a traffic infraction and if during the traffic stop the officer sees the driver not wearing a seatbelt, the officer can fine the driver, according to DrivingUniversity.com. In Missouri, it is the driver's responsibility to ensure anyone riding shotgun wears their seat belt as well, according to the DMV. The potential consequence is a fine for the driver and the passenger.

There have been many initiatives in Missouri to adopt a primary seat belt law, which would allow police officers to pull over a driver directly for not wearing a seat belt — the last of which was during 2009, according to the Insurance Journal. It seems municipalities in Missouri increasingly are enacting their own primary seatbelt laws. During 2011, 22 Missouri towns had primary seatbelt laws, according to a 2011 CBS St. Louis article.

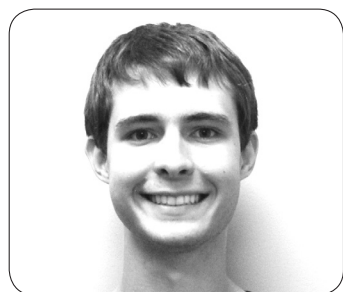
A primary seatbelt law would be an infringement on personal freedoms. It should be the driver's choice whether he or she wants to wear their seatbelt. This is because an individual choosing not to wear a seatbelt would not cause harm to anyone but that individual. The damage done to another person's car is not going to be worse if the offending driver was not wearing his or her seatbelt. Yes, the offender will be putting his life at greater risk than if he chose to wear his seatbelt, but in the end that is his choice.

If a primary seatbelt law were passed, it could prove troublesome for Adair County residents. A 2010 study of “Accident Analysis & Prevention,” cited by the CDC, shows as the general size of the metropolitan area decreases, seatbelt use decreases as well. It doesn't take much to see that Adair County, Kirksville and the surrounding areas are not densely populated. Many residents live on large plots of land and use gravel back roads for the majority of their transportation.

It is up to the Sheriff's department to uphold traffic regulations on these roads, but if a primary seat belt law were passed, Adair County residents might see larger fines and penalties for those who choose not to wear their seatbelts, particularly on back roads with little traffic.

I am not advocating that seatbelts should not be worn. In fact, I wear my seatbelt even for a two-minute trip to the gas station — thanks, mom. However, what I am advocating is that we should keep the seatbelt laws for children and allow adults to choose for themselves, without the threat of anything but greater personal harm.

New Monsanto pesticide needs further research



Conor Gearin

The biotechnology company Monsanto is developing a new kind of insecticide with a mechanism it claims will be more precise, targeting only one species of corn-eating beetle larva. However, this claim needs more research.

Here in Missouri, it would be easy to celebrate this insecticide and other new technologies from St. Louis-based Monsanto that could improve how we grow corn, a common crop in the state. But we need to see past local benefits to global risks.

Throughout recent decades, biotechnology companies have created genetically modified — GM — crops, which have genes spliced into their DNA, making them resistant to pests that can destroy harvests. Commonly used tactics are to take a toxin-producing gene from a bacteria species and insert it into a crop variety. However, these often are general toxins that attack the nervous system of harmful and beneficial insects.

A new GM technology could be more specific, targeting only a single species of pest. Using a recently discovered tactic known as RNA interference to target a DNA sequence specific to the western corn rootworm, Monsanto has developed a new line of rootworm-resistant corn seeds, according to a Jan. 28 New York Times article. This development is important because the rootworm has evolved resistance to the neurotoxin currently in use. The company is investigating RNA interference that targets a mite linked to honeybee declines, according to the same article.

Monsanto is one of the most important Missouri-based companies, with the third-largest revenue and \$2,045,000 of profits during 2013, according to the Missouri Department of Economic Development. Furthermore, Missouri farmers devoted 3,339,000 acres to corn for grain during 2011, 11 percent of the total farm acreage, according to the National Agricultural Statistics Service. This produce was worth \$2,239,872,000.

Developments in corn pest resistance could significantly impact Missouri's economy.

However, we need to listen to critical voices pointing out the lack of research into the ecological effects of RNA interference. In a study by researchers from the University of Kentucky and the University of Nebraska, corn with the anti-rootworm RNA interference gene was shown to kill ladybugs, an ecologically necessary insect that eats aphids, a pest species. This result indicates RNA interference might harm more than one species.

In general, any time a radically new GM technology is introduced, we need to assess its ecological risks. In a 2010 study published in the journal “Science,” a research team led by University of Oxford ecologist Charles Godfray wrote GM crops need to be analyzed on a case-by-case basis, as they can be environmentally harmful in some situations and beneficial for ending food shortages in others, particularly in developing nations.

On the other hand, Monsanto has a monopoly in India, and thousands of Indian farmers have gone into debt because of their reliance on expensive GM seeds, according to a PBS Frontline investigation.

As GM technologies become more powerful, using multiple genes from distantly related species, we need to study what could happen if such super-plants accidentally are introduced to the wild. Crop plants engineered to survive disease could out-compete native species. Researchers now are developing ways to study such risks, but we need to let the pace of risk research catch up with the pace of developing new GM products.

Truman State students might want to work for biotechnology companies someday, and Adair County farmers depend on GM technologies to keep their crops pest-free. We need to expand our view to fully understand the use of GM crops. The poorly understood environmental effects and the problematic economic impacts of GM crops indicate we need to exercise caution. We must carry out sufficient ecological research and decide if GM crops are a reasonable economic solution for each community. Kirksville students and farmers can educate themselves about the ecological effects of specific GM crops and evaluate if the profits are worth the risks.

Conor Gearin is a senior biology and English major from St. Louis, Mo.

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What academic or career-oriented activities are you doing during break?

“Networking. I'm going to be talking to quite a lot of people. Homework, I'm going to be neglecting.”

Sam Lingle
Junior



“I'm going on two graduate school visits to University of Indiana, Bloomington, and University of Illinois, Urbana-Champaign.”

David Hutchinson
Senior



“I'm in the National Guard, so I'll be working at least one of the days over spring break.”

Libby Horton
Freshman



“I've got a huge history paper I have to write ... [about] women and the republic.”

Andrew Milhous
Freshman



AROUND THE QUAD

Paying it forward is as easy as a drive-through



Jessica Hack

“There is no wrong way to perform an act of kindness.”

Author Catherine Ryan Hyde's book “Pay It Forward” ignited a spark during 1991 that continues to fire up people around the world. A worldwide movement started during 2007 by Australian Blake Beattie promotes one day a year during which everyone “pays it forward,” according to PayItForwardDay.com. Sixty-five countries publically participated

in the Pay It Forward Day during 2013. This year, the international date set by this foundation is April 24.

According to Hyde's Pay It Forward Foundation site, “Pay it Forward Day is a brilliant initiative. It embodies the power of giving which is the cornerstone of my book. It is amazing the difference a simple idea can have in changing the world — one good deed at a time.”

Truman State students should participate in Pay it Forward Day. — they might even benefit personally by doing so. A 2006 study by Stanford University psychologist Sonja Lyubomirsky determined students who did five weekly random acts of kindness reported higher levels of happiness than a control group.

“There are a lot of positive social consequences to being kind — other people appreciate you, they're grateful and they

might reciprocate,” Lyubomirsky said in a July 2006 Psychology-Today article.

We need to embrace the power of giving, because when we do, we are taking a step to change the world.

Sophomore Lydia Pearson said she regularly practices paying it forward. She is active in the Truman community, donating her time to help with the Campus Christian Fellowship's Parents Night Out. Pearson said she volunteers in the area with groups such as Newborns in Need, Kids Against Hunger and Relay for Life.

“I believe paying it forward, whether that means paying for someone's meal behind you in the drive-thru or volunteering in a homeless shelter, is very important,” Pearson said. “When we are discouraged or misfortune falls on us, someone taking the time to help us or show they care makes all the difference. If we don't help

each other, humanity is on its own, and we need each other.”

A Christian radio station in St. Louis, 99.1 Joy FM, promotes the Pay It Forward community on a daily basis, referring to this benevolent behavior as “spreading the joy.” I have taken part in this “spread of joy” on multiple occasions, but one instance especially stands out to me.

I was on my way to a rehearsal a half hour away from my house, so I decided to drive through Steak 'n Shake for a quick dinner. I heard the idea of “spreading the joy” on the radio, so I chose to act upon it. I told the worker at the drive-thru window as I was paying that I wanted to pay for the elderly lady in the car behind me.

I pulled forward and parked, checking to make sure the contents of my to-go bag were correct. While I was rummaging through the bag, I heard a

honk, causing me to look up. The older lady whose meal I had paid for was trying to get my attention, rolling down her window. I rolled down my window to hear her tell me that because I paid for her meal, she continued the trend I started and paid for the car behind her.

I think this is the true essence of “paying it forward.” We should do simple things for others — hold a door open, pay for someone else's meal or compliment them. When we do simple tasks for others, it leads to others to perform kind acts, too. When we pay it forward, we motivate others to do so as well. Paying it forward not only brightens others' lives, but has a positive effect on ourselves. Truman, it is time to start paying it forward.

Jessica Hack is a sophomore computer science and economics major from St. Louis, Mo.