

CornTalk

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Nebraska's
Family Corn
Farmers

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Karr Family
Blue Hill, Nebraska

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CornBoard
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What is a GMO?

Thousands of studies and decades of experience show that **GMO's are A-OK.**

The production and politics of food are on the minds of policy makers, special interest groups and consumers around the world. One of the most talked about subjects is the advanced science used to produce new plants and organisms through the manipulation of genetic material. Here are some answers to many of the questions you may have about the human health effects of genetically modified organisms or GMOs.



The 8 GMO products commercially available in the U.S.

Corn • Soybeans • Sugar beets • Cotton • Alfalfa • Papaya • Squash • Canola

Genetically Modified technology can result in seedless, better-tasting fruits and vegetables that stay fresh longer and are naturally resistant to insects. More consistent products that stay fresh longer can reduce food waste—and that alone helps increase the supply of food around the world.



What is a GMO?

When creating a genetically modified organism (GMO), researchers copy specific genetic information from one plant or organism and introduce it into another to improve or enhance a specific characteristic or trait, such as resistance to insects. Developing special traits in plants allows for more food to be grown in more places using fewer chemicals and fewer natural resources.

Is genetic modification a new thing?

Manipulating genes in plants is an approach that has been used for centuries to make bread, cheese, wine and beer. Today, nearly every food on grocery store shelves has been modified by human hands at the genetic level. The foods we eat are modified using various breeding methods. Breeding alters a plant's genes so that it expresses new traits. That's how we get those desirable family favorites such as seedless watermelons, red grapefruit, peanuts, honey crisp apples and other foods.

GMOs simply accelerate this process. "Everything about science is learning new ways to speed up evolution so we can come up with crops faster than Mother Nature ordinarily would," said Dr. Sally Mackenzie, Ralph and Alice Raikes Professor of Plant Science at the University of Nebraska–Lincoln.

Are GMOs safe for humans?

To date, more than 2,000 peer-reviewed studies have confirmed that GMOs are safe for human consumption. While there has been a handful of studies that state otherwise, these studies have been roundly debunked by scientists around the world. With over 25 years of independent research, there is no documented evidence of harm to human health or deaths from consumption of GM foods. (*National Research Council, European Commission*)

NOT JUST MORE FOOD. BETTER FOOD.



A new generation of GM crops is focused on improved nutrition and human health:

- Golden Rice and vitamin A-enhanced cassava will deliver high levels of vitamin A, which is key for a healthy immune system, good vision and cell growth.
- Pineapple with lycopene, which may help prevent lung and prostate cancer.
- Peanuts with very low allergen levels that have the potential to eliminate life threatening peanut allergies.
- High carotene mustard seed oil and enriched sweet potatoes are also among the innovations awaiting approval.

Is it safe to eat meat and milk from animals that were fed GMO crops?

! Absolutely. A 2012 review of 24 long-term or multigenerational studies found that genetically modified corn, soy, potato and rice had no ill effects on the cows, pigs, chicken, sheep, quail, rats and mice that ate them. Growth, development, blood, tissue structure, urine chemistry and, organ and body weights were normal.

How does genetic modification affect nutrition?

! There is no difference. Exhaustive testing and FDA review have confirmed that GMOs are nutritionally the same as their non-GM counterparts. They have the same levels of key nutrients such as amino acids, proteins, fiber, minerals and vitamins.

Do GMOs cause allergies?

! No. GMOs do not create new allergens that are not already present due to other unrelated factors. If a person is allergic to a non-GMO plant, they will be allergic to the GMO variety since the two are nutritionally the same.

Do GMOs cause gluten intolerance?

! There is absolutely no relationship because there is no GMO wheat on the market today. If such a product were to come on the market, it could not cause new allergies because standard GM testing and FDA review ensure that GMOs are not introducing new potential allergens.

Visit: gmoanswers.com



Scientists are working on an **Omega 3** oilseed that would replace wild fish in rations for land-based aquaculture operations. This innovation would help reduce overfishing by allowing field-grown crops to be substituted for ocean fish in those rations.

A corn farmer's perspective on GMOs.



Mike Karr raises corn, soybeans and cattle on his farm near Blue Hill, Nebr. He is a strong proponent of GM technology in the corn and soybean seeds he plants each year. "Our main goal is to increase yield and do so responsibly," Karr said. "It's

a choice between using pesticides and insecticides—or using biotechnology and GMOs to meet demand."

Karr said that new biotech corn hybrids have been especially effective in battling corn borer and corn rootworm. Corn rootworm usually strikes in August and has traditionally been treated by aerial application of insecticides. "Having the gene in the corn itself to battle rootworm means we're not spraying chemicals in the air—and we're not missing spots in the field," he said. "GM is a much more effective strategy and reduces chemical use."

Effective rootworm prevention helps at harvest as well. "If you have rootworm, harvest takes twice as long because the stalks are weak and tend to bend over," he added. "With GM corn, we get a good stand which saves time and actually enables us to harvest more corn from the field."

The Karr family (featured on the cover) feeds the cattle they raise on their farm the GM corn that they grow on their farm and are confident when they eat their home-raised corn-fed beef. "We have four boys who eat plenty," he said. "When we feed our fast-growing boys our beef for dinner, we have no question about the safety and quality of our corn-fed beef. We have always been confident that the food we raise on our farm is safe and wholesome."

"If we want to eat with climate change, we will need new technologies or we simply won't survive—and that's just a reality."

Dr. Sally Mackenzie, University of Nebraska–Lincoln

There's no sugarcoating it. Your body doesn't know where sugar comes from.

The skinny on sugar.

What's the difference between the sugar in fruit and the sugar in soda? There is no difference. The sugars found in fruits and vegetables are the same as those found in sugar cane, sugar beets and high-fructose corn syrup: fructose and glucose. Fruits and vegetables bring the added benefit of fiber, vitamins and other nutrients that are not available in sugars alone.

How does the body metabolize excess sugar? Consuming excess glucose or fructose will result in excess body fat, leading to elevated levels of blood sugar. These processes happen in the human body regardless of the sugar source.

Does sugar cause diabetes? Sugar itself is not a direct cause of diabetes. Diabetes is made worse when a person gains excess body fat through consumption of excess food of any type—starch, protein, fat, carbohydrates, etc.

For more information, visit:
sweetsurprise.com



A spoonful of cane sugar on your morning corn flakes. A soda sweetened with high fructose corn syrup for lunch. An apple with dinner. A bowl of beet sugar-sweetened kettle corn for a late-night snack.

Even though every one of the sugars on this menu comes from a different source, to your body they are all the same thing. What they say is true: **Sugar is sugar.**

The white crystalline table sugar that we're used to is actually made up of two different sugars: about 50% fructose and 50% glucose. High fructose corn syrup is also made up of fructose and glucose in virtually the same proportion as table sugar, which is usually made from sugar cane or sugar beets.

"When we consume these sugar sources, the human body does not really distinguish what the source is. All the

body knows is that it's getting fructose and glucose. It metabolizes these sugars in the same manner, regardless of the source," said Dr. Tim Carr, professor and head of the Department of Nutrition and Health Sciences at the University of Nebraska–Lincoln. "We really could be calling table sugar 'high fructose table sugar' because it is essentially the same composition."

High fructose corn syrup begins with corn starch, which is then processed into syrup. Other sugar sources such as sugar beets and sugar cane are also processed to extract the sugars they contain.

So, it's not about the types of sugar we eat or where it comes from. What matters is how much sugar we consume.

"We need carbohydrates to function and sugars are carbohydrates," Carr added. "The key word is 'excess'. If we consume excess sugars, regardless of where they come from, we will ultimately store those as body fat."

"Consumers have difficulty understanding that high fructose corn syrup is really the same as regular sugar."

Dr. Tim Carr, University of Nebraska–Lincoln



How corn could help



Each one of us has a virtual ecosystem in our intestinal tracts—a unique array of more than 100 trillion bacteria, microbes, viruses, and fungi that dictates how our body absorbs and metabolizes nutrients. What’s more, every person’s combination of these “microbiota” is as unique as one’s thumbprint.

Recent research indicates that microbiota in the human gut contribute to obesity related diseases such as type 2 diabetes, coronary heart disease, metabolic syndrome and even cancer. In fact, numerous studies have demonstrated striking differences in the combination of the gut microbiota between lean and obese individuals.

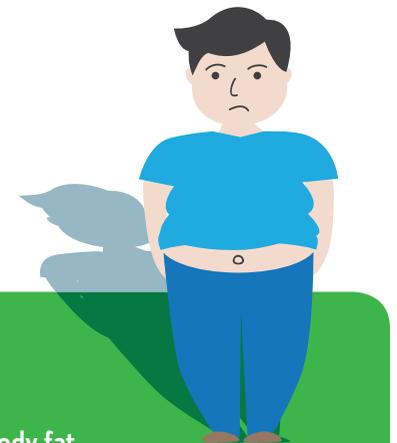
Research at the University of Nebraska–Lincoln, funded with Nebraska corn checkoff dollars, is focused on ways to use a common food ingredient made from corn to fine-tune intestinal microbiota to improve obesity and metabolic health.

Resistant starches (RS) derived from corn are commonly used as a food ingredient to increase dietary fiber content without compromising product quality. However, it appears that these starches might be even more beneficial in improving human health.

The UNL research will explore the potential of corn-derived resistant starches to help improve the balance within the complex microbial environment in the gut. Resistant starches escape digestion and are not absorbed in the small intestine of healthy individuals.

Initial studies will be conducted using mice. Ultimately, the knowledge gained will provide a valuable foundation for future human clinical trials testing RS as a dietary intervention for improving human health.

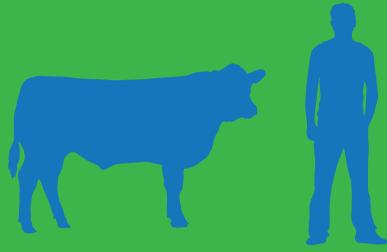
“The idea that corn-based starches could help address significant health issues is incredibly exciting,” said Debbie Borg, a farmer from Allen, Nebr. and the chair of the Nebraska Corn Board’s Market Development and Research Committee. “Investing in this research could lead to groundbreaking new uses for corn that would have a profound impact on the quality of life not just for Nebraskans, but for people around the world.”



Simple cornstarch could address complex human health concerns:

Resistant starches derived from corn could improve human health in a number of important ways:

- Prevent obesity
- Maintain healthy blood glycemic levels
- Enhance insulin sensitivity
- Promote weight loss
- Reduce body fat
- Reduce obesity-related diseases such as type 2 diabetes, coronary heart disease, metabolic syndrome, and cancer



ESTROGEN PRODUCTION in humans vs. potential estrogen intake from implanted beef

The human body produces more estrogen on a daily basis than would likely be consumed in a lifetime through implanted beef.

SOURCE	ESTROGEN AMOUNT
Pregnant Woman	19,600.00 ng/day
Non-pregnant Woman	513,000 ng/day
Adult man	136,000 ng/day
Pre-puberal children	41,000 ng/day
500 g of beef from implanted cattle	7 ng

Hoffman and Eversol (1986)

ng=nanogram



ESTROGENIC ACTIVITY of common foods (ng/500g)

Many common foods consumed daily contain more estrogen than implanted beef, which is typically consumed less frequently.

FOOD	ESTROGENIC ACTIVITY
Soy flour defatted	755,000,000
Tofu	113,500,000
Pinto beans	900,000
White bread	300,000
Peanuts	100,000
Eggs	555
Butter	310
Milk	32
Beef from implanted steer	7
Beef from non-implanted steer	5

Hoffman and Eversol (1986), Hartman et al (1998), Shore and Shemesh (2003), USDA-ARS (2002). Units are nanograms of estrone plus estradiol for animal products and isoflavones for plant products per 500 grams of food.

Hormone use in beef production:

A Safe Strategy to Deliver Affordable Protein.

Beef lovers in Nebraska and around the world crave the flavor, tenderness and nutrition of Nebraska corn-fed beef. In order to meet domestic and global demand for beef—at a competitive price—beef producers employ a number of management tools to improve the performance of their animals. One of those tools is growth promotants that help cattle gain weight and get to market more efficiently.

Male cattle (bulls) produce natural male hormones that can cause aggressive behavior and injury to themselves and others (including people!) That's why most male cattle (bulls) are neutered early in life and become steers. But those hormones in bulls cause them to grow faster, produce more muscle (meat), more protein and deposit less fat than steers.

Providing small amounts of hormones—or growth promotants—to young steers allows them to regain some of the growth rate of bulls and produce more meat more efficiently. The level of hormones used is a fraction of the natural production that occurs in bulls. Estrogen and androgen are the most commonly used hormones in beef production.

Growth promotants help steers produce muscle instead of fat and lower the price of beef. This helps the animal grow faster with less feed consumed—and that helps beef producers provide consumers with a consistent supply of high-quality, nutritious, lean beef at a competitive cost. This increased efficiency also leads to less feed consumed, reduced demand on resources such as land and water, and lower priced beef.

Growth promotants are typically given to cattle in the form of small pellets, which

slowly dissolve over 100-120 days—ensuring that hormone concentrations remain constant and low. The pellets are implanted under the skin of the animal's ear. The ear is used because it is not part of the food system, so there is no risk of the highly concentrated pellet being found in meat.

Hormones Naturally Occur in Animals—and Common Foods

All animals have hormones in their bodies, including humans. In fact, the human body produces much higher levels of hormones on a daily basis than the total amount of hormones a person might consume in beef. (See chart)

“There is very little difference in the measurable levels of hormones in the meat of a treated animal versus one that is not treated—about two nanograms,” said Dr. Dennis Burson, professor of meat extension and food safety specialist at the University of Nebraska–Lincoln. “That is roughly equivalent to one blade of grass on a football field.”

Hormone levels in beef are among the lowest in many foods consumed by most families on a daily basis. Common foods such as eggs and milk are naturally much higher in estrogen than implanted beef. (See chart)

“Most people are eating eggs, milk and bread much more often than they do beef,” said Jon Holzfaster, a farmer from Paxton and director on the Nebraska Corn Board. “Responsible use of growth promotants by Nebraska beef producers is not a threat to human health—and is actually helping ensure that nutritious, lean beef is an available and affordable source of protein for families in the U.S. and around the world.”

“The difference in hormone levels between an implanted animal and a non-implanted animal is roughly equivalent to one blade of grass on a football field.”

Dr. Dennis Burson, University of Nebraska–Lincoln

How ethanol makes our air healthier.

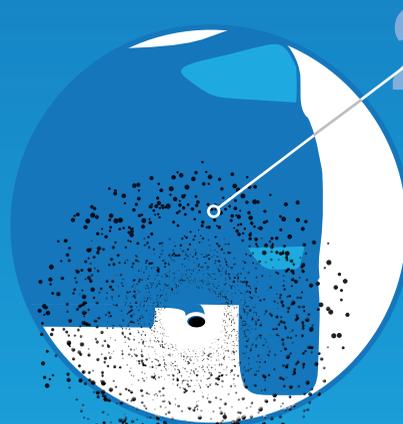
Nebraska's air looks clean and pure. But what we can't see is hurting all of us.

1 Cancer-causing toxic compounds are a component of gasoline. (They previously added lead to improve fuel performance until it was prohibited.)

GASOLINE PLUS
BENZENE

GASOLINE PLUS
TOLUENE

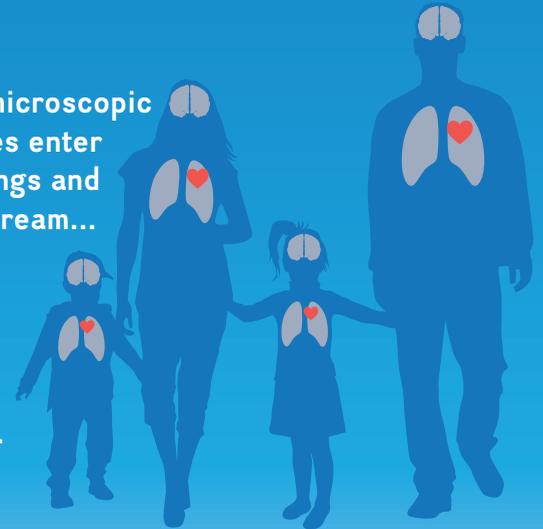
GASOLINE PLUS
XYLENE



2 Because of incomplete combustion, these toxic compounds come out in the exhaust and enter the air we breathe.

3 Small microscopic particles enter your lungs and bloodstream...

...bad for all of us, but especially kids, the elderly and anyone with respiratory or heart problems.



4 Air pollution from vehicles is being linked to serious health issues such as asthma, cancer and cardiopulmonary disease.

5 Using more ethanol in our fuel reduces the amount of toxic compounds and particulate matter by improving combustion.

AMERICAN ETHANOL
CLEANER AIR FOR NEBRASKA
e10
10% Ethanol
PUSH HERE

AMERICAN ETHANOL
CLEANER AIR FOR NEBRASKA
e15
15% Ethanol
PUSH HERE

AMERICAN ETHANOL
CLEANER AIR FOR NEBRASKA
e85
85% Ethanol
PUSH HERE

6 1 in 7 Nebraskans is driving a flex fuel vehicle that can use a wide range of ethanol blends. Check your owner's manual. (And everyone can use E10.)



Ethanol is a non-toxic oxygenate that improves combustion and increases octane—thereby improving air quality and reducing health effects.



CLEANER AIR FOR NEBRASKA



Nebraska Olympic Champion Teams with Corn & FFA

The Nebraska Corn Board (NCB) and Nebraska FFA, with the help of Olympic champion Curt Tomasevicz are partnering on a new program and contest for Nebraska FFA students called "Ag Champions".

Tomasevicz, from Shelby, Nebr., has served as a spokesperson for the Nebraska Corn Board since winning a gold medal in the four-man bobsled competition at the 2010 Winter Olympics.

Ag Champions is designed to prepare FFA students to become "agvocates" (agricultural advocates) in their communities and amongst their peers. The program will provide a toolbox of resources and a contest to allow FFA chapters to submit a plan, which would earn the top three winning chapters grants, based off of the budget in their advocacy proposal.

The Grand Champion winning chapter will earn the opportunity for Tomasevicz to be involved with their program.

"Through this project, we want to engage FFA members by developing a lasting impact through direct community involvement, as well as encouraging grassroots agvocacy," said Anita Wollenburg, interim Nebraska FFA state advisor. "Through this plan, FFA chapters will determine an issue in their community, the audience they want to reach and expand on an agvocacy plan of defending agriculture along with education and communication."

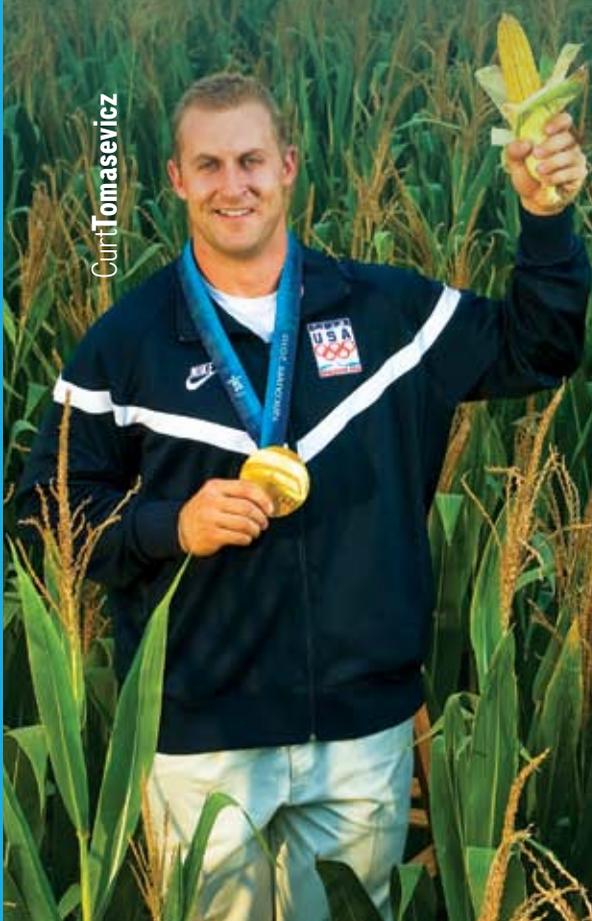
The overall goal of the Ag Champions program is to create agvocates in the state's communities and help put a realistic plan in place that can be used by the FFA chapters and students in any situation. These plans will be applicable regardless of whether a chapter wins a grant.

"As issues adversely affecting agriculture appear too often, we are encouraging local FFA chapters to have a plan in place to defend their industry, while also putting agriculture on the offense," said Kelly Brunkhorst, NCB executive director. "Education is key in helping dispel myths and misinformation about agriculture, so it's important to have that foundation and basic understanding in place early on."

Tomasevicz is helping to spread the message about the Ag Champions program with a shout-out to FFA students on his YouTube channel. Deadline for the Ag Champions plans to be submitted to NCB is May 15, 2015.

For information on the contest, click on the "Ag Champions" icon at NebraskaCorn.org.

Curt Tomasevicz



District 1
Dave Bruntz
Friend, NE



District 6
Dennis Gengenbach
Smithfield, NE



District 2
John Greer
Edgar, NE



District 7
David Merrell
St. Edward, NE



District 3
Brandon Hunnicutt
Giltner, NE



District 8
Jon Holzfaster
Paxton, NE



District 4
Debbie Borg
Allen, NE



At-large
Alan Tiemann
Seward, NE



District 5
Tim Scheer
St. Paul, NE



Nebraska Corn Board members represent the eight districts indicated on the map and are appointed by the Governor. One at-large member is elected by the other Board members.

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Boone McAfee
director of market development & research



Emily Thornburg
director of communications



Kim Clark
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Janet Miller
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On the Cover The Karr family from Blue Hill, Nebr., raises corn, soybeans, wheat and has a cow-calf operation.

