



Department Overview
February 22, 2005



Mission

DEED's mission is to:

- facilitate an economic environment that produces net new job growth in excess of the national average;
- improve the quality of existing jobs; and
- improve the quality of the state workforce.

These actions will support the economic success of individuals, businesses, and communities by improving opportunities for growth.

DEED at a Glance

- Over \$3 billion in operations, pass-through grants, and payments to individuals (06/07)
 - Includes projected \$1,709 million in Unemployment Insurance benefits
 - Includes projected \$605 million in Public Facilities Authority funds
- Approximately 1,740 FTEs across the state.
- Wide and diverse customer base: businesses, job seekers, community development professionals, etc.

Our Customers

INDIVIDUALS WHO:

- Seek high-wage jobs
- Seek skilled training
- Are visiting Minnesota and our attractions
- Achieve success when coping with disabilities
- Need unemployment insurance benefits
- Have lost their job and are starting their career planning

BUSINESSES WHO:

- Are just starting up
- Are expanding or relocating in Minnesota
- Seek qualified, skilled workers
- Wish to export goods and services worldwide
- Are navigating government services
- Seek economic info to help with their decisions

Our Customers

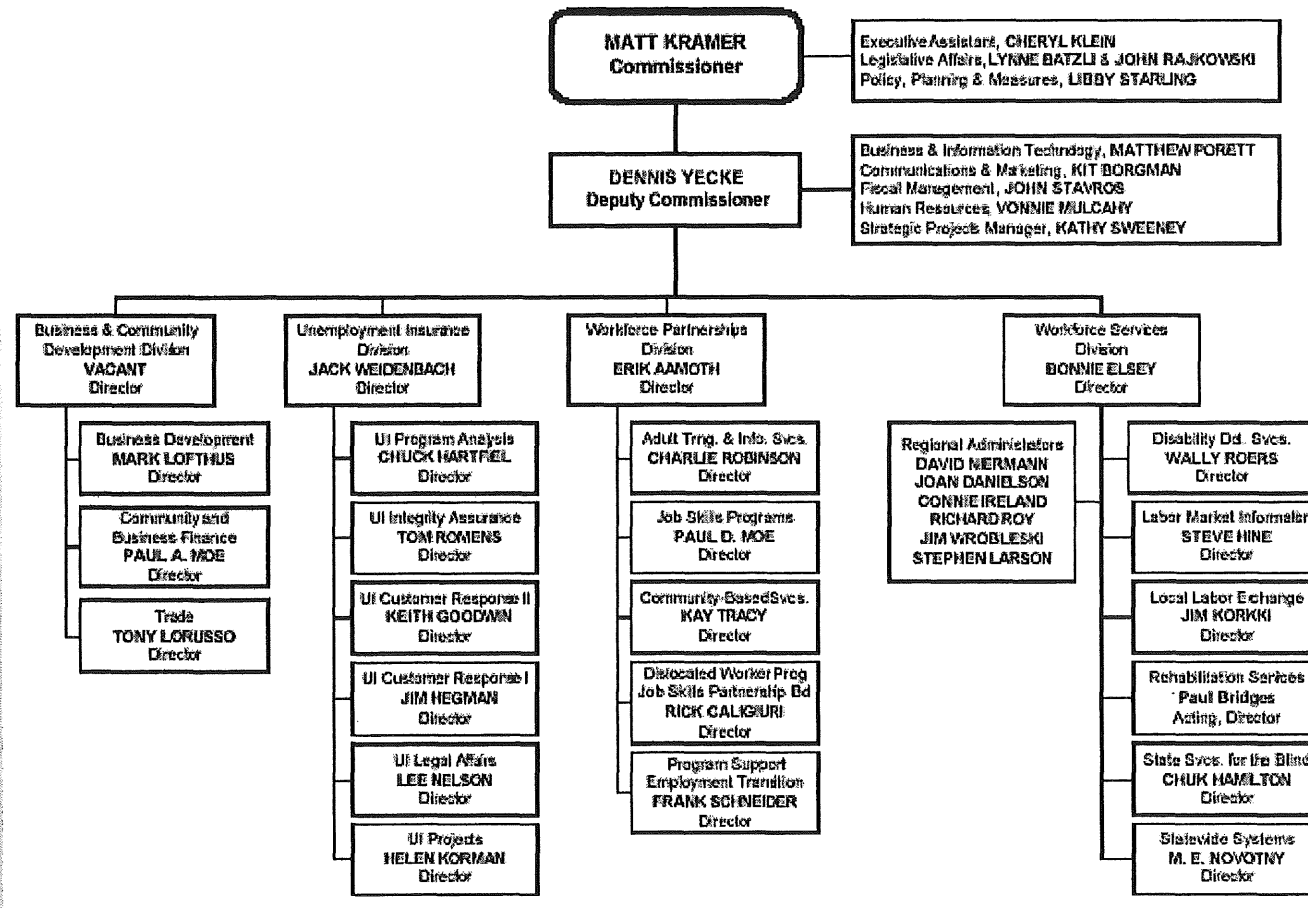
COMMUNITIES WHO:

- Are revitalizing rural landscapes
- Need infrastructure to meet their growth goals
- Have been impacted by large or small layoffs
- Want to take advantage of the global economy
- Want to have tourists come visit
- Are dealing with contaminated building sites

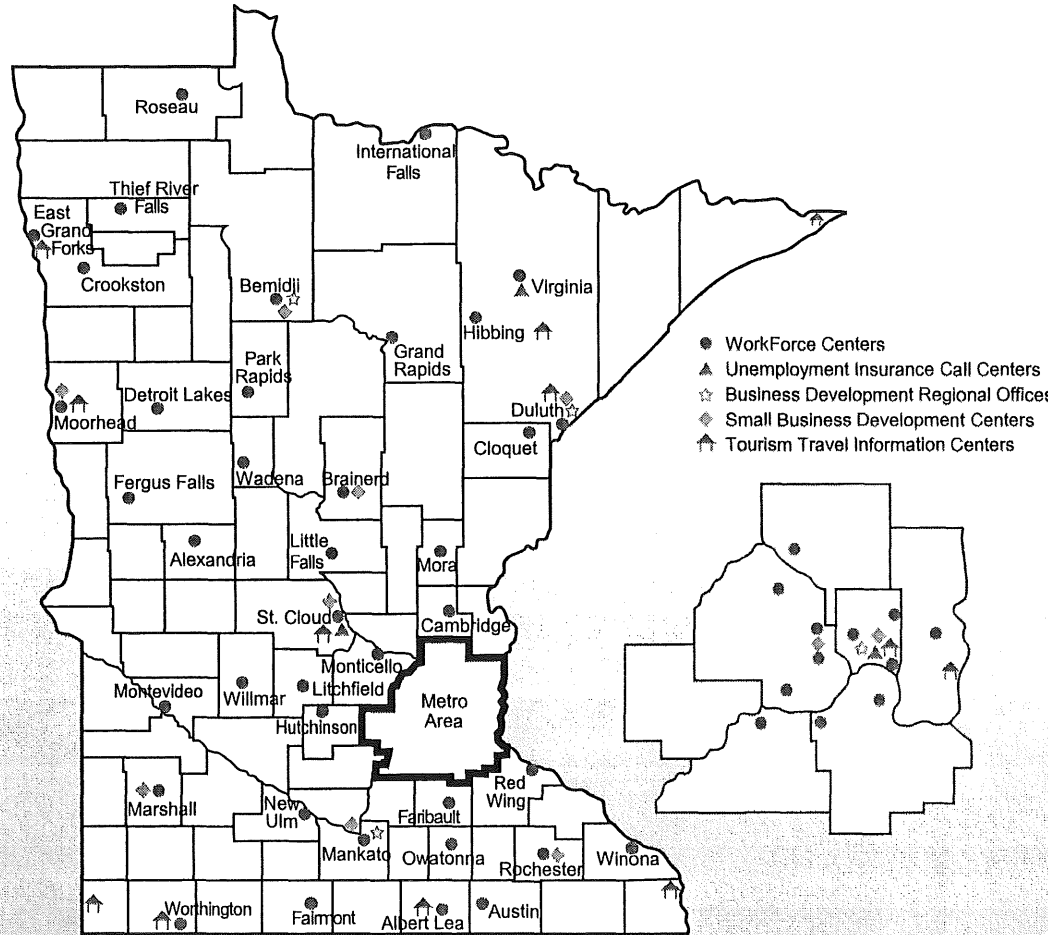
PARTNERS WHO:

- Create labor value (MnSCU, U of MN)
- Provide services with pass-through dollars
- Complement our agency's services
- Make economic and workforce policy locally
- Serve on multiple policy and advisory boards
- Match resources with federal, local, or private dollars

Our Organization

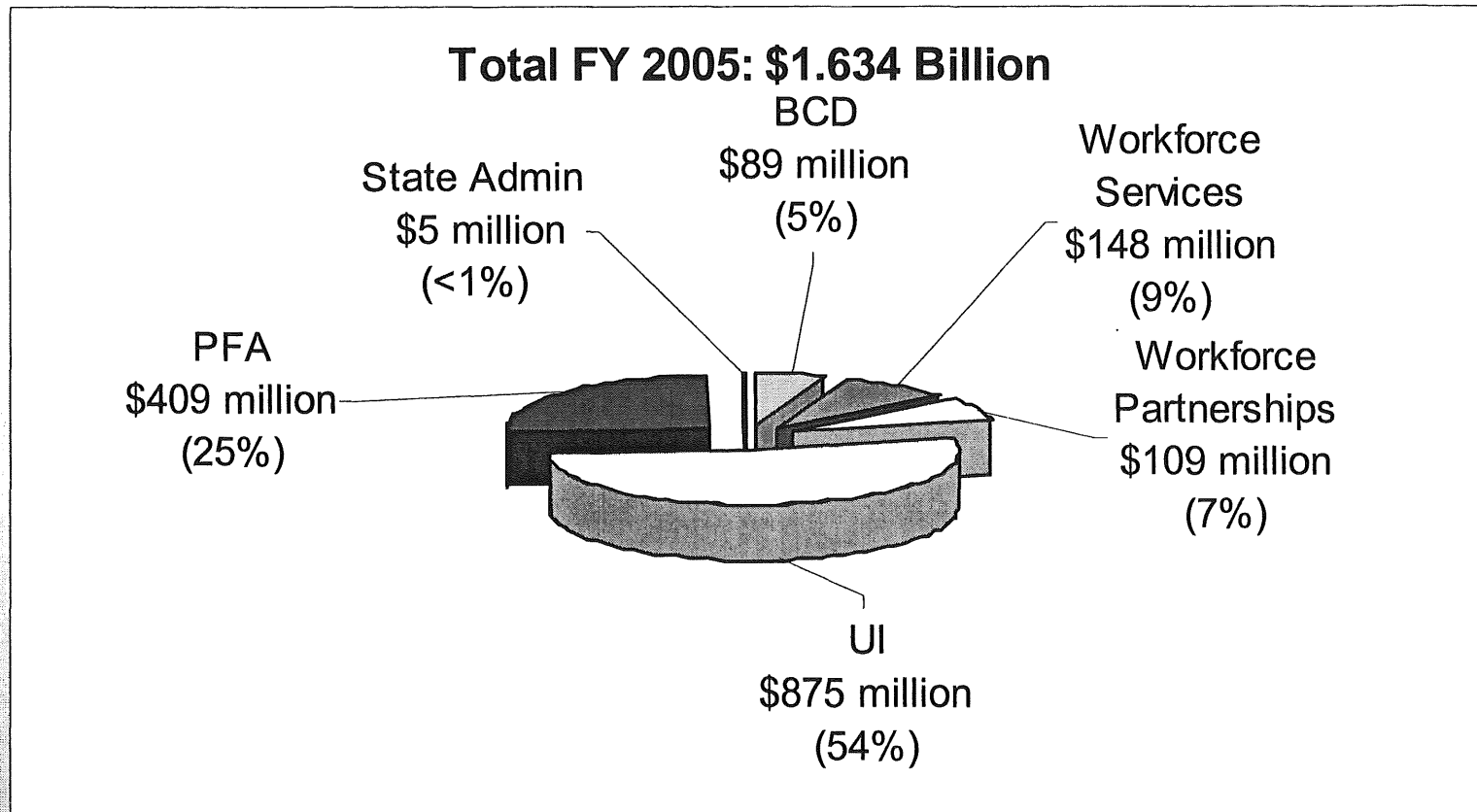


Our Locations Statewide



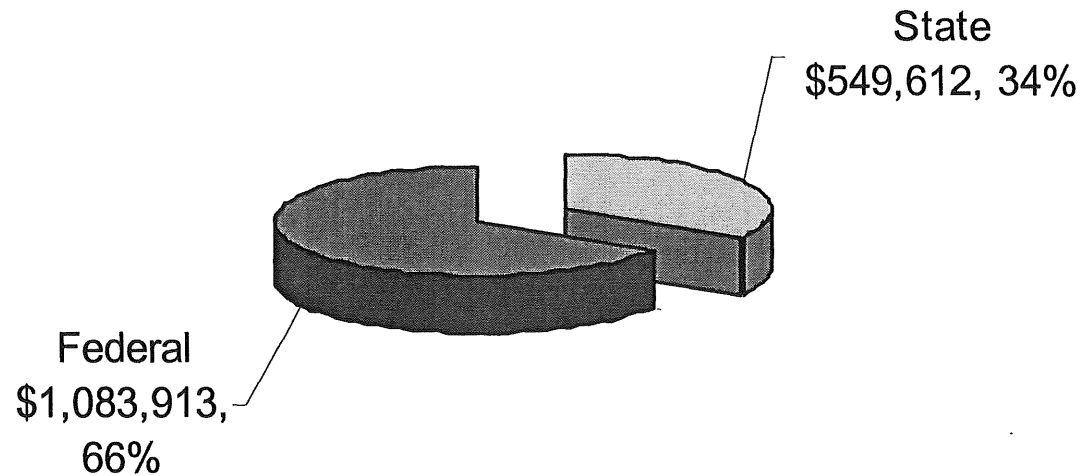
positively
Minnesota
Department of Employment
and Economic Development

DEED by Division



DEED by Funding Source

Total FY 2005: \$1.634 Billion



DEED by Division and Source

<i>(FY 05, in 000s)</i>	State	Federal	Total
BCD	\$30,433	\$58,853	\$89,286
WF Partnerships	\$56,497	\$52,328	\$108,825
WF Services	\$28,766	\$118,891	\$147,657
UI	\$20,700	\$853,841	\$874,541
PFA	\$408,561	\$0	\$408,561
State Funded Admin	\$4,655	\$0	\$4,655
Totals	\$549,612	\$1,083,913	\$1,633,525

Business & Community Development

<i>(FY 05, in \$000)</i>	State General	State Special	Federal	Total
Minnesota Investment Fund	\$1,220	\$1,045	\$5,835	\$8,100
CDBG/Small Cities Development	\$495	\$0	\$49,728	\$50,223
Small Business Assistance	\$628	\$0	\$2,482	\$3,110
Contaminated Grants	\$1,540	\$7,232	\$808	\$9,580
Mayo Clinic Biotech	\$1,000	\$0	\$0	\$1,000
21 st Century Minerals Fund	\$0	\$8,090	\$0	\$8,090
Minnesota Trade Office	\$2,482	\$262	\$0	\$2,744
JobZ Program	\$30	\$0	\$0	\$30
Center for Rural Policy Analysis	\$150	\$0	\$0	\$150
WomenVenture	\$150	\$0	\$0	\$150
Metropolitan Economic Development Association	\$100	\$0	\$0	\$100
Other BCD Programs	\$2	\$3,486	\$0	\$3,488
BCD Operations	\$2,378	\$143	\$0	\$2,521
Total BCD	\$10,175	\$20,258	\$58,853	\$89,286

BCD Structure/Goals

- Minnesota Trade Office
 - Export Assistance/Training
 - Foreign Direct Investment
- Business Development
 - Specific projects across the state
 - Customized technical assistance
- Community and Business Finance
 - Administration of all loan/grant programs
 - JOBZ Program
 - Small Cities/Contaminated Sites/other programs

Workforce Partnerships

<i>(FY 05, in \$000)</i>	State General	State Special	Federal	Total
Job Skills Partnership	\$8,172	\$3,431	\$544	\$12,147
Dislocated Worker	\$0	\$36,224	\$30,603	\$66,827
Youth Programs	\$6,424	\$0	\$10,040	\$16,464
Adult Training	\$0	\$0	\$11,141	\$11,141
Employment Transitions	\$421	\$1,825	\$0	\$2,246
Total Workforce Partnerships	\$15,017	\$41,480	\$52,328	\$108,825

Workforce Partnerships Structure/Goals

Most programs administered through partners

- Minnesota Youth Program
 - Job search/employment assistance
- Dislocated Worker Program
 - Assistance with those laid off in retraining/job search
- Services to adults
 - Job search/employment assistance
- Minnesota Job Skills Partnership
 - Funding for skills improvement for incumbent workers
- Multiple direct funding of organizations as directed by the legislature

Workforce Services

<i>(FY 05, in \$000)</i>	State General	State Special	Federal	Total
Employment Programs	\$0	\$0	\$44,659	\$44,659
Labor Market Information	\$80	\$0	\$1,765	\$1,845
Vocational Rehabilitation	\$7,521	\$6	\$39,564	\$47,091
Independent Living	\$1,325	\$0	\$1,458	\$2,783
Extended Employment Programs	\$6,307	\$7,062	\$0	\$13,369
State Services for the Blind	\$4,862	\$1,603	\$9,745	\$16,210
Disability Determination	\$0	\$0	\$21,700	\$21,700
Total Workforce Services	\$20,095	\$8,671	\$118,891	\$147,657

Workforce Services Structure/Goals

- Job Services
 - Universal customer support
 - Assistance to employers in meeting workforce needs
 - Job Search skills training
- Veterans
 - Specialized job search assistance
- Vocational Rehabilitation
 - to those with disabilities
- State Services for the Blind
 - Job search/employment assistance
 - Services to the elderly
- Disability Determination Services
 - Determination of disability for US Social Securities Administration

Public Facilities Authority

<i>(FY 05, in \$000)</i>	State	Federal	Total
Drinking Water Revolving Loans (PFA revenue bond proceeds)	\$84,115	\$10,948	\$95,063
Clean Water Revolving Loans (PFA revenue bond proceeds)	\$255,299	\$24,359	\$279,658
Transportation Revolving Loan Fund	\$32,814	\$79	\$32,893
Administration (2 percent of loan repayments)	\$947	\$0	\$947
Total Public Facilities Authority	\$373,175	\$35,386	\$408,561

PFA Structure/Goals

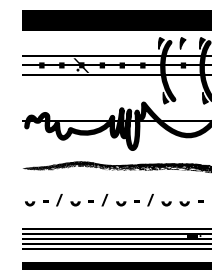
- Public Facilities Authority
 - To provide supplemental assistance grants to municipalities seeking financing for high cost wastewater, drinking water, treatment projects
 - Extensive bonding authority
 - Triple AAA rated
 - Coordinates applications/priority list with:
 - Minnesota Pollution Control Agency
 - Minnesota Department of Health

Vision for the Department

- Public workforce system integrated fully with economic development initiatives
- Emphasis on strategic investments as opposed to broad horizontal services
- Planning on a regional level to account for specific initiatives
- Measurable results assessed yearly
- Extensive coordination with higher education (MnSCU/U of MN)
- Aggressive interaction with all economic development partners

Arts

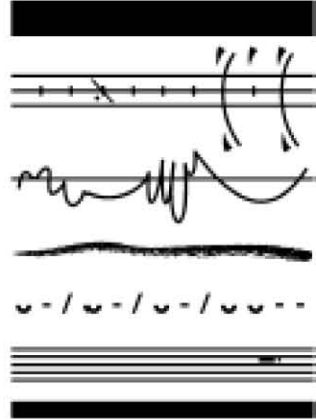
A Minnesota **Center** of Excellence



MINNESOTA
STATE ARTS BOARD

Budget Presentation
Fiscal Years 2006 - 2007

February 2005



MINNESOTA
STATE ARTS BOARD

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*The programs and activities of the
Minnesota State Arts Board do not discriminate
on the basis of race, national heritage,
color, sex, age, religion, sexual orientation
disability in admission, access, or employment.*

Arts: a Minnesota center of excellence

When the Children’s Theatre Company wins a Tony Award, the Minnesota Orchestra and Saint Paul Chamber Orchestra tour in Europe or Asia, the Guthrie Theater participates in the largest Shakespeare tour in American history, or the Minneapolis Institute of Arts hosts a major exhibition from an international museum, they bring Minnesota visibility and prestige, and give our state national and international acclaim.

Minnesota is home to one of the country’s most dynamic literary communities. We are recognized internationally as a leader in choral music. Very few states enjoy the range and quality of theater that we do—from classical to experimental. Our performing facilities are world class. In every corner of the state, Minnesotans experience and appreciate exceptional theater, visual arts, dance, music, and literature.

- Minnesota has long been recognized as a national leader in the arts. Our arts sector is regularly compared with New York, Illinois, and California. The arts are a distinctive Minnesota asset. They have helped create a favorable image, and a creative “brand” for our state.
 - In per capita ranking, the Minneapolis-Saint Paul metropolitan region ranks eleventh in the country in number of arts-related businesses, institutions, and organizations. The Twin Cities ranked lower than Seattle, San Francisco, New York, and Los Angeles, but **higher** than Boston, Washington-Baltimore, Philadelphia, and Chicago.
 - Arts didn’t become a Minnesota center of excellence by chance, but because of a long-term, successful public-private partnership that has nurtured and developed a highly sophisticated arts infrastructure for decades.
 - Minnesota’s public arts funding system (consisting of the Arts Board and eleven regional arts councils) is a model for the country. We were the second state in the nation to develop a decentralized public system, one that ensures that arts support and services are available to citizens in **all 87 Minnesota counties**. This system has been in place for thirty years, and has helped build one of the strongest arts sectors in the country.

“Thriving cultural life generates income, jobs, and tax revenue, and it also creates visibility for a state.”

National Governors’ Association

Minnesotans value the arts

Research tells us that Minnesotans, in every county and community of the state, care about the arts. They believe the arts are valuable in their own lives, their children's lives, and their communities:

- 95 %** of Minnesotans believe the arts are an important or essential part of the overall education of Minnesota children (e.g., classes in music, writing, dance, visual art, and drama)
- 94 %** of Minnesotans believe that arts and cultural activities help to make Minnesota an attractive place to live and work
- 91 %** of metro residents believe that performing arts help preserve and share cultural heritage
- 86 %** of metro residents believe that performing arts promote understanding of other people and a different way of life
- 86 %** of metro residents believe that the arts are a source of pride for those in the community

Minnesota State Arts Board and regional arts council funded activities served a combined audience of more than 20 million children and adults during the FY 2002-03 biennium.

- 82 %** of Minnesotans believe public funding for arts and cultural activities help to make them affordable and accessible to all Minnesotans
- 73 %** of metro residents attended a live performing arts (dance, theater, music) event in the past twelve months
- 67 %** of Minnesotans attended an arts activity (at a theater, auditorium, concert hall, museum, gallery) within the past year
- 60 %** of Minnesotans are involved in the arts, by doing some creative activity like singing in a choir, doing woodworking or needlepoint, writing poetry, or painting in their every day lives

Sources:
Minnesota State Survey, Center for Survey Research, University of Minnesota;
Performing Arts Research Coalition, The Urban Institute

Arts help Minnesota achieve important public goals

First and foremost, the purpose of the arts is to inspire, enlighten, connect, and challenge individuals. They give us new and different experiences, and help us understand and imagine the world from another person's point of view.

Beyond their essential purpose, the arts also produce tremendous secondary benefits that help Minnesota achieve many of its most important public goals.

"We believe that art can have an ennobling and uplifting effect on citizens. We believe, therefore, that it is appropriate for tax dollars to be used to support the arts."

Minnesota Policy Blueprint
Center of the American Experiment

- **Academic achievement**
- **Economic development**
- **Employment / workforce development**
- **Stronger communities**

Academic achievement

Research shows that children who study the arts demonstrate stronger overall academic performance. Arts can be especially helpful to nontraditional learners or at-risk students. These “problem” students often become high-achievers in arts learning settings; this success becomes a bridge to learning in other areas.

- Learning through the arts has significant effects on learning in other disciplines. Students consistently involved in music and theater show higher levels of success in mathematics and reading.
- In a national sample of 25,000 students, those with high levels of arts learning experiences earned higher grades and scored better on standardized tests than those with little or no involvement in the arts, regardless of socioeconomic status. In fact, researchers found that high arts participation has a more profound effect on the academic performance of students from low-income backgrounds than it does on high-income students.
- Disadvantaged youth involved in after-school arts related programs did better in school than disadvantaged youth involved in after-school sports or community involvement programs.
- Students of the arts continue to outperform their nonarts peers on the SAT tests. In 2001, those with music performance coursework scored 57 points higher on the verbal portion of the test and 41 points higher on the math portion.

“ ... the relationship between arts integration and student achievement was more powerful for disadvantaged learners, the group of students that teachers must reach to close the achievement gap.”

Center for Applied Research
& Educational Improvement,
University of Minnesota

“For both the important knowledge and skills they impart and the ways in which they help students to succeed in school and in life, the arts are an important part of a complete education.”

Rod Paige, U. S. Secretary of Education
July 2004 letter to U. S. superintendents

- An 11-year national study that examined youth in low-income neighborhoods found that those who participated in arts programs were much more likely to be high academic achievers, be elected to class office, participate in a math and science fair, and win an award for writing an essay or poem.
- For young people who are at risk of delinquency, school failure, substance abuse, teen pregnancy and other problems, involvement in the arts can improve academic performance, reduce school truancy, provide positive outlets and build new skills that give them a chance at a better life.
- Brain research shows that the stimuli provided by the arts—pictures, songs, movement, play acting—are essential for the young child to develop to the fullest potential. These activities are the “languages” of the child, the multiple ways in which he or she understands and interprets the world. They pave the way for the child’s success in learning to read and to write.

Economic development

The arts attract businesses, visitors and new residents, and encourage consumer spending, all of which result in increased tax revenues. Cultural offerings enhance the market appeal of an area, encouraging business relocation and generation of new jobs.

- The arts in Minnesota have over \$1 billion in economic impact annually.
- There are over 30,000 artists in the state of Minnesota and more than 1,600 arts organizations.
- Attendees at nonprofit arts events spend an average of \$22.87 per person, not including the price of admission, e.g. on restaurants, parking, hotels, etc.
- In Minneapolis, arts organizations spend \$171 million; audience spending adds another \$98 million for total arts-related spending of \$269 million.
- In Saint Cloud, arts organizations spend \$4 million; arts audiences spend another \$5.8 million for total arts-related spending of \$9.8 million.
- The Reif Center generates \$1.3 million for the Grand Rapids economy.

“Cultural activities attract tourists and spur the creation of ancillary facilities such as restaurants, hotels, and the services needed to support them. Cultural facilities and events enhance property values, tax resources, and overall profitability for communities”

National Governors Association

- Cultural or heritage tourism is one of the fastest growing tourism segments in the world.
- The arts also drive tourism in Minnesota, an increasingly important growth industry for our state. Travelers who come from other areas for arts-related tourism tend to take longer trips and spend more money (\$631 per trip) than the average U. S. traveler (\$457). These cultural tourists are more likely to fly; participate in more activities while traveling; and stay more often in hotels, motels, and bed and breakfast establishments.
- Five of Minnesota’s top tourist attractions are arts organizations: Children’s Theatre Company, Guthrie Theater, Orchestra Hall, Ordway Center for the Performing Arts, and the Walker Art Center.
- A recent analysis of Dun & Bradstreet data found that creative industries (for profit and nonprofit museums/collections; performing arts; visual/photography/film, radio, TV; design/publishing; arts schools/services) are an important international export industry for the United States—estimated at \$30 billion annually. The creative industries provide the essential fuel that drives the “information economy”—the fastest growing segment of the nation’s economy.

“In a newly competitive world, public investments in culture have become as important as those in manufacturing, farming and other more conventional economic developments. Enhancing Minnesota’s artistic mass...will pay off for generations of Minnesotans to come.”

Minneapolis Star Tribune

Employment / workforce development

Creativity will be one of the most important characteristics of the jobs and the workforce of the future. Arts experiences fuel the imagination and help produce the dynamic, talented workers and companies our economy needs.

- The Minnesota Department of Employment and Economic Development projects that, between 2000 and 2010, employment in the art, design, entertainment, sports, and media occupational groups is expected to grow by 18.1 percent—or over 7,200 jobs—compared to a projected 13.1 percent employment increase in overall jobs statewide.
- Support of the arts is a workforce issue for companies—the arts develop the kind of thinker and manager that businesses must have more of if they are to remain competitive in the global marketplace.
- Arts education aids achievement of “core competencies” needed for employment such as thinking creatively, problem solving, exercising individual responsibility, sociability, and self-esteem.
- Workers with arts-related skills are critical to the industries of the new economy: software development and web design; advertising firms; automobile design companies; architectural and engineering firms; and other fields seeking employees with high-level communication, computer, and creative problem solving abilities.
- The Minneapolis-Saint Paul metropolitan area ranks in the top 10 on Carnegie Mellon researcher Richard Florida’s “Bohemia Index” (a sum of people with creative occupations). The index shows a correlation between areas that rank high in artistic and cultural amenities, high in human capital, and high in technology industries. According to Florida, “A bohemian presence in an area helps establish an environment that attracts other talented or high human capital individuals. The presence of such human capital in a region in turn attracts and generates innovative, technology-based industries.”
- Artists are a resource for companies. They are the talent that helps a business design a better product (designers), write better manuals for workers and consumers (writers), solve management problems through simulation techniques (actors), and prepare better marketing materials (painters, photographers, writers).
- A recent Yale Medical School study showed that students who had taken an art appreciation course scored noticeably better in analyzing patient symptoms than did the test group that did not take the arts course.
- A KPMG survey of more than 1,200 high-tech workers examined the most important factors associated with taking a new job. “Community quality-of-life” was the second most important factor—after salary—and more important than benefits, stock options, or company stability.
- Quality of life in the community increases the attractiveness of a job by 33 percent for young knowledge workers.
- Babson College integrates the arts into its MBA curriculum. For more than a decade, *U. S. News and World Report* has ranked its entrepreneurship program number one in the country.

“...growth occurs in communities because they’ve got the kind of attributes—an innovative music scene, perhaps, or a vital community of creative artists, and an environment that encourages innovation and risk-taking—that attract the kinds of creative people companies need to prosper.”
“Mysteries of Urban Momentum”
Governing, April 2002

Stronger communities

Arts bring people together. Residents of a community understand their new immigrant neighbors better after seeing a traditional play. A struggling downtown begins to “hum” with new energy on the evenings the community arts center offers a concert. Towns celebrate their identity and heritage through an annual arts festival. Artists and arts participation build social capital—the social bonds and civic engagement needed in a healthy, thriving society.

- Small arts towns like Grand Marais, Fergus Falls, Grand Rapids, New York Mills, and Lanesboro have revived their town centers and reinvented themselves through increased commitment to the arts.
- Artists and arts organizations help address the state’s need for low-income housing in the Twin Cities, Fergus Falls, Saint Cloud, Grand Marais, and other greater Minnesota communities. Average family income for artists in live/work developments in the Twin Cities is less than 60 percent of the area median family income.
- *Child* magazine ranked the Twin Cities third on its list of the top ten best cities to raise kids, partially on the strength of the availability of arts programming and museums.

“Exposure to world culture is extremely limited to the people of this region, outside of television...ChuChumbe (Mexico) and the Bamboo Orchestra (Japan) brought their world to us.

Over 3,500 students’ lives were touched by these foreign performers. Language was not a barrier as students were brought forward to play instruments with, and as part of, the bands...The children don’t see borders or prejudice, but people. Because of this kind of arts programming, the great big world outside the Fairmont area got smaller.”

Michael Burgraff, executive director
Fairmont Opera House

“Children whose hearts and minds are nourished and challenged in wholesome ways—such as by art, dance, theater, and sports—are much less likely to succumb to the lure of crime.”

Richard Romley
Maricopa County district attorney

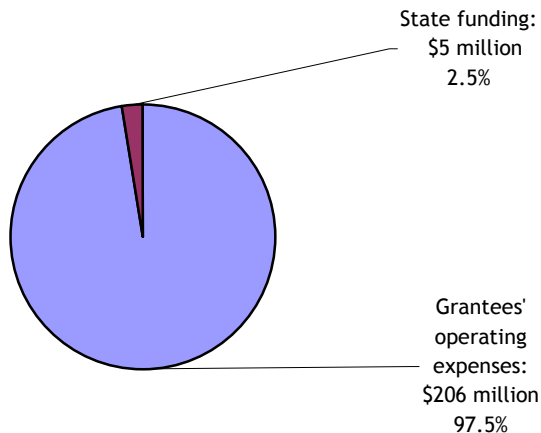
- For seven years running, Morgan Quitno Press named Minnesota the most livable state in the nation, due in part to our citizens’ access to the arts.
- Artists are catalysts for civic engagement. They are leaders in community causes, youth development, neighborhood activities.
- 62 percent of the artists in a community spend between one and four hours per week volunteering or performing community service, and another 18 percent spent between five and ten hours per week.
- Performing arts attendees in the Twin Cities are an active segment of the metro population, frequently participating in both arts and nonarts activities.
- Arts attendees go to the polls more often than the general public. 90 percent of Twin Cities performing arts attendees vote regularly.

**State arts funding ...
a modest, but VITAL investment**

In FY 2002-03 state arts funding was \$25.3 million

In FY 2004-05 state arts funding was reduced to \$17.2 million

**FY 2004 Inst / Pres Support
State funding as a percentage of
total operating expenses**



- Despite Minnesota's national reputation as an arts center, Minnesota was one of only nine states in the country that reduced arts funding more than 30 percent for FY 2004-05. The median change in other states was less than 10 percent.
- While the projected state deficit for FY 2004-05 was approximately 15 percent of the overall state general fund budget, arts funding was cut 32 percent.
- The governor's proposed FY 2006-07 biennial appropriation for the arts, \$17.2 million, is 0.06% (six one hundredths of one percent) of the state's \$ 29.6 billion biennial general fund budget.
- In the Minnesota State Arts Board's two largest grant programs (Institutional Support and Institutional Presenter Support), state funding represented an average of 2.5 percent of the organizations' total operating expenses for fiscal year 2004.



Minnesota State Arts Board

Vision All Minnesotans have the opportunity to participate in the arts

Mission

The Minnesota State Arts Board:

- Serves as a leading catalyst for creating a healthy environment for the arts that fosters broad public participation in, and support for, the arts in Minnesota.
- Promotes artistic excellence and preserves the diverse cultural heritage of the people of Minnesota through its support of artists and organizations.
- Acts as a responsible steward of the public trust.
- Works with the statewide network of regional arts councils to ensure accessibility to arts activities for all Minnesotans.

Goals

- Increase the level of support needed to sustain and grow a healthy arts community
- Ensure that public services and grants are delivered effectively throughout the statewide arts system
- Serve as a leader, promoting the value of the arts to Minnesota's quality of life
- Support increased access and opportunities in arts education

Primary issues / needs for the coming biennium

- *Increasing demand for arts funding.* In 2002-2003, the Arts Board was able to fund only 40 percent of the grant applications it received.
- *Maintaining a stable level of support for Minnesota's arts organizations.* Arts organizations are in a difficult financial situation. Their three primary sources of revenue—public support, private contributions, and earned income all took steep negative turns at roughly the same time. The ongoing weakness in the economy makes balancing the budget a challenging task.
- *Arts education/arts in the schools.* As public schools face their own budget crises, arts in education programs and the number of arts teachers and specialists are being drastically reduced.
- *Touring.* Many communities do not have the resources to support their own an orchestra, theater, or dance company, yet residents want access to those activities. Touring support enables Minnesota communities to share cultural treasures with one another.
- *Financial and technical support for individual artists.* Individual artists are sole-proprietor business. They need financial support, but also need technical assistance to build their capacity in marketing, fundraising, and financial management.
- *Expand use of technology.* The demand for Arts Board services continues to grow, but its resources to reach individuals and organizations throughout the state are extremely limited. It needs to further develop its capacity to utilize more cost-effective technology tools.

Minnesota State Arts Board members

The board is made up of eleven citizens, appointed by the governor. There is one representative from each congressional district and three members who represent the state at large.

First district	Jane Belau, Rochester
Second district	Diana Lewis, Sunfish Lake
Third district	Chris Osgood, Minnetonka
Fourth district	Matthew Anderson, White Bear Lake (vice chair)
Fifth district	Ellen McInnis, Robbinsdale
Sixth district	Pamela Perri Weaver, Anoka (chair)
Seventh district	Corey Elmer, Moorhead
Eighth district	William Miller, Duluth (treasurer)
At large representatives	Sarah Caruso, Hopkins Yvonne Condell, Moorhead (officer at large) Edward Oliver, Deephaven (secretary)

Minnesota's regional arts councils

Northwest Regional Arts Council (region 1), Warren
(218) 745-6733; www.nwrdc.org/arts.htm

Region 2 Arts Council (region 2), Bemidji
(218) 751-5447; (800) 275-5447; www.r2arts.org

Arrowhead Regional Arts Council (region 3), Duluth
(218) 722-0952; (800) 569-8134; www.aracouncil.org

Lake Region Arts Council (region 4), Fergus Falls
(218) 739-5780; (800) 262-2787; www.charterinternet.com/lrac4

Five Wings Arts Council (region 5), Staples
(218) 894-5485; www.fwac.org

Southwest Minnesota Arts and Humanities Council
(regions 6E, 6W, 8), Marshall
(507) 537-1471; (800) 622-5284; www.smahc.org

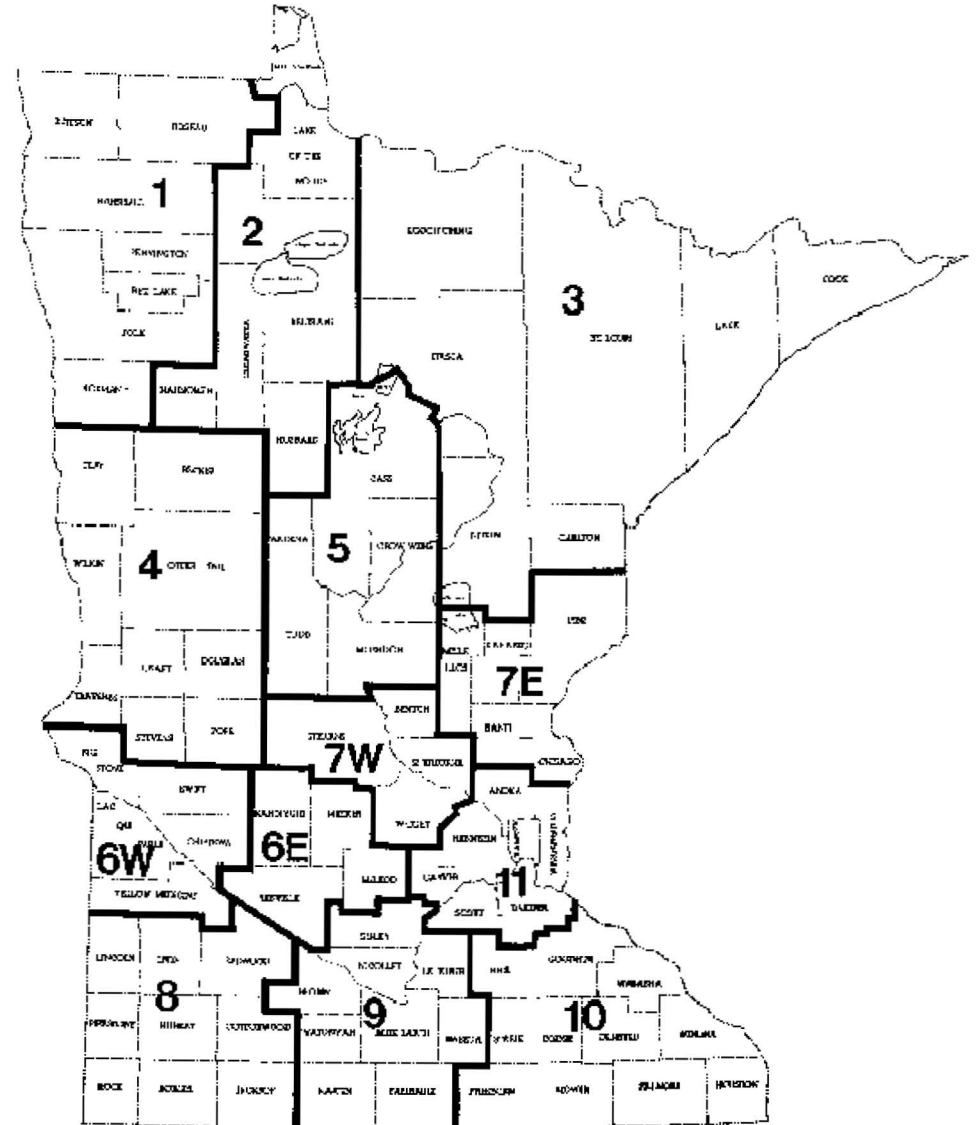
East Central Arts Council (region 7E), Mora
(320) 679-4065; www.region7erdc.org

Central Minnesota Arts Board (region 7W), Elk River
(763) 241-9517; www.centralmnartsboard.org

Prairie Lakes Regional Arts Council (region 9), Waseca
(507) 833-8721; (800) 298-1254; www.plrac.org

Southeastern Minnesota Arts Council (region 10), Rochester
(507) 281-4848; www.semac.org

Metropolitan Regional Arts Council (region 11), Saint Paul
(651) 645-0402; www.mrac.org



Regional Arts Councils' impact

Minnesota has a unique, decentralized structure for supporting and promoting the arts. This system of eleven regional arts councils was established to be an effective means to distribute arts funds throughout the state so that all citizens could have access to arts in their own communities. Each year, the regional arts councils contribute to the state of Minnesota and its citizens by:

- Increasing the quality of local art production and regional touring activities
- Providing on-site professional and technical services to individuals and organizations
- Generating increased private and public funding for the arts at the regional and community levels
- Encouraging production or sponsorship in areas with little arts activity
- Enhancing the capabilities of local arts organizations, enabling them to develop further both professionally and artistically
- Effectively distributing arts funds to every corner of the state
- Spearheading arts related economic community development efforts in small and rural communities
- Generating a positive impact on the local economy and tourism industry through arts projects
- Enabling citizens to participate in arts activities that would otherwise be unavailable
- Providing a way for communities to work together on local projects, giving people pride in their hometowns and cities

Primary issues / needs for the coming biennium

As the regional arts councils work to ensure that artists and arts organizations throughout the state are served, the following factors are shaping the development of their programs and services:

- *Increasing demand for arts funding.* As arts activities and organizations grow in greater Minnesota, the need for contributed income grows as well. In many areas of the state, the regional arts council is the primary source of arts funding available.
- *Organizational stability and capacity for current grantees.* Smaller arts organizations desperately need general operating support and more significant project support.
- *Technical assistance and direct program services.* Because community based arts organizations are predominantly managed by volunteers, there is a great need for professional marketing, technical assistance, and training that is not readily available.
- *Greater support for individual artists.* Opportunities for individual artists are vanishing, forcing artists to migrate to other states that offer more chances for employment, visibility, and collaboration.
- *The need for arts facility restoration in greater Minnesota.* Regional arts councils have planned to provide one-time opportunities for arts facility renovation and upgrade in greater Minnesota, but funding is not currently available.

**FY 2002 - 2003
Audiences served
Dollars requested and granted**

Audiences

Regional Arts Councils

Adults	3,052,733
Children	1,212,458
Artists	59,823

Arts Board

Adults	11,560,885
Children	5,028,346
Artists	127,891

Combined

21,042,136

<u>Requests and grants</u>	<u>Dollar amount</u>	<u>%</u>
Regional Arts Councils		
Dollars requested	\$ 8,852,038	
Dollars granted	\$ 5,226,822	59 %
Minnesota State Arts Board		
Dollars requested	\$ 31,524,427	
Dollars granted	\$ 17,085,715	54 %
Combined		
Dollars requested	\$ 40,376,465	
Dollars granted	\$ 22,312,537	55 %



good ideas are growing

PLANT BIOTECHNOLOGY



Plant biotechnology: good ideas are growing

Plant biotechnology is helping today to provide people with more and better food and holds even greater promise for the future.

Whether cotton farmers in China, India and South Africa, canola farmers in Canada, soybean farmers in Argentina or corn farmers in Spain and the United States, millions of farmers around the world are using biotech seeds to boost yields, improve their livelihoods and preserve the environment.

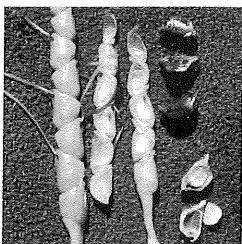
That's why organizations including the United Nations, American Medical Association, International Society of African Scientists and the Organization for Economic Cooperation and Development, have voiced their support for plant biotechnology.

Yes, there are questions and concerns — just as there are with any new technology. But for nearly 300 years, plant breeders have worked to create better crops — a process that actually began thousands of years ago with the domestication of wild plants. Plant biotechnology is the next stage in the evolution of our continuing efforts to improve the food we eat.

What is plant biotechnology?

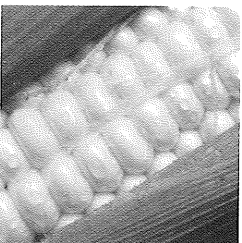
Plant biotechnology is a process in which genetic information and techniques are used to develop useful and beneficial plants.

“It is important to recognize that we have been genetically modifying the food supply for thousands of years,” wrote food scientist Susan Harlander.²

TEOSINTE⁵

Modern corn, for example, bears little resemblance to its early ancestor, teosinte. Those early cobs were just one to two inches long with a few tiny kernels.³ Ancient varieties of potatoes and tomatoes were also vastly different from their modern relatives — and barely edible, if at all.⁴ It was only after centuries of careful breeding that corn, potatoes and tomatoes were developed into the tasty, nutritious foods we know and enjoy today.

Austrian monk Gregor Mendel was the first to begin understanding genetics, as he said, “just what it is that gives the colors and the shapes to the different trees and fruits and flowers.”



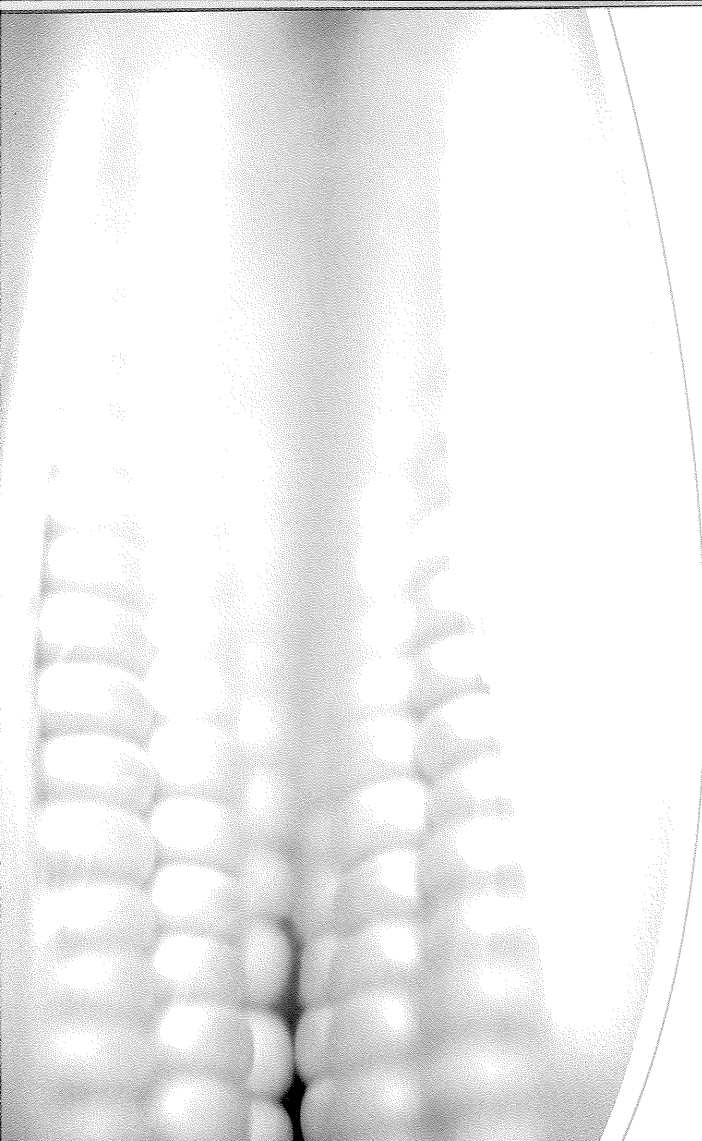
MODERN CORN

In 1866 Mendel speculated that certain unseen particles passed traits from one generation to the next. It wasn't until nearly 100 years later that researchers discovered that these unseen particles are genes. Genes carry the code that tell a plant what color it will be or how it will taste.⁶

In 1973, researchers Stanley Cohen and Herbert Boyer actually took a gene from one organism and inserted it into another, launching the modern biotechnology era.⁷ Their work led to the very first commercial biotech product — human insulin.

Modern plant biotechnology is a much more precise tool than traditional plant breeding. It allows researchers to select a gene with a specific trait — such as taste or hardiness — in one plant and move it to another. With traditional plant breeding, many genes are transferred to create a new plant variety. Some of these genes carry desired traits, others carry unwanted traits that must be removed with still more breeding. Getting it right is often difficult.

But with organisms modified with advanced biotechnology, “We are in a better, if not perfect, position to predict the [resulting traits],” said the National Research Council in a 1989 report.⁸ The NRC advises the U.S. government on science issues.



Products approved for market

To date, more than 50 biotech crops have been approved for sale in the United States and Canada, and three have been approved in Mexico. The list includes enhanced soybeans, cotton, corn, canola, cantaloupe, papaya, potato, squash, sugar beets and tomatoes.

Most of these crops have been enhanced in one or more of the following ways:

- **Herbicide tolerant** crops are immune to certain herbicides that are effective against harmful weeds but have no effect on the crop. Globally, about three-fourths of the biotech crops planted in 2002 were herbicide tolerant.⁹
- **Pest resistant** crops usually contain a protein from *Bacillus thuringiensis* or *Bt*, a naturally occurring soil bacterium that wards off the European corn borer.
- **Virus resistant** crops are shielded from plant viruses in a similar way that humans are protected from disease with vaccines: by being “inoculated” and thus building a natural defense.
- **Stacked trait** crops combine these and other traits.

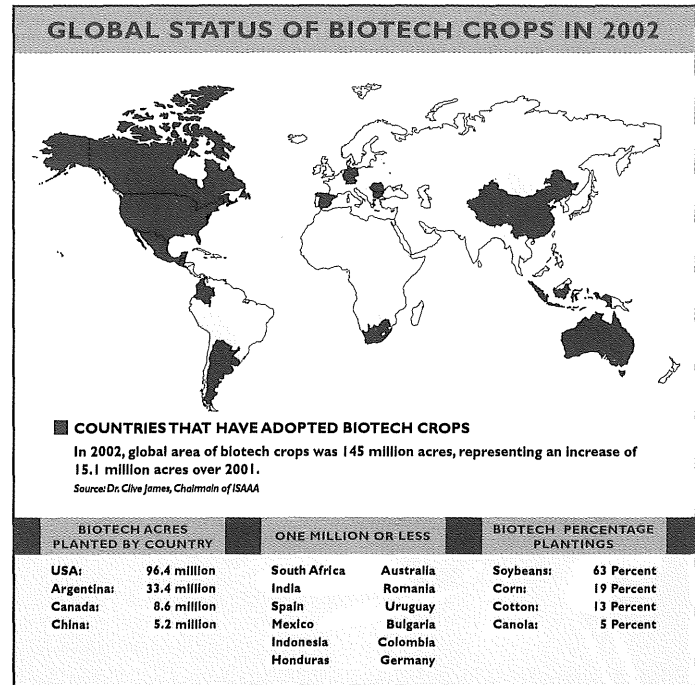
While four countries — the United States, Argentina, Canada and China — accounted for 99 percent of the global biotech acreage in 2002,¹⁰ the adoption of biotech crops has actually been faster in developing countries than in developed countries.¹¹ Between 5.5 million and 6 million farmers in 16 countries planted biotech seeds in 2002, according to the International Service for the Acquisition

of Agri-biotech Applications (ISAAA). More than three-quarters were farmers in developing countries — primarily in China and South Africa.¹²

“Normally, at the end of the year, I would ask my wife how we are going to pay our bills,” says South African cotton farmer T.J. Buthelezi, who now plants *Bt* cotton. “Now I ask her, how are we going to spend this money?”

Farmers have embraced the technology so quickly for very simple reasons: Biotech crops improve yields, cut costs, reduce spraying and save time.¹³

“Biotechnology continues to be the most rapidly adopted technology in agricultural history due to the social and economic benefits the crops offer farmers and society, particularly the 5 million resource-poor farmers in developing countries,” says Clive James of ISAAA. “Biotech crops can significantly alter the lives of these farmers, limiting the time they must spend in the field and helping alleviate poverty.”



4000 BC – 1600 AD



Early farmers — like those in Egypt and the Americas — saved seeds from plants that produced the best crops and planted them the next year to grow even better crops.

1700 – 1720



Thomas Fairchild, the forgotten father of the flower garden, creates Europe's first hybrid plant.¹

1866



Austrian monk Gregor Johann Mendel publishes a study on heredity that describes how plant characteristics are passed from generation to generation.²

1870 – 1890

Plant researchers crossbreed cotton to develop hundreds of new varieties with superior qualities.³



MONARCH BUTTERFLY

While a 1999 Cornell University study suggested that large amounts of *Bt* corn pollen — when fed to monarch larvae in the laboratory — could pose a threat, several studies have since concluded that biotech corn does not harm monarchs.

In a comprehensive study that has been described as a model for assessing the risks of biotech crops, a team of federal, university and industry scientists concluded that the impact of *Bt* corn — enhanced with a naturally occurring soil bacterium that wards off insect pests — on monarch populations is “negligible.”¹⁴ Other groups concur. “The weather seems to be by far the largest influence on monarch butterfly populations,” said a report on the butterfly issue by the nonprofit Pew Initiative on Food and Biotechnology.¹⁵

As wilderness, including monarch habitat, shrinks from agricultural expansion, biodiversity is lost. Biotech crops can make existing farmland more productive, reducing pressure to put wilderness areas under the plow.

Because *Bt* corn is not considered a threat, the U.S. Environmental Protection Agency (EPA) in October 2001 approved the planting of *Bt* corn for another seven years and one year later the European Congress of Entomology issued a statement supporting the use of *Bt* corn.¹⁶

Benefits of biotechnology

More and more studies are documenting the economic and environmental benefits of biotech crops.

A 2002 study of biotech crops by the National Center for Food and Agricultural Policy (NCFAP) found that six biotech crops planted in the United States — soybeans, corn, cotton, papaya, squash and canola — produced an additional 4 billion pounds of food and fiber on the same acreage, improved farm income by \$1.5 billion and reduced pesticide use by 46 million pounds.¹⁷

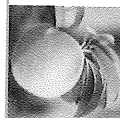
Other global studies have confirmed the economic benefits of biotech crops:

- Yield increases for *Bt* cotton ranged from 5 to 10 percent in China, 10 percent or more in the United States and Mexico, and 25 percent in South Africa — reaping global cotton farmers an additional \$1.7 billion in income between 1998 and 2001, according to ISAAA.¹⁸
- *Bt* corn in Spain produced yield increases of between 10 and 15 percent — and an average income gain of 12.9 percent — in areas with high levels of insect infestations in 2001-02, according to a study funded by Agricultural Biotechnology in Europe.¹⁹

- Biotech canola in Canada produced 10 percent yield increases in 2000, generating an average earnings increase of \$5.80 per acre compared with conventional canola, according to a Canola Council of Canada study.²⁰
- Biotech soybean yields in Argentina were 10 percent higher than yields for conventional soybeans, according to ISAAA.²¹

While biotech cotton has led the way in developing countries like China and South Africa, there's even more excitement about the benefits this new technology can bring to staple food crops grown in developing regions of the world. The reason is very simple: The developing world, home to 800 million hungry people, has the most at stake and potentially the most to gain through plant biotechnology.

1871 – Early 1900s



Researcher Luther Burbank developed the Russet Burbank Potato, and later went on to develop several new hybrid fruits, including plums, berries, prunes and peaches.⁴

1908

First U.S. hybrid corn produced by G.H. Shull of Carnegie Institute through self-pollination.⁵

1919

Word "biotechnology" coined by Hungarian immigrant Karl Ereky.⁶

1930



Inspired by writings of Luther Burbank, U.S. Congress passes the Plant Patent Act, enabling the products of plant breeding to be patented.⁷



“Agribiotechnology matters to Kenya, as to most other African countries, for the most basic reasons: Our people do not have enough to eat.”

Florence Wambugu, African scientist and founder,
A Harvest Biotech Foundation, Nairobi, Kenya

More food

With the world population projected to top 8 billion by 2030, there will be another 2 billion mouths to feed — most of them in developing regions.²² With income growth also fueling demand for better diets, farmers will need to at least double their production over the next 25 years to satisfy these appetites, according to the United Nations.²³ But annual increases in agricultural yields in recent years are holding at just 1.3 percent a year — less than half of the gains of 30 years ago.²⁴

C.S. Prakash, founder of the AgBioWorld Foundation, says an additional 4 billion acres will need to come under the plow by 2050 to feed all of these people if there are no increases in farm productivity.²⁵ That's more than twice the size of the continental United States.

Getting the most production from existing land is important because more than a fourth of the world's 21.5 billion acres of agricultural land, pastures and woodlands have already been degraded from overuse or misuse, such as over-irrigation or erosion.²⁶ Biologists fear that up to half of the world's remaining 6 billion acres of tropical forests will be lost to agricultural expansion, and some are warning

that as many as 20 percent of all tropical forest species could be extinct within 30 years if forests continue to disappear at the current rate.²⁷

Biotechnology is not the single solution for feeding a growing population. But it is a tool that can help grow more food in a sustainable way that does not deplete existing farmland or force more remaining wilderness areas to go under the plow.

Researchers are busy developing hardier crops that can produce greater yields on existing land, or even thrive on marginal land:

- A biotech rice that can better withstand droughts and thrive in marginal soil is being developed by Cornell University researchers.
- A biotech sweet potato that can produce twice the yields of conventional varieties is midway through field trials in Kenya.²⁸ Sweet potatoes are a staple crop for millions in the developing world.
- A biotech papaya — credited with saving the papaya industry in Hawaii — is now being brought to farmers in Southeast Asia, the Caribbean and several other developing areas where papaya is a staple food.

1933

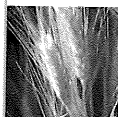


Hybrid corn becomes available commercially⁸ in the United States, causing corn yields to triple over the next 50 years.⁹

1953

Watson and Crick describe the double helix structure of DNA, providing more insight into how DNA carries genetic information.¹⁰

1960s



After decades of work, Norman Borlaug creates dwarf wheat that increases yields by 70 percent, launching the Green Revolution that helped save millions of lives.¹¹

1973



Cohen and Boyer successfully splice a gene from one organism and move it into another, launching the modern biotechnology era.¹²



"We face many other fascinating possibilities. How about genetically modifying foods to contain higher levels of cancer-fighting compounds... Or developing fresh fruits and vegetables with improved shelf lives?"

Joe Schwarcz, Office for Science and Society,
McGill University, Montreal, Canada

Better food

Not only is biotechnology being used to produce more food, it is also developing better food — food that is healthier, more nutritious and better tasting.

For the developing world, researchers are working to create:

- Golden rice, which is fortified with beta carotene that stimulates the production of vitamin A in the human body. Every year, between 250,000 and 500,000 children go blind because of vitamin A deficiency, according to the World Health Organization. And about half of these children die within a year of losing their sight.²⁹
- Cassava, a staple food in many poorer parts of the world, enhanced so it contains 35 to 45 percent more protein and essential amino acids.³⁰
- Plant-based vaccines — made from crops such as banana or potato — which are then pulverized and administered in pill form. Researchers have developed a vaccine for hepatitis B that is similar to a traditional vaccine but can be produced by a banana for a fraction of the cost.

It's reasons like these that have led organizations like the United Nations to call biotechnology a “breakthrough technology for

developing countries”³¹ and the International Society of African Scientists to say that “Africa and the Caribbean cannot afford to be left further behind in acquiring the uses and benefits of this new agricultural revolution.”³²

Biotechnology is also being used to develop better food for people in the industrialized world. Researchers are working to develop:

- A cancer-fighting tomato with three times more beneficial lycopene than conventional varieties. Lycopene protects human tissue and could help prevent breast and prostate cancers as well as heart disease.
- New cooking oils made from canola, corn and soybeans that contain up to 10 times more healthful vitamin E. Researchers believe vitamin E can lower the risk of cardiovascular disease and some cancers.
- Food with fewer allergens. Researchers are working to reduce the allergens in rice, wheat, peanuts and other crops so more of the estimated 50 million people who suffer from allergies worldwide can enjoy the food most people eat everyday.

1978

Boyer's lab created a synthetic version of the human insulin gene.¹³

1982



The first biotech plant is produced — a tobacco plant resistant to an antibiotic. The breakthrough paved the way for beneficial traits, such as insect resistance, to be transferred to plants.¹⁴

1985



Field trials for biotech plants that are resistant to insects, viruses and bacteria are held in the United States.¹⁵

1986

The EPA approves the release of the first crop produced through biotechnology — tobacco plants.¹⁶ A coordinated framework for the regulation of products derived from biotechnology is established.¹⁷



“Biotechnology helps me be a more successful farmer and a better steward of my land.”

Donna Winters, farmer, Lake Providence, Louisiana

Better for the environment

Biotech crops are also helping protect the environment. A recent report confirmed their benefits.

“The results clearly show that soil, air and water quality are enhanced through the responsible use of current biotechnology-derived soybean, corn and other crops,” said Teresa Gruber, executive director of the Council for Agricultural Science and Technology.³³

Biotech crops also make it easier for farmers to use environmentally friendly conservation tillage practices, where more residue from the previous crop is left on the field rather than plowed under.

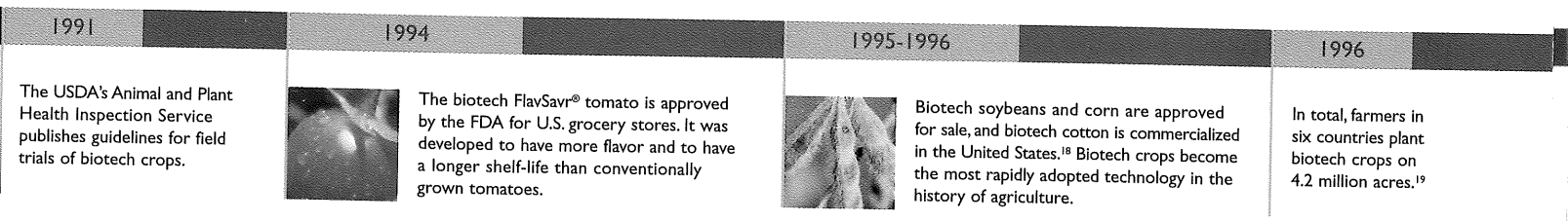
No-till conservation practices — the best for the environment because soil is left virtually undisturbed from harvest to planting — have increased 35 percent since biotech crops came on the market in 1996, according to a study by the Conservation Technology Information Center in Indiana.³⁴

“There is a clear association between sustainable tillage practices and biotech crops,” said the study, noting that nearly three-fourths of no-till soybean acres — and 86 percent of no-till cotton acres — were planted with biotech varieties.

Conservation tillage in the United States has:

- Saved nearly 1 billion tons of soil per year.
- Resulted in a projected \$3.5 billion savings by lowering maintenance costs for activities such as dredging rivers, cleaning road ditches and treating drinking water.
- Created better habitat for birds and mammals, which thrive in the protective residue of no-till fields.
- Reduced levels of phosphorous and nitrogen in lakes, streams and the Gulf of Mexico.
- Saved 306 million gallons of fuel in 2002 by reducing the number of tractor passes needed to control weeds. On average, no-till saves about 3.9 gallons of fuel per acre, according to the study.

In Canada, studies by George Morris Centre and the Canola Council of Canada have reached similar conclusions about the environmental benefits of biotech crops.





REGULATION

Before foods developed with biotechnology can be marketed in the United States, there are nine separate steps in the regulatory process that typically take seven to 10 years to complete — a far more rigorous process than is required for conventional foods, says Bruce Chassy, a professor of food microbiology at the University of Illinois.

“Crops produced through biotechnology have proven to be as safe or safer than crops produced by conventional breeding,” he says.³⁵

In Canada, there are six steps that must be taken before foods developed with biotechnology are approved.³⁶

After studying biotechnology issues for two years, the Canadian Biotechnology Advisory Committee said that although the regulatory process could be improved, biotech foods currently on the market are safe.

“GM foods currently in the marketplace have arguably undergone greater regulatory scrutiny than their conventional counterparts,” said the report.³⁷ “We conclude that no scientific evidence exists to suggest that GM plants and foods currently in the market pose any greater health or environmental risk than other foods.”³⁸

Safety

Perhaps the most telling fact about the safety of plant biotechnology is that there isn't a single documented case of an illness caused by foods developed with biotechnology since they first came on the market in the mid-1990s.³⁹

Even a report from the European Commission, whose member states are more skeptical about biotech products, concluded that "the use of more precise technology and the greater regulatory scrutiny [over biotech foods] probably make them even safer than conventional plants and foods."⁴⁰

That report, validating the safety of biotech crops, summarized more than 15 years of research by 400 research teams funded by European governments. A host of other organizations have also attested to the safety of foods developed with biotechnology.

- The American College of Nutrition "supports the use of biotechnology to develop food crops that contribute to global food security and enhance the safety and nutritional value of the food supply."
- The American Medical Association recognized the "many potential benefits offered by genetically modified crops and

foods... and encourages ongoing research developments in food biotechnology."⁴¹

- The International Society of Toxicology says "there is no reason to suppose that the process of food production through biotechnology leads to risks of a different nature than those... created by conventional breeding."
- The General Accounting Office — the investigative arm of the U.S. Congress — says "biotechnology experts believe that the current regimen of tests has been adequate for ensuring that GM foods marketed to consumers are as safe as conventional foods."
- And the World Health Organization said, "The benefits of biotechnology are many," including improved production and reduced pesticide use, and promise "major improvements in both food quality and nutrition."⁴²

Regulatory agencies in the United States:

Food and Drug Administration, Department of Agriculture, Environmental Protection Agency

Regulatory agencies in Canada:

Canadian Food Inspection Agency, Health Canada, Environment Canada

Regulatory agencies in Mexico:

CIBIOGEM, which includes six ministries (Agricultura, Salud, Medio Ambiente, Educacion, Economia, Hacienda y Credito Publico) and the National Council of Science and Technology (CONACYT)

1999



German and Swiss scientists develop golden rice, fortified with beta carotene, which stimulates production of vitamin A that can prevent some forms of blindness.²⁰

2000



The first entire plant genome is sequenced, *Arabidopsis thaliana*, which provides researchers with greater insight into the genes that control specific traits in many other agricultural plants.²¹

2000

Farmers in 13 countries plant biotech crops on 109.2 million acres, a 25-fold increase over 1996.²²

2001



U.S. and Canadian scientists develop a biotech tomato that thrives in salty soil, a discovery with the potential to create tomatoes and other crops that can grow in marginal conditions.²³



*“Biotechnology is the greatest thing since
hybrid corn.”*

Rod Gangwish, farmer, Shelton, Nebraska

Support grows

More organizations and leaders are voicing their support for the many benefits of biotechnology.

“We are increasingly encouraged that the advantages of genetic engineering of plants and animals are greater than the risks,” said Catholic Bishop Elio Sgreccia. “We cannot agree with the position of some groups that say it is against the will of God to meddle with the genetic make-up of plants and animals.”⁴³

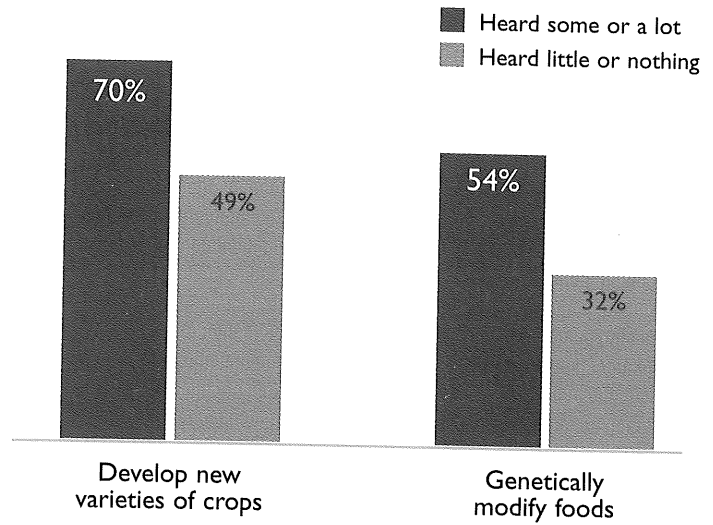
Opinion polls show that a majority of people believe plant biotechnology will be good for society in the long term. Julia Child, the master chef and cookbook author, says she’s fascinated by the potential benefits of biotechnology.

“If they can give us a better tomato, I’m for it,” she once said.

Biotechnology is just beginning to deliver the benefits that can improve lives all over the world. Yes, there are questions. But they are being answered by studies that are documenting the benefits these crops have delivered over the past few years. And that is just the beginning of the potential for biotechnology to provide more and better food in years ahead.

SUPPORT GROWS WITH KNOWLEDGE

Percent who support biotech to...



Council for Biotechnology Information, November 2002

2001

The European Commission releases a 15-year, \$64 million study that involved more than 400 research teams on 81 projects. It found that biotech products pose no more risk to human health or the environment than conventional crops.²⁴

2001

EPA renews registration for *Bt* corn²⁵ and cotton²⁶, citing that they do not pose health or environmental risks.

2002



A National Center for Food and Agricultural Policy study found that six biotech crops planted in the United States — soybeans, corn, cotton, papaya, squash and canola — produced an additional 4 billion pounds of food and fiber on the same acreage, improved farm income by \$1.5 billion and reduced pesticide use by 46 million pounds.²⁷

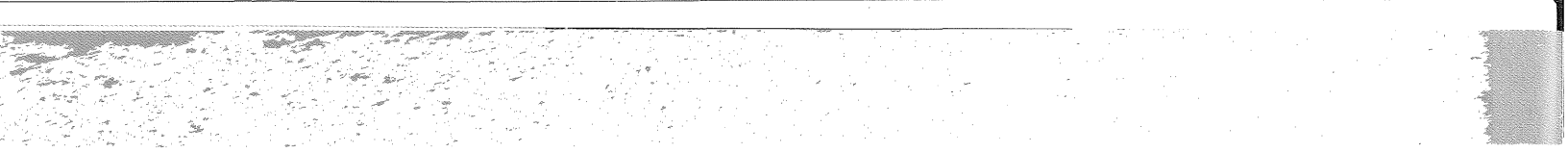
Sources

- 1 "Communiqué of the G8 Heads of Government meeting at Genova," Organization for Economic Cooperation and Development, July 2001, Communiqué of the G8 Heads of Government meeting at Genova, July 2001, www.oecd.org/EN/document/0,,EN-document-528-14-no-21-9800-528,00.html.
- 2 Harlander, Susan K. "The Evolution of Modern Agriculture and its Future with Biotechnology," Journal of the American College of Nutrition, June 2002, p. 161S, www.jacn.org/cgi/reprint/21/suppl_3/161S.pdf.
- 3 "Considering the Nature and Issues of Food Biotechnology," North Carolina Biotechnology Center, www.ncbiotech.org.
- 4 McGloughlin, Martina. "Harvest of Fear" interview, Nova/Frontline documentary, www.pbs.org/wgbh/harvest/interviews/mcgloughlin.html.
- 5 Photo by Hugh Iltis, www.wisc.edu/teosinte/Images.htm.
- 6 "Agricultural Biotechnology: What Are the Issues," University of California at Davis, College of Agricultural and Environmental Sciences.
- 7 About Biotech, Overview and History, Access Excellence, The National Health Museum, www.accessexcellence.org/AB/BC/1953-1976.html.
- 8 "Field Testing Genetically Modified Organisms: Framework for Decisions," National Academy Press, 1989, p. 13-14.
- 9 James, Clive. "Preview: Global Status of Commercialized Transgenic Crops: 2002," International Service for the Acquisition of Agri-biotech Applications, ISAAA Briefs, No. 27.
- 10 James, Clive. "Preview: Global Status of Commercialized Transgenic Crops: 2002," International Service for the Acquisition of Agri-biotech Applications, ISAAA Briefs, No. 27, p. 7.
- 11 James, Clive. "Preview: Global Status of Commercialized Transgenic Crops: 2002," International Service for the Acquisition of Agri-biotech Applications, ISAAA Briefs, No. 27, p. iii.
- 12 James, Clive. "Preview: Global Status of Commercialized Transgenic Crops: 2002," International Service for the Acquisition of Agri-biotech Applications, ISAAA Briefs, No. 27, p. 19.
- 13 James, Clive. "Preview: Global Status of Commercialized Transgenic Crops: 2002," International Service for the Acquisition of Agri-biotech Applications, ISAAA Briefs, No. 27.
- 14 Sears, Mark et al., with the Agricultural Research Service, "Impact of Bt corn pollen on monarch butterfly populations: A risk assessment," Proceedings of the National Academy of Sciences, Oct. 9, 2001, www.pnas.org/cgi/content/full/98/21/11937.
- 15 "Three Years Later: Genetically Engineered Corn and the Monarch Butterfly Controversy," Pew Initiative on Food and Biotechnology, p. 16, <http://pewagbiotech.org/resources/issuebriefs/monarch.pdf>.
- 16 "Resolution, VII European Congress on Entomology," October 7-13, 2002, Thessaloniki, Greece.
- 17 Gianessi, Leonard P. "Plant Biotechnology: Current and Potential Impact for Improving Pest Management in U.S. Agriculture, An Analysis of 40 Case Studies," June 2002, p. 1, www.ncfap.org/40CaseStudies/NCFAB_Exec_Sum.pdf.
- 18 James, Clive. "Global Review of Commercialized Transgenic Crops: 2001. Feature: Cotton," International Service for the Acquisition of Agri-biotech Applications, Dec. 13, 2002, www.isaaa.org/kc/CBTNews/ISAAA_PR/briefs26_exeng.htm.
- 19 Brookes, Graham. "The Farm Level Impact of Using Bt Maize in Spain," Sept. 16, 2002, www.europabio.org/upload/documents/gb_press_release/EuropaBio_btmaizeinspainreport_FINAL.pdf.
- 20 "Impact of Transgenic Canola on Growers, Industry and Environment," Canola Council of Canada, www.canola-council.org/production/impactsurvey.pdf.
- 21 James, Clive. "Preview: Global Status of Commercialized Transgenic Crops: 2002," International Service for the Acquisition of Agri-biotech Applications, ISAAA Briefs, No. 27, p. 17.
- 22 "Population Numbers and Trends: World Population Still Growing," United Nations Population Fund, www.unfpa.org/modules/briefkit/05.htm.
- 23 "State of World Population 2001: Chapter 2, Environment Trends, Moving Towards Food Security" United Nations Population Fund, November 7, 2001, www.unfpa.org/swp/2001/english/ch02.html#2d.
- 24 Hautea, Randy A., James, Clive. "The Road to Global Sustainable Agriculture: A View and Experience from ISAAA," multimedia presentation, slide 3.
- 25 Prakash, C.S. "Agricultural Biotechnology and Food Security," PowerPoint presentation, Slide 8, www.agbioworld.org.
- 26 "Food in the 21st Century: From Science to Sustainable Agriculture," Consultative Group on International Agricultural Research (CGIAR), p. 21, www.worldbank.org/html/cgiar/publications/shahbook/shahbook.pdf.
- 27 "Food in the 21st Century: From Science to Sustainable Agriculture," Consultative Group on International Agricultural Research (CGIAR), p. 24, www.worldbank.org/html/cgiar/publications/shahbook/shahbook.pdf.
- 28 "Sweet Potato," International Service for the Acquisition of Agri-biotech Applications, www.isaaa-africenter.org/sweetpotatoes.htm.
- 29 "Combating Vitamin A Deficiency: The Challenge," World Health Organization Web site, Sept. 12, 2002, www.who.int/nut/vad.htm.
- 30 "Harvest on the Horizon," Pew Initiative on Food and Biotechnology, September 2001, pewagbiotech.org/research/harvest/harvest.pdf.
- 31 "Although Controversial, Biotechnology Could Be Breakthrough Technology for Developing World," United Nations Development Programme, July 10, 2001, www.undp.org/hdr2001/pr2.pdf.
- 32 International Society of African Scientists Position Statement on Agricultural Biotechnology Applications in Africa and the Caribbean, www.monsantofrica.com/reports/ISAS/ISAS.html.
- 33 "Biotech Crop Use Benefits Environment," Council for Agricultural Science and Technology press release, June 25, 2002, www.cast-science.org/pubs/biotechcropbenefit_nr.htm.
- 34 "Conservation Tillage and Plant Technology: How New Technologies Can Improve the Environment by Reducing the Need to Plow," Conservation Technology Information Center, October 2002, www.ctic.purdue.edu/CTIC/Biotech.html.
- 35 "Food Safety Evaluation of Crops Produced Through Biotechnology," Journal of the American College of Nutrition, Vol. 21, No. 90003, 166S-173S (2002),

- ³⁵ "Food Safety Evaluation of Crops Produced Through Biotechnology," *Journal of the American College of Nutrition*, Vol. 21, No. 90003, 166S-173S (2002), www.jacn.org/cgi/content/full/21/suppl_3/166S.
- ³⁶ "Plant Biotechnology in Canada," Council for Biotechnology Information, www.hybiotech.com/html/pdf/plant_bt_in_canada.pdf.
- ³⁷ "Improving the Regulation of Genetically Modified Foods and Other Novel Foods in Canada," Canadian Biotechnology Advisory Committee, August 2002, p. ix, www.cbac-cccb.ca/documents/en/cbac_report.pdf.
- ³⁸ "Improving the Regulation of Genetically Modified Foods and Other Novel Foods in Canada," Canadian Biotechnology Advisory Committee, August 2002, p. xii, www.cbac-cccb.ca/documents/en/cbac_report.pdf.
- ³⁹ Aaron, David, former undersecretary of Commerce and Trade. "In Support of Biotechnology (Expert Views)," *The Alliance for Better Foods*, www.betterfoods.org/Expert/Expert.htm.
- ⁴⁰ "Commission Launches Roundtable on GMO Safety Research," European Commission, Sept. 10, 2001, europa.eu.int/rapid/start/cgi/guesten.ksh?pp_action=gettxt=gt&doc=IP/01/1391/10RAPID&lg=E N&display.
- ⁴¹ "Genetically Modified Crops and Foods," American Medical Association (AMA), Recommendation #6, www.ama-assn.org/amc/pub/article/2036-3604.html.
- ⁴² "Report of a Joint Consultation of the U.N. Food and Agriculture Organization and the World Health Organization" 1996, www.who.int.
- ⁴³ "Vatican Experts OK Plant, Animal Genetic Engineering," *St. Louis Review*, Oct. 22, 1999, www.bio.org/food&ag/vatican.html.
- ⁹ Hybrid Corn History, Development, National Corn Handbook, www.inform.umd.edu/EdRes/Topic/AgrEnv/ndd/agronomy/HYBRID_CORN_HISTORY%2C_DEVELOPMENT.html.
- ¹⁰ "Watson and Crick Describe Structure of DNA," *A Science Odyssey, People and Discoveries*, PBS, www.pbs.org/wgbh/aso/databank/entries/do53dn.html.
- ¹¹ Billions Served, Reason Online, April 2000, reason.com/0004/fe.rb.billions.shtml.
- ¹² About Biotech, Access Excellence, The National Health Museum, www.accessexcellence.org/AB/BC/1977-Present.html.
- ¹³ About Biotech, Access Excellence, The National Health Museum, www.accessexcellence.org/AB/BC/1977-Present.html.
- ¹⁴ About Biotech, Access Excellence, The National Health Museum, www.accessexcellence.org/AB/BC/1977-Present.html.
- ¹⁵ About Biotech, Access Excellence, The National Health Museum, www.accessexcellence.org/AB/BC/1977-Present.html.
- ¹⁶ About Biotech, Access Excellence, The National Health Museum, www.accessexcellence.org/AB/BC/1977-Present.html.
- ¹⁷ "Milestones in Molecular Biology and U.S. Agricultural Biotechnology," *Economic Issues in Agricultural Biotechnology/AIB-76Z*, USDA-ERS.
- ¹⁸ "Biotech Basics, A Brief Biotech Timeline," Monsanto, www.biotechknowledge.monsanto.com/biotech/bbasics.nsf/timeline.html?OpenPage.
- ¹⁹ International Service for the Acquisition of Agri-biotech Applications, www.isaaa.org.
- ²⁰ "Biotech Basics, A Brief Biotech Timeline," Monsanto, www.biotechknowledge.monsanto.com/biotech/bbasics.nsf/timeline.html?OpenPage.
- ²¹ "Little Weed in Science Landmark," *BBC News*, Dec. 13, 2000, news.bbc.co.uk/1/hi/sci/tech/1068848.stm.
- ²² International Service for the Acquisition of Agri-biotech Applications, www.isaaa.org.
- ²³ Travis, John. "Gene Makes Tomatoes Tolerant of Salt," *Science News Online*, Aug. 4, 2000, www.sciencenews.org/20010804/job1.asp.
- ²⁴ "EC-sponsored Research on Safety of Genetically Modified Organisms: A Review of Results," European Commission Web site, europa.eu.int/comm/research/quality-of-life/gmo/index.html.
- ²⁵ "Biotech Corn Approved for Continued Use," Environmental Protection Agency, Oct. 16, 2001, yosemite.epa.gov/opa/admpress.nsf/b1ab9f485b098972852562e7004dc686/8db7a83e66e0f7d085256ae7005d6ec2?OpenDocument.
- ²⁶ "Conditional Registration of Bt Cotton Reaffirmed," Environmental Protection Agency, Oct. 2, 2001, yosemite.epa.gov/opa/admpress.nsf/b1ab9f485b098972852562e7004dc686/e9220c40c6c547de85256ad90063699b?OpenDocument.
- ²⁷ Gianessi, Leonard P. "Plant Biotechnology: Current and Potential Impact for Improving Pest Management in U.S. Agriculture, An Analysis of 40 Case Studies, Executive Summary," June 2002, p. 1, www.nefap.org/40CaseStudies/NCFAB_Exec_Sum.pdf.

Timeline Sources

- ¹ Leapman, Michael. *The Ingenious Mr. Fairchild*, St. Martin's Press. New York, 2001.
- ² "Mendel, Gregor Johann," Microsoft® Encarta® Online Encyclopedia 2002, encarta.msn.com/encnet/refpages/RefArticle.aspx?refid=761562358.
- ³ Biotechnology Industry Organization timeline, www.bio.org/en/timeline2.asp.
- ⁴ "Luther Burbank: The Idaho Potato," The Lemelson-MIT Award's Program's Invention Dimension, web.mit.edu/invent/www/inventorsA-H/burbank.html.
- ⁵ Hybrid Corn History, Development, National Corn Handbook, www.inform.umd.edu/EdRes/Topic/AgrEnv/ndd/agronomy/HYBRID_CORN_HISTORY%2C_DEVELOPMENT.html.
- ⁶ About Biotech, Overview and History, Access Excellence, The National Health Museum, www.accessexcellence.org/AB/BC/Overview_and_Brief_History.html.
- ⁷ "Luther Burbank: The Idaho Potato," The Lemelson-MIT Award's Program's Invention Dimension, web.mit.edu/invent/www/inventorsA-H/burbank.html.
- ⁸ Biotechnology Industry Organization Timeline, www.bio.org/en/timeline2.asp.



GETTING INVOLVED WITH THE HORMEL INSTITUTE

Tours: Would you or your group like to tour the Hormel Institute? Tours for individuals last thirty minutes. Tours for groups last one hour and include a presentation on the work and history of the Hormel Institute. Tours can be scheduled weekdays 8:00am to 4:30pm and in some cases on Saturday.

Presentations: Would your class, group or service club be interested in hearing more from the Hormel Institute? Presentations include: "Thinking Like A Scientist", "The Work and History of the Hormel Institute", "Fighting Cancer in the Kitchen", and "Value of Scientific Research". Presentations can last from 20 to 45 minutes depending on your needs.

Volunteer Opportunities: Volunteers are currently needed to serve as Tour Guides, speak on the Speaker's Bureau and to serve on the Research Support Advisory Council.

Press Inquiries: Writing a story about scientific research, cancer research, or the economic impact of research? In addition to the availability of a professional public relations staff, the Hormel Institute has scientists who may offer insights into scientific and medical breakthroughs.

Making Gifts in Support of Scientific Research: Would you like to support research for an alternative to chemotherapy? Interested in giving researchers cutting edge tools to do their work? Gifts to the Hormel Institute, University of Minnesota are tax deductible and fund new staff, new programs and new equipment.



THE HORMEL INSTITUTE

UNIVERSITY OF MINNESOTA

Fill out tear off card and send to Hormel Institute for more information

Name _____

Job Title _____

Company _____

Address/P.O. Box _____






City _____

State _____ Zip _____ Country _____

Phone _____ Fax _____

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Please fill in the key you would like more information for:

-  Tours
-  Presentations
-  Volunteer Opportunities
-  Press Inquiries
-  Making Gifts in Support of Scientific Research

Mail this portion to:
The Hormel Institute
University of Minnesota
801 16th Avenue N.E.
Austin, MN 55912

WELCOME TO THE HORMEL INSTITUTE

The purpose of the Hormel Institute is to promote research and education in various fields of biological science with applications in medicine. Currently, the Hormel Institute is investigating the causes of cancer to develop new basic strategies for its prevention, treatment and cure. The Institute's aim is to build bridges that effectively span the gap between basic laboratory research and clinical application.

The Hormel Institute is an independent research branch of the Graduate School of the University of Minnesota. The Institute currently employs 70 people including research scientists, laboratory technicians, administrative and building and grounds personnel. All personnel are University of Minnesota employees. The work of the Hormel Institute is strongly supported by the Hormel Foundation.

After 62 years of continued productivity and scientific development, the Hormel Institute is widely recognized as an important biomedical research center of the University of Minnesota and is well known internationally for its significant contributions to biomedical science. The Hormel Institute is now prepared to add new programs and to enter a new phase of growth.

The Hormel Institute employs some of the world's leading scientists working on cutting edge research. Among our many collaborative research partners are: University of Minnesota Cancer Center, Mayo Clinic, Rutgers University, and the University of Arizona.

The Hormel Institute is unique in its exclusive access to hundreds of natural compounds for testing in the prevention and treatment of cancer.

Early projects of the Hormel Institute included: development of a miniature pig for use in studying human disease, lipid metabolism and chemistry, and the preservation of foods. The Hormel Institute became the nation's leading center of scientific research in the field of lipids.

Currently, the Hormel Institute is rapidly becoming a recognized leader in the scientific field showing that foods modulate crucial cellular pathways in cancer development and prevention, and we were among the first to report the discovery of key elements in tumor promotion. We are making major contributions to the identification and characterization of natural anti-cancer agents that are nontoxic and highly effective.

RECENT DISCOVERIES OF THE HORMEL INSTITUTE INCLUDE:

- The link between sunlight (UVA and UVB radiation) and skin cancer.
- Food factors modulate signal transduction pathways crucial in cancer development and prevention.
- Molecular mechanisms that are key players in tumor promotion.
- Topical application of certain tea polyphenols reduces skin cancer risk.
- The discovery that omega 3, a fat found in fish oil, effectively inhibits the development of several cancers.
- Ginger compounds are highly effective in treating established cancers, including colorectal cancers.

LEADERSHIP OF THE HORMEL INSTITUTE

Zigang Dong, M.D., Dr.P.H. Executive Director
Hormel/Knowlton Professor
Ann M. Bode, Ph.D Assistant Director

RESEARCH SECTIONS OF THE HORMEL INSTITUTE

Biophysics

Howard L. Brockman, Jr., Ph.D., Professor

Cancer Biology,

Junxuan Lü, PhD, Associate professor

Cell Biochemistry

David W. Li, Ph.D., Assistant Professor

Cellular & Molecular Biology

Zigang Dong, Ph.D., Professor

Membrane Biochemistry

R. E. Brown, Ph.D., Professor

Nutrition & Metabolism

Margot P. Cleary, Ph.D., Associate Professor

SUPPORT UNITS FOR THE HORMEL INSTITUTE INCLUDE:

Research Support Services & Distance Outreach and Education

Office, Library, Building Operations and Maintenance

MEDIA ATTENTION

Last year, the Hormel Institute reported several significant and highly publicized cancer-related discoveries. In particular, two research

developments received enormous publicity. The first was the work showing that green tea targeted an important cancer gene and its application prevented skin cancer. The second study showed that feeding ginger to mice with human colon cancer implants significantly delayed the growth of

those tumors. These findings were presented at the American Cancer Society meeting and the American Association for Cancer Research "Frontiers in Cancer Research", respectively. Both were carried by hundreds of radio and TV stations, including CNN and CBS and were also reported on several hundred websites.

PATENTS PENDING

Our patent on the use of ginger compounds as a cancer therapeutic agent has been filed in the U.S. Europe and Canada and research studies continue to be sponsored by Pediatric Pharmaceuticals, Isleim NJ. We have several additional patents in process or pending on the use of selected natural compounds as anti-cancer agents derived from Noni fruits, lactone compounds, Chinese herbal compounds (rabdosisia rubescens), and dactylones and glabruquinones isolated from marine organisms.

EXPANSION PLANS

Over the last 2-3 years – the Hormel Institute has been growing exponentially in terms of cancer prevention programs and other external funding

Over the next 2-5 years we are projecting continued rapid growth with the addition of more research programs to investigate the causes of cancer and develop new basic strategies for its prevention, treatment and cure.

Plans are being developed to provide facilities to accomodate our rapidly expanding cancer research programs.

REASONS FOR COMMUNITY INTEREST AND SUPPORT OF THE HORMEL INSTITUTE:

- Desire for new natural treatments for cancer as an alternative to chemotherapy
- An interest in preventing, treating, curing a particular type of cancer
- Recognition that biomedical research improves the quality of life
- The pursuit of knowledge – understanding how something "works"
- An economic development interest in benefiting Southern Minnesota
- An interest in healthy lifestyles and cancer prevention
- Pride in a local institution with a world-wide reputation
- Valuing cultural diversity that contributes to quality of life in community

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

THE HORMEL INSTITUTE

UNIVERSITY OF MINNESOTA

MEMORANDUM OF AGREEMENT
ESTABLISHING

**THE HORMEL INSTITUTE
AUSTIN, MINNESOTA**

AS A

**UNIT OF
THE GRADUATE SCHOOL
UNIVERSITY OF MINNESOTA**

CERTIFICATE OF INCORPORATION
AND BY LAWS OF

**THE HORMEL FOUNDATION
AUSTIN MINNESOTA**

NOVEMBER 30, 1942

Leadership of The Hormel Institute

- Zigang Dong, M.D.,
Dr.P.H.
Executive Director
Hormel/Knowlton
Professor



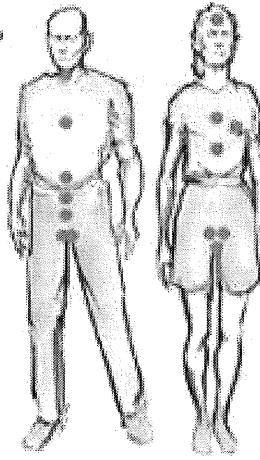
Cancer becomes top killer of most Americans

For the first time, cancer has surpassed heart disease as the top killer of Americans under 85, health officials said.

Rate of cancer deaths by type for top cancers in all ages*

MALE

Lung	31%
Prostate	10
Colon and rectum	10
Pancreas	5
Leukemia	4
Esophagus	4
Liver	3
Non-Hodgkin's lymphoma	3
Bladder	3
Kidney	3



FEMALE

27%	Lung
15	Breast
10	Colon and rectum
6	Ovary
6	Pancreas
4	Leukemia
3	Non-Hodgkin's lymphoma
3	Uterine
2	Multiple myeloma
2	Nervous system**

* Estimates for 2005 ** Includes brain

Cancer affects us all

Deaths from the most common cancers are still rising in spite of President Nixon declaration in 1971 of “the war on cancer”

Cancer’s toll is enormous causing personal suffering, lost productivity and increasing health care costs.

Its as if one World Trade Center tower collapses each day in terms of the loss of life

To win the war against cancer:

- **We must know the enemy-- understand carcinogenesis.**
- **Prevent or treat cancer by targeting specific cancer genes and/or proteins.**

Changing Trends In Cancer Treatment

Past	Present	Future
<ul style="list-style-type: none">• Combinations of nonspecific cytotoxic drugs• Balance efficacy with side effects	<ul style="list-style-type: none">• Focus on molecular cause(s) of cancer• Selectively exploit tumor traits• Achieve higher therapeutic index• Targeted therapy	<ul style="list-style-type: none">• Combination cytotoxic plus targeted therapy

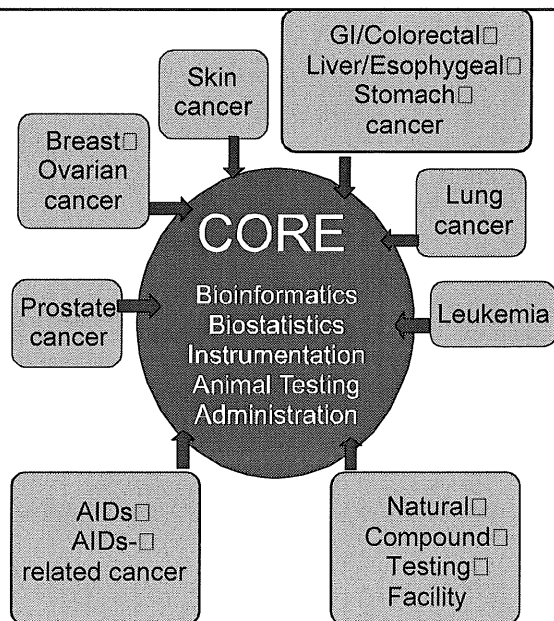
Chemoprevention provides desired alternatives

- Chemoprevention is the use of chemical agents, drugs or food supplements to prevent disease.
- Nutritional or dietary factors have attracted a great deal of interest.
- Dietary factors are one of the most important origins of human cancer.

The Hormel Institute is uniquely qualified to generate these alternatives

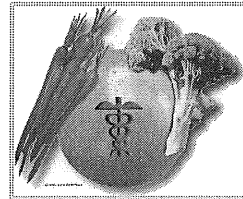
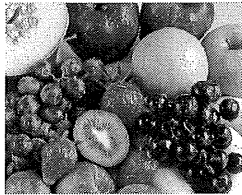
- Employs some of the world's leading scientists working on cutting edge research.
- Many collaborative research partners
 - University of Minnesota Cancer Center
 - Mayo Clinic
 - Rutgers University
 - the University of Arizona
- Exclusive access to hundreds of natural compounds for testing in the prevention and treatment of cancer.
- Scientifically sound understanding of the way food interacts with cancer cells

The Hormel Institute will accelerate the process with the right people, resources and facilities



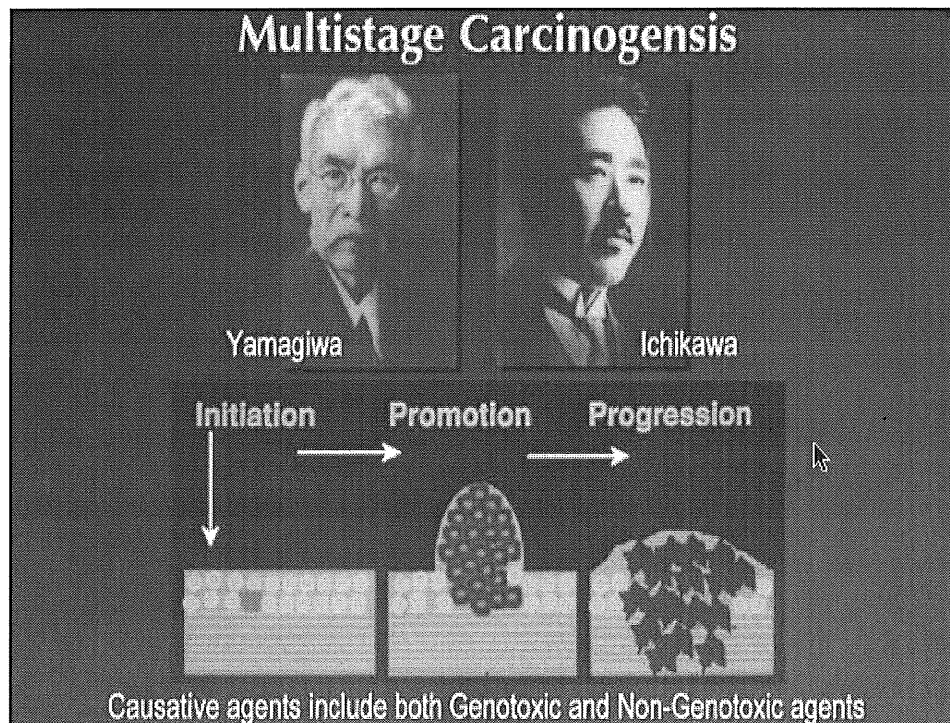
Hormel Institute

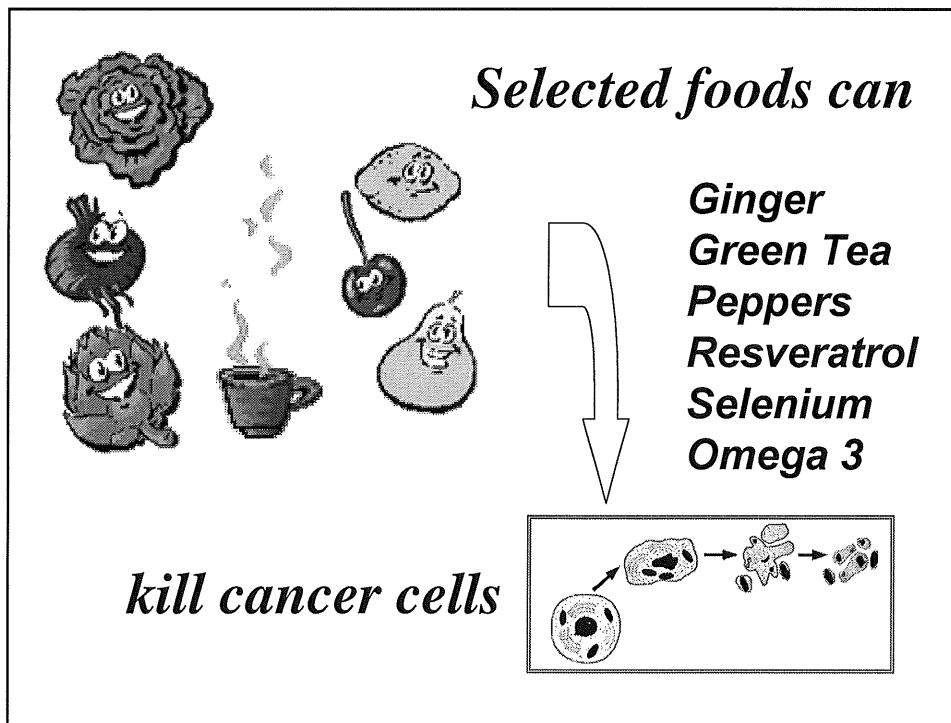
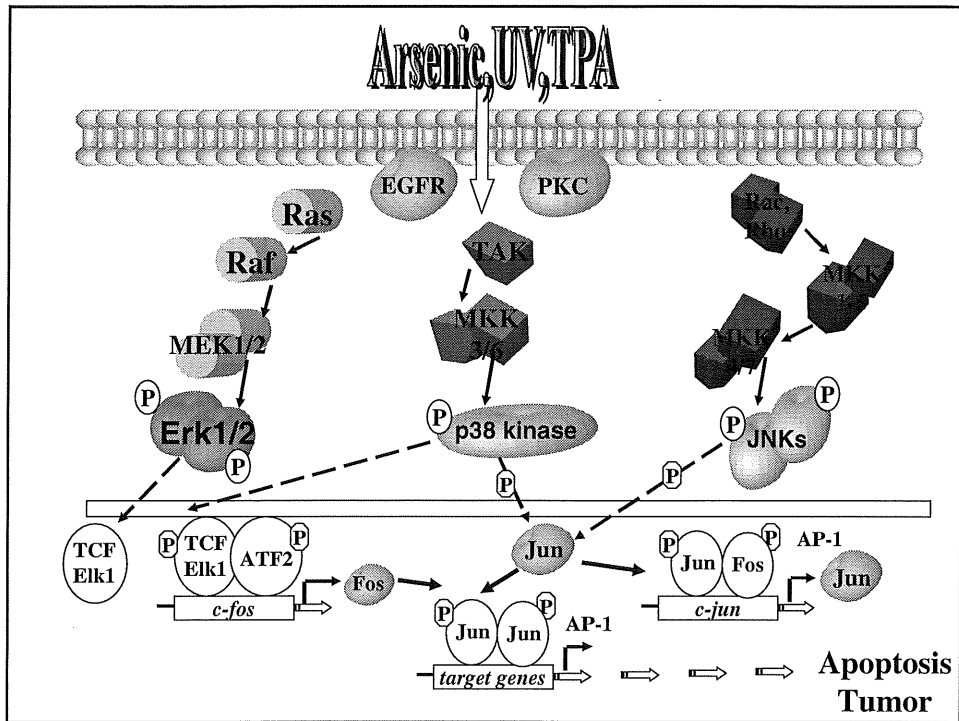
Our goal is to identify anticancer agents that are nontoxic with no side effects



Many food factors have potent anticancer activities.

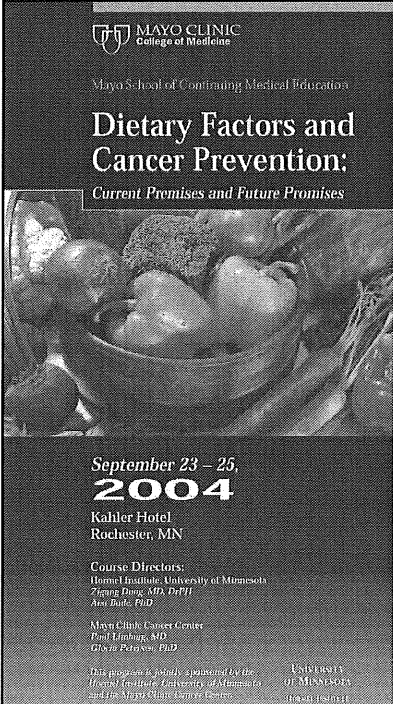
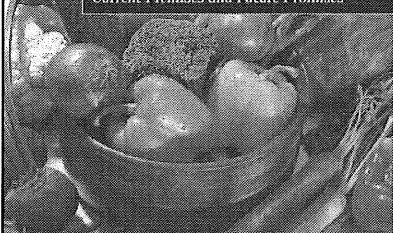
In collaboration with colleagues throughout the USA and world, we are testing the anticancer effect of hundreds of food factors.





Patents

- Ginger compounds as a therapeutic agent filed in U.S., Europe and Canada
- Filing patents on chemotherapeutic agents derived from Noni fruits, lactone compounds, Chinese herbal compounds, and compounds isolated from marine organisms

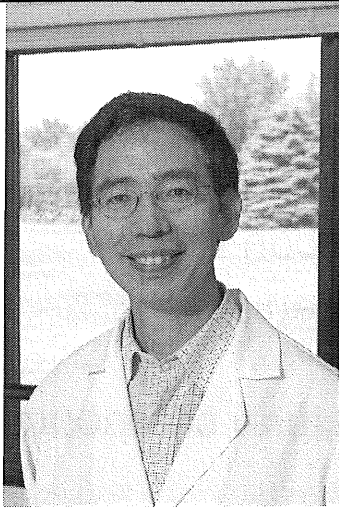
 <p>MAYO CLINIC College of Medicine Mayo School of Continuing Medical Education</p> <p>Dietary Factors and Cancer Prevention: <i>Current Promises and Future Promises</i></p>  <p>September 23 – 25, 2004 Kahler Hotel Rochester, MN</p> <p>Course Directors: Hemel Institute, University of Minnesota Ziyang Dong, MD, DrPH Ann Doherty, PhD</p> <p>Mayo Clinic Cancer Center Paul Minkov, MD Gloria Padgug, EdD</p> <p><small>This program is jointly sponsored by the Hemel Institute, University of Minnesota, and the Mayo Clinic Cancer Center.</small></p>	<h2>Reputation</h2> <p>Dietary Factors and Cancer Prevention was a “smashing success”!</p> <p>So much so that the NIH is considering moving its October 2005 study section which was to be held in San Diego to Rochester so that it can coincide with our next symposium on signal transduction.</p>
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Economic Development Opportunities

- Use of facilities – possible business incubation activities
- Contract for services ala Alcon Labs
- License opportunities ala Pediatric Pharmaceuticals
- Drug development from natural compound research
- Spin off businesses utilizing Hormel Institute expertise – i.e. Good Housekeeping seal of approval on natural compound testing

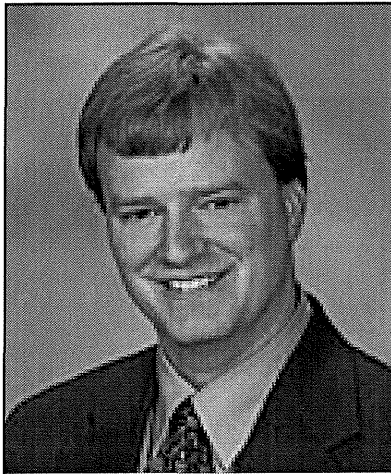
Rapid Growth of Functional Foods

“Functional foods/nutraceutical sales are projected to grow at an average rate of 9.9% annually, reaching \$74.7 billion by 2003”
(Business Communications Company, Inc. RGA-085R
Evolving Nutraceutical Business,
May 2003)



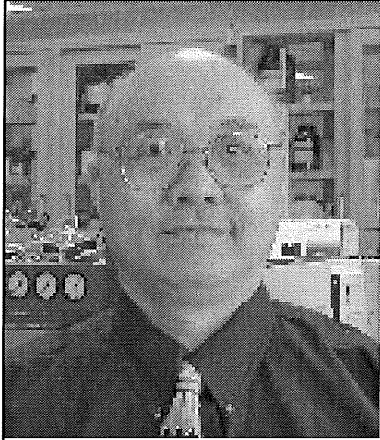
Professor Zigang Dong, Director of the Hormel Institute and worldwide authority on diet and cancer prevention research, is establishing a core group of highly successful cancer researchers

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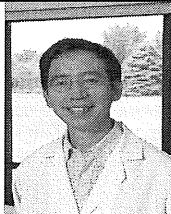
Dr. Paul Limburg, from the Mayo Cancer Center, runs the new Chemopreventive Clinical Trial Unit, which has the capacity for running full clinical trials in both preventive and therapeutic cancer regimens. The Mayo Clinic Cancer Center will conduct Phase I and II clinical trials.

 **MAYO CLINIC**
College of Medicine

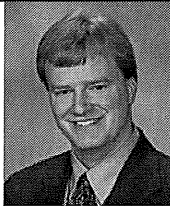


THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

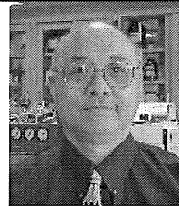
Dr. Chi-Tang Ho, Rutgers University, is a national and international leader in the isolation, purification and synthesis of dietary food factors from a variety of plant and animal sources. This group will purify food factors from vegetables, fruit, and other foods.



THE HORMEL INSTITUTE
UNIVERSITY OF MINNESOTA



 MAYO CLINIC
College of Medicine



THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

Together we are initiating and coordinating systematic testing of hundreds of dietary factors isolated from natural agricultural sources.



1 Vision

Preventing and Treating Cancer
with Food and Nontoxic Drugs

2 Outcomes

Alternatives to Economic
Chemotherapy Benefits for
 Minnesota

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