

RESEARCH AND DEVELOPMENT AT THE UNIVERSITY OF MARYLAND BALTIMORE



FISCAL YEAR 2002 ANNUAL REPORT

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RESEARCH AND DEVELOPMENT AT THE UNIVERSITY OF MARYLAND BALTIMORE FISCAL YEAR 2002 ANNUAL REPORT

► OVERVIEW

The University of Maryland Baltimore reached a milestone number in extramural funding in FY 02: \$305.3 million. The research conducted on campus and the hundreds of projects funded from federal, state and local governments and the private sector demonstrate UMB's ever-increasing contribution to the life sciences and health care research fields. As an economic engine for Maryland, UMB provides access to millions of dollars of research to the business community. The commercial potential for much of this work is being actively patented and licensed.

Summary of Success

Principal Investigators with Awards:	617
Principal Investigators with \$1 million Plus in Awards:	44
Funding Applications:	2,274
Funding Awards:	1,673
Total Dollar Amount of Extramural Funding:	\$305.3 Million
Total Dollar Amount of Extramural Funding through ORD:	\$250 Million
% of Total Extramural Funding:	82%
Volume of Federal Awards:	\$142.7 Million
NIH Funding Amount:	\$127.2 Million
% of Indirect Costs:	22.8%

► EXTRAMURAL FUNDING AT UMB

Support for extramural funding at the UMB campus has tripled in the last eight years. UMB has a combined total of \$305,376,642 in funding in FY 02, a 19% increase over FY 01's \$256 million. Federal sources account for more than half of these resources. An increase of 25% in corporate sponsored research from FY 01 totals is significant, with corporate funding now accounting for 13% of these resources.

Grants and contracts processed through the Office of Research and Development constitute \$250 million of the total in extramural support in FY 02 or 84% of the total. Other sources, contributing \$55 million to this total include, the UMB Foundation, the School of Medicine, and the Veterans Administration.

Details of extramural funding, by school, are on the following page.

Summary of Extramural Funding, by School – FY 02

School	Amount Awarded through ORD	Other UMB Offices and Partners	Total FY 02	% of Total
Dental	\$10,036,801	\$1,275,247	\$11,312,048	4%
Law	\$1,019,378	\$1,868,802	\$2,888,180	1%
Medicine	\$211,541,049	\$45,434,940	\$256,975,989	84%
Nursing	\$6,883,308	\$2,318,536	\$9,201,844	3%
Pharmacy	\$9,759,187	\$1,427,407	\$11,186,594	4%
Social Work	\$8,750,812	\$634,895	\$9,385,707	3%
Campus Admin.	\$2,066,047	\$2,360,233	\$4,426,280	1%
TOTAL	\$250,056,582	\$55,320,060	\$305,376,642	100%

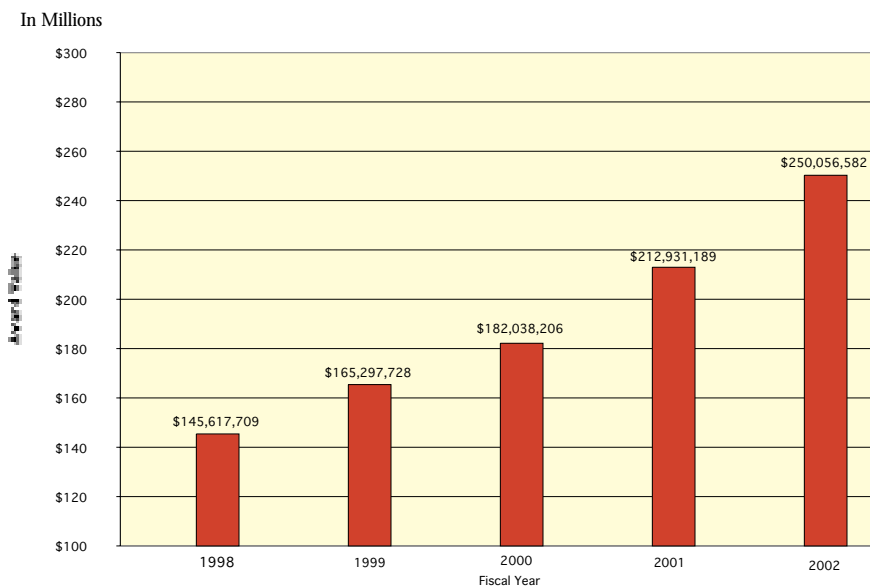
Following are the details of the greatest portion of external funding (84%): Grants and contracts processed through the Office of Research and Development.

OFFICE OF RESEARCH AND DEVELOPMENT OUTCOMES

Of the \$305 million in extramural funding, the **Office of Research and Development (ORD)** processed \$250 million in awards. This number sets yet another record for the campus for grants and contracts, with a 17% increase over FY 01 totals. The \$250 million includes grants and contracts for research, training and service from sources including the federal, state and local governments, corporations and foundations. Awards processed through ORD have realized a 34% rate of growth since FY 98 and doubled in the last seven years.

The following charts and graphs detail these trends in funding amounts, by source and by school.

GRANTS AND CONTRACTS, COMPETITIVE AWARDS (FY 98 – FY 02)



The number of applications was up 7% in FY 02 and the number of awards increased by 5%. Indirect costs accounted for 22.8% of project costs in FY 02. The five-year trend is illustrated below:

GRANT APPLICATIONS AND AWARDS ACTIVITY FY 98 – FY 02

YEAR	APPLICATIONS	AWARDS	\$ AMOUNT	DIRECT	INDIRECT	% IDC
FY 98	1,916	1,316	\$145,617,709	\$119,707,347	\$25,910,362	21.64%
FY 99	1,845	1,325	\$165,297,728	\$134,414,138	\$30,883,590	22.98%
FY 00	2,017	1,451	\$182,038,206	\$148,745,134	\$33,293,072	22.38%
FY 01	2,115	1,597	\$212,931,189	\$174,869,951	\$38,061,238	21.77%
FY 02	2,274	1,673	\$250,056,582	\$203,618,096	\$46,438,486	22.80%

AWARDS BY SOURCE:

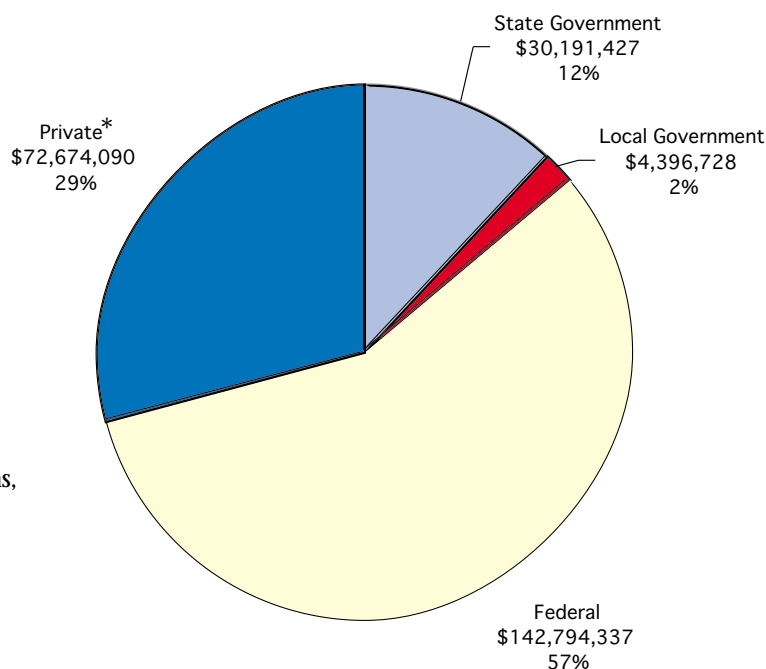
Federal sources contribute 57% of the total dollar value of awards, and privately sponsored projects contribute a significant 29%.

FEDERAL AND NON-FEDERAL AWARDS FIVE-YEAR TREND

YEAR	FEDERAL	NON-FEDERAL	TOTAL	% INCREASE
FY 98	\$86,677,069	\$58,940,640	\$145,617,709	
FY 99	\$98,883,075	\$66,414,653	\$165,297,728	13.51%
FY 00	\$107,442,033	\$74,596,173	\$182,038,206	10.13%
FY 01	\$122,588,076	\$90,343,113	\$ 212,931,189	16.97%
FY 02	\$142,794,337	\$107,262,245	\$ 250,056,582	17.44%

To further illustrate:

GRANTS AND CONTRACTS FY 02 TOTALS BY SOURCE OF FUNDS TOTAL \$250,056,582



* Private includes: corporations, foundations, other universities

Of federal sources, the National Institutes of Health (NIH) contributes 89% of all project funding processed through ORD. The Department of Defense, with more than \$5.9 million in support, is the second-largest federal-funder. The following chart details dollar amounts by major contributing source:

AGENCY SUMMARY REPORT OF AWARDS RECEIVED (FY 01 – FY 02)

SOURCE	FY 01 #	FY 01 AMOUNT	FY 02 #	FY 02 AMOUNT
National Science Foundation	8	\$1,225,156	5	\$538,436
Dept. of Health & Human Services	466	\$107,224,128	464	\$127,265,434
Dept. of Defense	29	\$2,993,043	40	\$5,825,276
U.S. Dept. of Education			1	\$148,579
Environmental Protection Agency	2	\$520,541	2	\$173,699
U.S. Dept. of Energy	1	\$337,000	2	\$546,659
Other Federal Agencies	190	\$10,526,878	173	\$8,296,254
State of Maryland	96	\$21,260,539	127	\$30,191,427
City and Local Governments	52	\$4,014,351	64	\$4,396,728
Private Agencies	755	\$65,089,273	793	\$72,644,090
All Other			1	\$30,000
Total	1,559	\$213,190,909	1,672	\$250,056,582

See [Appendix A](#) for detail of all government sources, by agency, since FY 98 and [Appendix B](#) for the NIH and all other federal sources, by school, five-year trend.

Contributing significantly to UMB sponsored research totals are corporate sponsors, many of whom are local Maryland companies and most of the largest biomedical and pharmaceutical companies in the world:

Maryland Companies

Amarex, LLC	Guilford Pharmaceuticals, Incorporated	PEM Technologies
Clinical Cardiovascular Research	Human Genome Sciences	Pro-Neuron Incorporated
Cylex Incorporated	MedImmune Incorporated	Sequella Incorporated
Digene Corporation	Metamorphix Incorporated	Shire Laboratories
Dovetail Technologies	Nutramax Laboratories, Incorporated	Westat Incorporated
GenVec Incorporated	Otsuka America Pharmaceutical	

Other Industry Leaders Sponsoring Research at UMB:

Alza Corporation	Eli Lilly Research Labs	Sanofi-Synthelabo Research
Abbott Laboratories Fund	Fujisawa USA Incorporated	Schering Corporation
Agouron Pharmaceuticals	G.D. Searle & Company	Scios Nova Incorporated
Amgen Incorporated	Genentech Incorporated	Searle Laboratories
AstraZeneca LP	Genzyme Corporation	Smith Kline Beecham
Aventis Pasteur SA	Kowa Company	Sugen Incorporated
Baxter Healthcare Corporation	Ligand Pharmaceuticals, Inc.	Takeda Chemical Industries, Ltd.
Bayer, AG	Medtronic Incorporated	Teva Pharmaceutical Industries
Biogen Research Corporation	Novartis Pharma AG	Titan Pharmaceuticals
Boston Life Sciences, Inc.	Novo Nordisk	Valentis Incorporated
Boston Scientific Corporation	Pfizer Incorporated	Vion Pharmaceuticals
Bristol-Myers Squibb	Pharmacia & Upjohn Company	Wyeth-Ayerst Laboratories
COR Therapeutics, Inc.	Procter and Gamble Company	Yamanouchi Pharmaceutical, Ltd.
Coulter Pharmaceuticals	Roche Diagnostics/BMC	
Dupont Merck Pharmaceutical Co.	Sankyo Pharma Development	

► SUCCESS BY SCHOOL

Each of the UMB schools is significantly expanding the dollar value of awards. It also should be noted that, increasingly, awards are being won by teams of faculty located in different departments and in different schools. The following table reflects that the entire award is allocated solely to the school/department of the primary investigator.

UMB EXTRAMURAL FUNDING AWARDS BY SCHOOL FY 02

Schools	FY 01	FY 02	Increase
Dental	\$7,536,298	\$10,036,801	33.2%
Law	\$650,903	\$1,019,378	56.6%
Medicine	\$184,559,483	\$211,541,049	14.6%
Nursing	\$4,493,407	\$6,883,308	53.2%
Pharmacy	\$8,677,610	\$9,759,187	12.5%
Social Work	\$4,988,934	\$8,750,812	75.4%
Campus Admin.	\$2,024,554	\$2,066,047	2%
Total	\$212,931,189	\$250,056,582	17.4%

The direct and indirect costs related to each school for FY 02 follows:

DIRECT AND INDIRECT COSTS FOR AWARDS BY SCHOOL

Schools	# of Awards	Total Amount Awarded	Direct Cost	Indirect Costs	% Ind/Dir
Dental	86	\$10,036,801	\$7,451,680	\$2,585,121	34.69%
Law	22	\$1,019,378	\$996,006	\$23,372	2.35%
Medicine	1,345	\$211,541,049	\$171,729,060	\$39,811,989	23.18%
Nursing	66	\$6,883,308	\$5,674,898	\$1,208,410	21.29%
Pharmacy	112	\$9,759,187	\$7,848,171	\$1,911,016	24.28%
Social Work	34	\$8,750,812	\$8,105,842	\$644,970	7.95%
Campus Admin.	8	\$ 2,066,047	\$1,812,439	\$253,608	13.99%
Total	1,673	\$250,056,582	\$203,618,096	\$46,438,486	22.80%

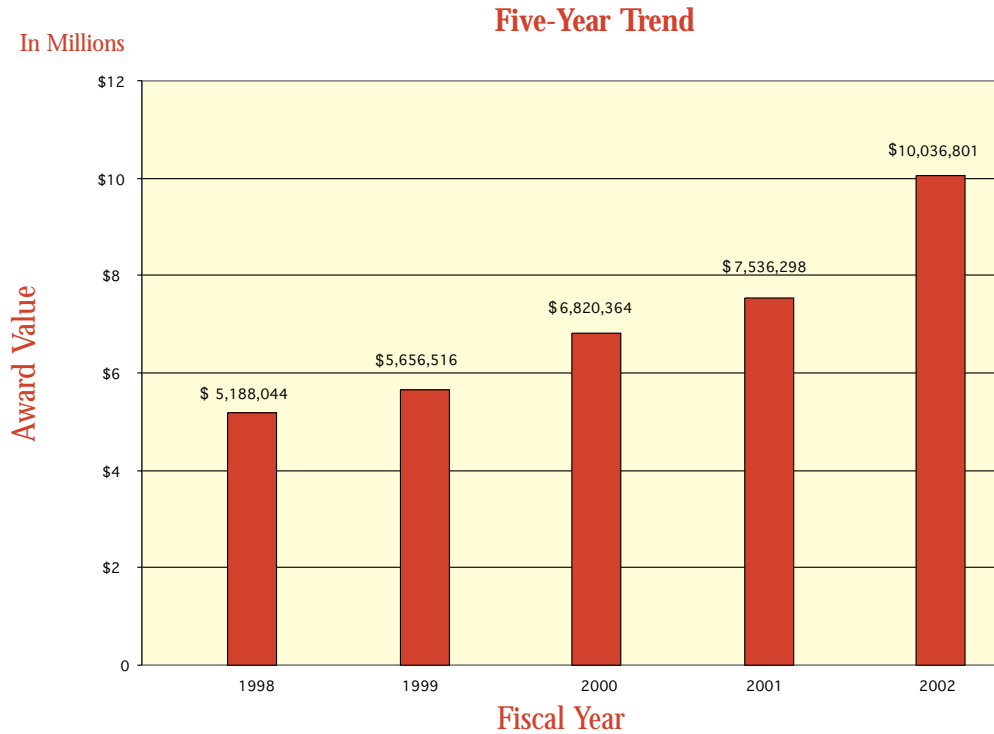
Following is a one-page summary of each school's success in FY 02. Refer to [Appendix C and D](#) for more detail on the types of awards, categorized by research, service and training; new, renewals and continuations. Refer to [Appendix E](#) for a detailed summary of all awards, by department, and [Appendix E1](#) for a summary of success rates by school.

DENTAL SCHOOL
At a Glance

\$10,036,801

% Increase over FY 01: 33.2%

Number of Awards: 86



TOP FIVE PROJECTS, BY AMOUNT

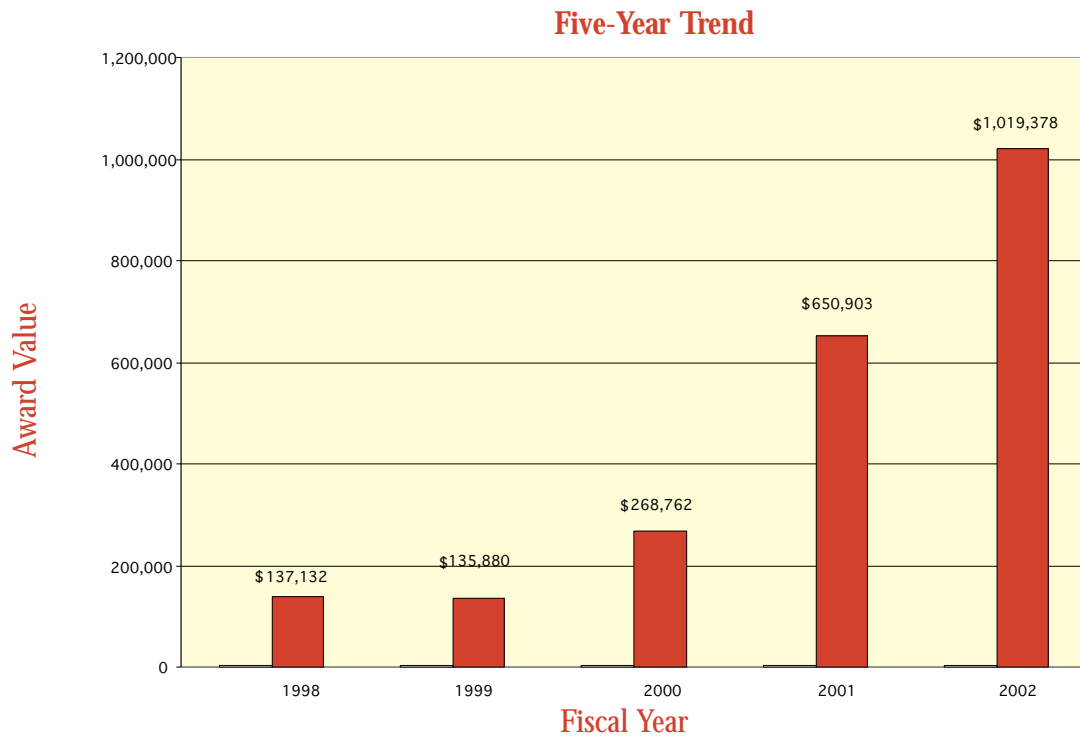
PI	Source	Title	Amount
Ronald Dubner	National Institute/Neurologic Disorders & Stroke (NINDS) Extramural	Plasticity and Modulation in Models of Persistent Pain	\$1,339,602
Ronald Dubner	National Institute of Dental & Craniofacial Research (NIDCR)	Training in Orofacial Biology and Neuroscience	\$438,775
Maureen Stone	National Institute of Deafness & Other Communicative Disorders (NIDCD)	Four-Dimensional Tongue Behavior in Speech	\$430,107
John Sauk	National Institute of Dental & Craniofacial Research (NIDCR)	Cell Surface Marker and Homing Target for Squamous	\$352,316
Ronald Dubner	National Institute on Drug Abuse (NIDA) Extramural Activities	CMS Modulation of Persistent Pain and Spinal Plasticity	\$334,125

SCHOOL OF LAW
At a Glance

\$1,019,378

% Increase over FY 01: 56.5%

Number of Awards: 22



TOP FIVE PROJECTS, BY AMOUNT

PI	Source	Title	Amount
Diane Hoffmann	DHMH	Estab. Resource Ctr. for Tobacco Reg. Litigation & Advocacy	\$239,306
William Reynolds	Reynolds PSA	Reynolds Professional Service Agreement (PSA)	\$100,693
Karen Czapanskiy	West Virginia Univ.	PSA	\$85,000
Taunya Banks	Washington College of Law, American University	Banks PSA	\$84,684
Diane Hoffmann	Montgomery County	Establish Intellectual Property Legal Resource Center	\$80,000

SCHOOL OF MEDICINE
At a Glance

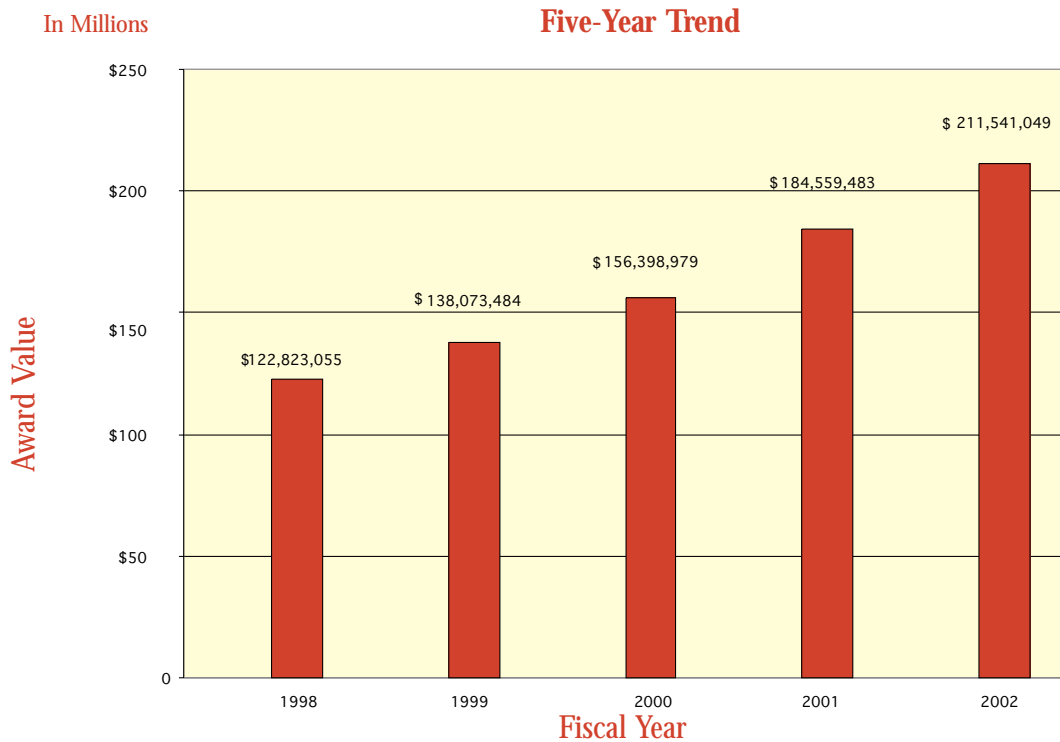
\$211,541,049

14.6% increase in dollar value over FY 01 total

Number of Awards: 1,345

NIH Awards: 310

Dollar Value: \$95,759,733



TOP FIVE PROJECTS, BY AMOUNT

PI	Source	Title	Amount
Sanford Stass	UMMS/DHMH	Cigarette Restitution Cancer Research	\$ 7,107,836
Myron Levine	National Institute of Allergy and Infectious Disease (NIAID)	Vaccine Testing and Evaluation Unit	\$4,291,457
Myron Levine	Bill/Malinda Gates Foundation	Mucosal Measles Vaccine for Immunizing Young Infants	\$4,246,704
William Carpenter	DHMH	Interagency agreement: MD Psychiatric Research Center (MPRC)	\$3,921,614
Claudia Baquet	UMMS/DHMH	Maryland Statewide Health Network (NSHN)	\$3,470,600

► **SCHOOL OF NURSING**
At a Glance

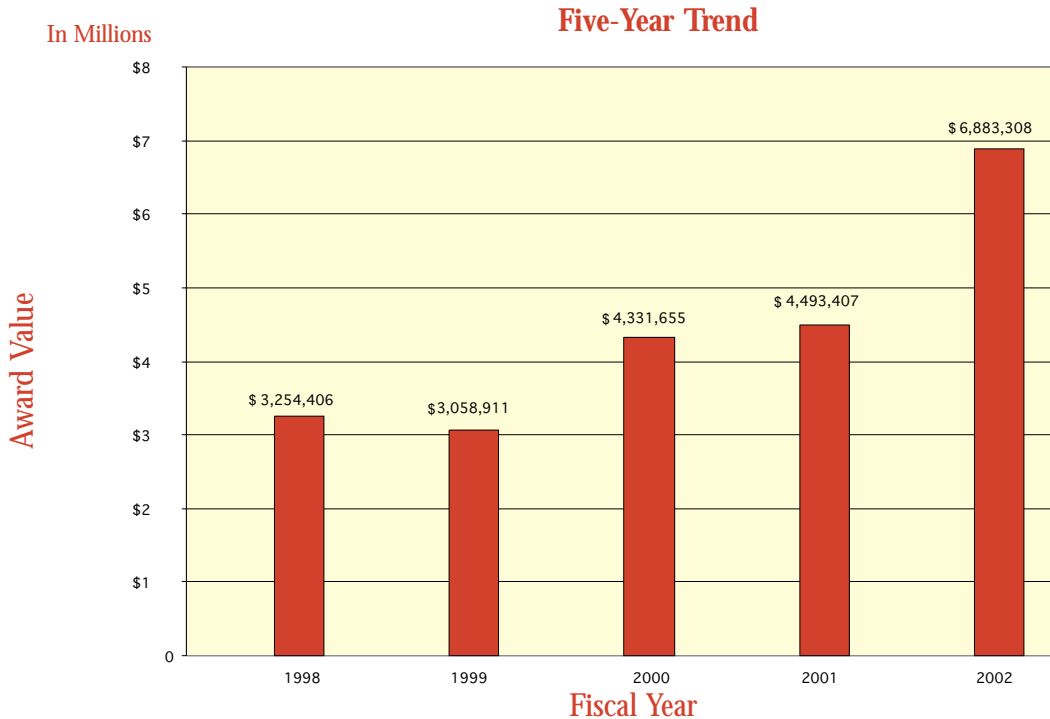
\$6,883,308

% Increase over FY 01: 53.2%

Number of Awards: 66

NIH Awards: 6

Dollar Value: \$1,306,586



TOP FIVE PROJECTS, BY AMOUNT

PI	Source	Title	Amount
Barbara Resnick	National Institute on Aging (NIA) Extramural Activities	Testing the Exercise Plus Program Following Hip Fracture	\$ 543,974
Claudia Smith	U. S. Department of Housing and Urban Development	Park Heights Healthy Homes Demonstration & Education	\$435,510
Alison Trinkoff	Agency for Health Care Policy and Research (AHCPR)	Do Organizational Factors Influence Both Patient & Work?	\$348,942
Susan Ludington	National Institute of Nursing Research (NINR) – Extramural Activities	Preterm Skin Contact Effects on Electrophysiologic Sleep	\$346,407
Barbara Heller	Health Resources and Services Administration (HRSA)	Advanced Education Nursing Traineeships	\$325,582

SCHOOL OF PHARMACY
At a Glance

\$9,759,187

Increase over FY 01 award total: 12.5%

Number of Awards: 112

NIH Awards: 8

Dollar Value: \$1,505,643



TOP FIVE PROJECTS, BY AMOUNT

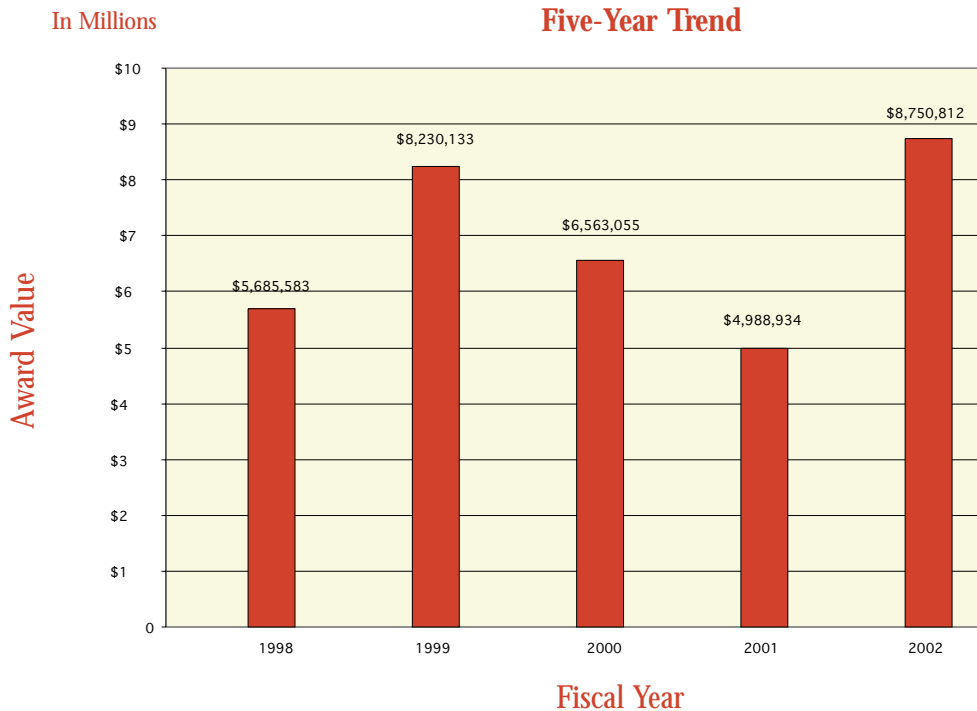
PI	Source	Title	Amount
Ilene Zuckerman	Pennsylvania Department of Public Welfare	Pennsylvania Medicaid Retrospective Drug Utilization	\$1,194,076
David Moore	DHMH	Improving Pharmacy Services: Spring Grove Hospital	\$534,743
Raymond Love	DHMH	Centralized Administration of Pharmacy Project— MHA	\$317,295
Raymond Love	Walter P. Carter Center	Improvement of Pharmacy Services: Walter P. Carter Center	\$302,535
Kwang Chul Kim	National Heart, Lung and Blood Institute (NHLBI)	Pseudomonas Aeruginosa Adhesion to MDC1 Mucin	\$297,000

SCHOOL OF SOCIAL WORK
At a Glance

\$8,750,812

% Increase over FY 01: 75.4%

Number of Awards: 34



TOP FIVE PROJECTS, BY AMOUNT

PI	Source	Title	Amount
Catherine Born	MDHR	Research in Support of Welfare Reform in Maryland	\$2,524,302
Jennie Bloom	MDHR	Title IV-E Social Work Degree Program	\$2,513,890
Ronald Zuskin	MDHR	Program Support of Training Department	\$847,061
Donna Harrington	MDHR	Evaluate Child Welfare Managed Care Demonstration Project	\$412,648
Catherine Born	MDHR	Research in Support of Maryland's Child Support Program	\$345,542

▶ AREAS OF STRENGTH

Forty-four faculty members among four of the professional schools were awarded grants and contracts that exceed \$1 million, accounting for more than \$118 million in FY 02 awards or 48% of the year-end total. These faculty, whose pursuits are in areas such as AIDS, cancer, vaccine development, diabetes, schizophrenia, and transplant surgery, continue to elevate the University as a premier institution for research, health services and training. Their success is detailed as follows:

NAME	FY 02 TOTAL FUNDING	AREA OF WORK
Myron M. Levine, MD, PhD, DTPH	\$12,456,206	Vaccine development
William T. Carpenter, MD	\$8,241,503	Schizophrenia
Claudia R. Baquet, MD, MPH	\$8,080,597	Health policy and rural outreach
Sanford A. Stass, MD	\$8,058,062	Cancer
J. Glenn Morris Jr., MD, MPH & TM	\$5,092,233	Infectious Disease
William A. Blattner, MD	\$3,947,075	AIDS
Robert R. Redfield Jr., MD	\$3,897,884	AIDS
Alan R. Shuldiner, MD	\$3,723,444	Genetics, diabetes, obesity
Christopher J. Plowe, MD, MPH	\$3,519,323	Malaria
Jay A. Perman, MD	\$3,413,117	Pediatrics
Ligia Peralta, MD	\$3,357,374	Adolescent pediatrics
Catherine Born, PhD	\$3,131,202	Welfare reform
Barbara C. Hansen, PhD	\$2,942,037	Obesity
Jay S. Magaziner, PhD	\$2,727,506	Gerontology
Lisa M. Dixon, MD	\$2,609,312	Schizophrenia
Jennie D. Bloom, MSW	\$2,513,890	Social work training
Andrew P. Goldberg, MD	\$2,443,484	Gerontology
Ronald Dubner, DDS, PhD	\$2,227,828	Persistent pain
Brian Berman, MD	\$2,147,829	Acupuncture
Eric Weintraub, MD	\$2,077,635	Substance abuse
Frieda O. Weise, MLS, AHIP	\$1,862,907	Regional Medical Library
Anthony F. Lehman, MD, MSPH	\$1,828,787	Schizophrenia
Eugene Albrecht, PhD	\$1,754,480	Female reproduction
Horst R. Zielke, PhD	\$1,742,098	Mental retardation and developmental disorders
Joseph Lakowicz, PhD	\$1,630,012	Flourescence spectroscopy
John W. Warren, MD	\$1,591,809	Interstitial cystitis
Michael T. Shipley, PhD	\$1,503,522	Neurobiology
Stephen T. Bartlett, MD	\$1,477,500	Transplant surgery
Abdu F. Azad, PhD, PharmD, MPH	\$1,311,030	Tropical diseases
Robert J. Bloch, PhD	\$1,308,551	Membrane biology
Giuseppe Inesi, MD, PhD	\$1,280,532	Cardiac function
Marc C. Hochberg, MD, MPH	\$1,268,023	Osteoarthritis
Ilene H. Zuckerman, PharmD	\$1,264,764	Drug utilization
G. Thomas Strickland, MD, PhD	\$1,254,699	International health
Peter Calabresi, MD	\$1,220,361	T cell research
Louis J. DeTolla, Jr., VMD, PhD	\$1,220,322	Comparative medicine
Bradley E. Alger, PhD	\$1,184,653	Neuroscience
Maureen Black, PhD	\$1,173,696	Children of adolescent mothers
Carol O. Tacket, MD	\$1,139,477	Vaccine development
William F. Morgan, PhD	\$1,092,126	Genomic X-ray
Raymond Jones, PhD	\$1,083,509	Tissue banks
Raymond C. Love, PharmD, BCPP, FASHP	\$1,061,308	Pharmacy services
Patricia C. Dischinger, PhD	\$1,042,868	Vehicular trauma
Kenneth P. Johnson, MD	\$1,014,485	Multiple sclerosis

▶ TECHNOLOGY COMMERCIALIZATION

The Technology Commercialization Group (TEC-COM) is charged with translating the results of the research and discoveries of the UMB campus into valuable intellectual property and, ultimately, commercial products that enhance the lives of people in Maryland, across the nation and throughout the world. Over the last five years, the University has realized 344 invention disclosures. More than a third of these technologies were invented by a core group of faculty and one student, with the majority of these inventors performing research in the School of Medicine. The list below provides details.

TOP 15 DISCLOSING FACULTY

FY 98 – FY 02

Total Portfolio = 344

INVENTOR	SCHOOL	DEPARTMENT	NUMBER OF DISCLOSURES
Lakowicz	Medicine	Biochemistry	32
Panigrahi	Medicine	Pediatrics	10
Malone*	Medicine	Pathology	10
Shuldiner	Medicine	Medicine	9
Trucksis*	Medicine	Center for Vaccine Development	8
Thompson	Medicine	Biochemistry	7
Malkas*	Medicine	Pharmacology & Experimental Therapeutics	6
Brodie	Medicine	Pharmacology & Experimental Therapeutics	6
Sussman**	Pharmacy; Medicine	Pharmaceutical Sciences; Obstetrics & Gynecology	6
Hack	Dental	Restorative Dentistry	6
Farhi	Dental	Student	6
Fasano	Medicine	Pediatrics	6
Tang	Medicine	Neurology	5
Constantine	Medicine	Pathology	5
Highsmith	Medicine	Pathology	5
Subtotal			127
Percent of Total			37%

* No longer at UMB

** 3 disclosures with Medicine, 3 with Pharmacy

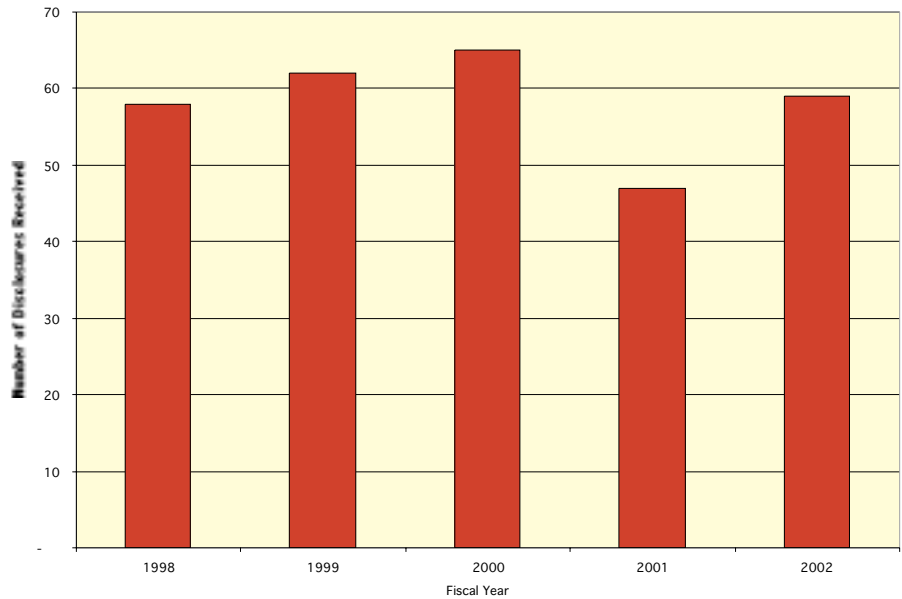
DISCLOSURES:

In FY 02, ORD's TEC-COM Team received 59 disclosures from 41 different principal investigators and a total of 105 co-inventors (i.e., contributing inventors). These are summarized briefly below:

- ▶ 16 therapeutics
- ▶ 18 devices
- ▶ 8 diagnostics
- ▶ 6 vaccines
- ▶ 8 research tools
- ▶ 2 drug delivery

The graph below demonstrates a consistent five-year trend in disclosures among UMB faculty:

DISCLOSURES RECEIVED FY 98 – FY 02

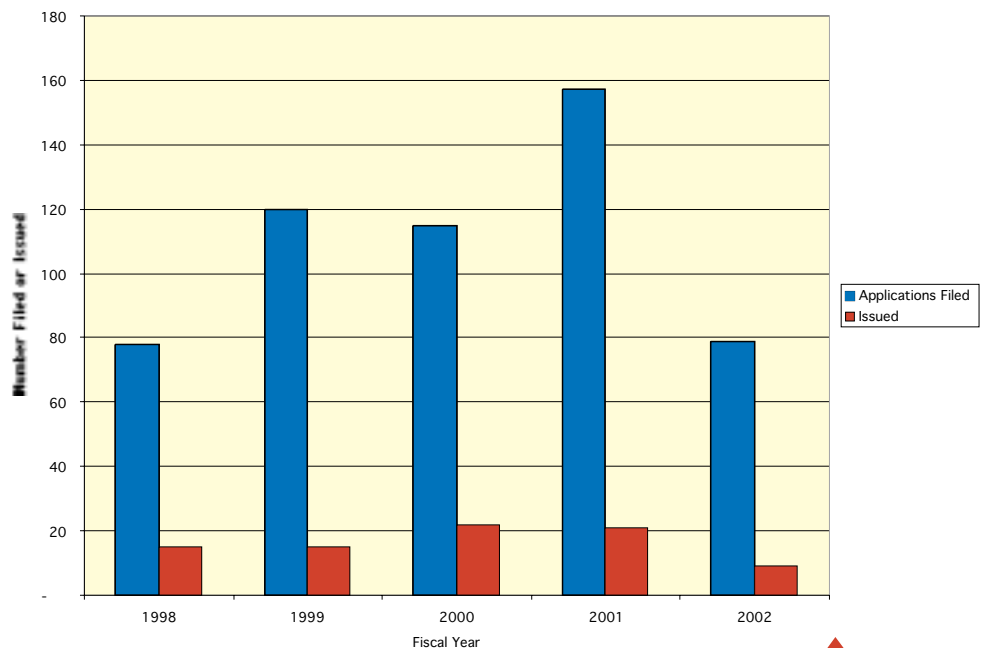


PATENTS:

In FY 02, ORD filed 79 patent applications, a drop from FY 01's level of 157. Since the fourth quarter of FY 02, a positive upward rise in applications has been realized. With an increased budget for pursuing patents, ORD expects a significant increase in this area in FY 03.

A five-year trend in the number of patent applications filed and patents issued is illustrated in the following graph:

PATENTS, TRADEMARKS AND COPYRIGHTS



Nine patents were issued in FY 02: six for inventions by School of Medicine faculty and three for inventions by Dental School faculty. Details of this success are as follows, and further detail is provided in [Appendix F](#):

Inventor(s)	Department	IP Type	Technology Title
Ross, Doyle, Abruzzo	Medicine; Pathology	Non-Provisional Patent	Breast Cancer Resistance Protein (BCRP) and the DNA Which Encodes It
Earl, Shepard	Radiation Oncology	Copyright	Direct Aperture Optimization
Litkowski, Hack, Greenspan	Restorative Dentistry	Non-Provisional Patent	Compositions Containing Bioactive Glass and Their Use in Treating Tooth Hypersensitivity
Jarrell, Skinner, Raczek, Jarrell	Surgery	Copyright	Computer Based Interactive Teaching Tool
Fasano, Maurelli, Fernandez, Bloch	Pediatrics	Non-Provisional Patent	Method of Identifying Bacterial Genes Incompatible with Bacterial Pathogenicity and the Use of Such Genes Such as cadA to Reduce Pathogenicity in a Bacteria or to Combat Pathogenic Bacterial Infections
Litkowski, Hack, Greenspan	Restorative Dentistry	Foreign Patent	Methods and Compositions for Whitening Teeth
Litkowski, Hack, Greenspan	Restorative Dentistry	Non-Provisional Patent	Methods and Compositions for Whitening Teeth
Aurelian	Pharmacology and Experimental Therapeutics	Foreign Patent	Vaccine Composition for Herpes Simplex Virus and Methods of Use
Key, Warren, Hise	Medicine	Non-Provisional Patent	Diagnosis of Interstitial Cystitis

LICENSING:

A significant effort to license the technologies of UMB is under way in ORD. Many marketing and outreach activities draw attention to the technologies available for licensing. Through constant market searches and networking with industry experts, ORD is actively promoting these and many other technologies in our portfolio:

THERAPEUTICS

- ▲ Peptide antagonists for tight-junction modulator zonulin
- ▲ Innovative strategies for the prevention and treatment of type I diabetes mellitus
- ▲ Small molecular weight modulators of cellular phosphorylation
- ▲ Novel multidrug resistance transporter isolated from human breast cancer cells
- ▲ LASSBio 294, a novel compound having *Digitalis*-like cardiotoxic properties
- ▲ Protein kinase with anti-apoptotic activity
- ▲ Restoration of neurotrophin survival response in neurodegenerative disorders
- ▲ Sulfonylurea compounds as treatment for brain swelling
- ▲ Ace protein as a therapeutic agent for cystic fibrosis
- ▲ Polyamines induce methemoglobin for the treatment of sickle cell anemia
- ▲ Novel retinoic acid metabolism blocking agents as cancer therapeutics
- ▲ D-Tagatose increases HDL cholesterol levels

VACCINES

- ▲ ShET-2 *Shigella*
- ▲ Gua mutants of *Salmonella typhi* as typhoid vaccines and delivery systems
- ▲ Plasmid maintenance system for antigen delivery
- ▲ Anti-aggregation protein-encoding gene in enteroaggregative *Escherichia coli*
- ▲ Virulence genes of *Mycobacterium marinum* and *M. tuberculosis*

DRUG DELIVERY

- ▲ Zonulin transiently opens tight junctions in the intestine, lung and brain
- ▲ Peptide homing missile for epidermoid carcinoma
- ▲ Novel polyethylene glycol (PEG) -like linkers

DIAGNOSTICS

- ▲ Epithelial growth factor levels for the diagnosis of interstitial cystitis
- ▲ Novel isoform of alanine transaminase (ALT) for diagnosis of liver diseases
- ▲ Novel multidrug resistance transporter isolated from human breast cancer cells
- ▲ Anti-aggregation protein-encoding gene in enteroaggregative *Escherichia coli*
- ▲ A simple, minimally invasive blood test for cancer
- ▲ Method for diagnosing and treating chronic pelvic pain syndrome

DEVICES AND RESEARCH TOOLS

- ▲ Novel methodology for rational design and screening of therapeutics
- ▲ Radiative decay engineering that makes nonfluorescent molecules fluorescent
- ▲ Bilateral arm trainer
- ▲ Novel device for helical electron beam radiation therapy
- ▲ Minimally invasive surgical procedures for operating inside a beating heart

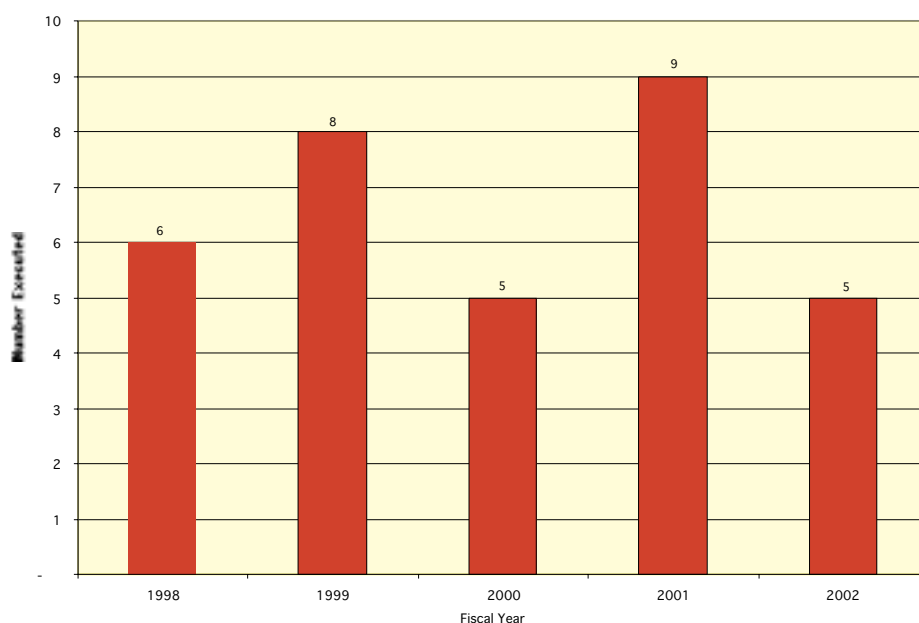
Nine licenses were executed in FY 02. They are described briefly below and in greater detail in [Appendix G](#).

Agreements Executed During FY 02

Agreement Type	Company or Institution	PI	School	Department	Technology
License	Altarex	Mann	Medicine	Medicine	Therapeutic Method and Composition Utilizing Antigen-Antibody Complexation and Presentation by Dendritic Cells
License	Artemis	Schwarz	Medicine	Psychiatry	NMDA Antagonists
IIA	University of Mississippi	Ghandehari	Pharmacy	Pharmaceutical Sciences	Targeted Delivery of Polyamine Analogs for Cancer Chemotherapy
Option	Xenoport	Polli	Pharmacy	Pharmaceutical Sciences	A Bile Acid Pro-drug of Acyclovir
IIA	University of Minnesota; UC Davis	Dumler	Medicine	Pathology	Cloned Genes of Ehrlichia Equi and the Agent of Human Granulocytic Ehrlichiosis
License	FOCUS	Dumler	Medicine	Pathology	Cloned Genes of Ehrlichia Equi and the Agent of Human Granulocytic Ehrlichiosis
IIA	Dartmouth University	Hassel	Medicine	UMCC	Cancer Therapy or Prevention Pathway Involving UBE1L, ISG15, UBP43
License	IPBL	Bucci	Medicine	Biochemistry	Controlled Polymerization of Hemoglobin
License	Articulation Innovations	Siegel	Dental	Restorative Dentistry	Cast Mounting Stabilizers; CaStix [®]

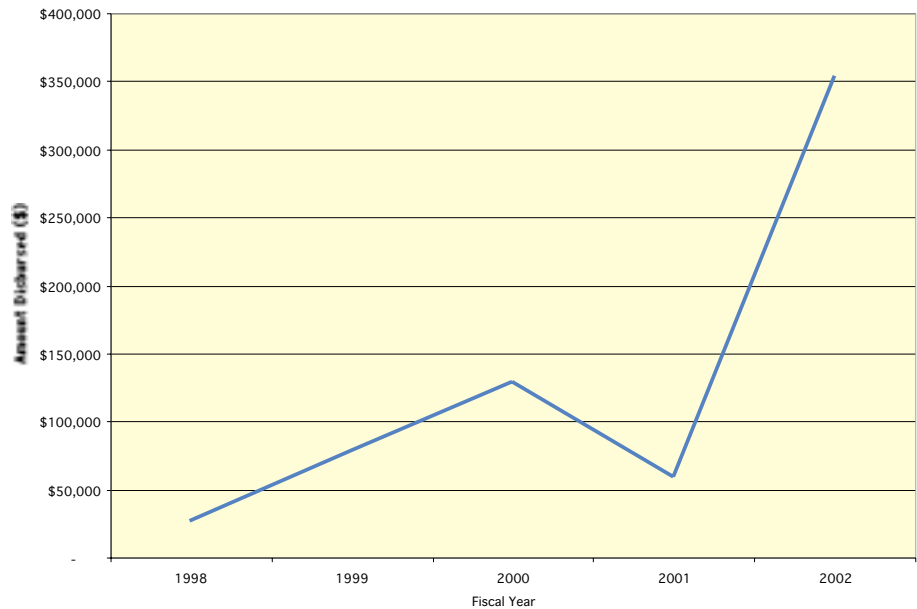
Over the last five years, which are detailed below, 50 UMB inventions have been licensed to more than 30 companies worldwide.

LICENSE AGREEMENTS ▶



Gross revenue received by ORD grew more than 60% to a record high of \$750,000. This increase reflects a maturing base of licenses that ORD expects will generate steady income in the future. Larger up-front payments and expense reimbursements and a concerted effort to collect outstanding monies due researchers under existing agreements also attribute to this rise.

DISBURSEMENTS



NEW INITIATIVES

UMB RESEARCH PARK

Building on several years of discussions about such a project and armed with a universally endorsed and data-driven recommendation from consultants lead by the Battelle Institute, UMB has launched an initiative to examine the feasibility of developing a UMB Research Park on the north side of the 800 and 900 blocks of West Baltimore Street. With UMB's \$305 million research enterprise, the targeted acceleration of technology commercialization and the future expansion of corporate partnerships serve as the basis of confidence that UMB will be successful in this endeavor. Work is under way to develop a site analysis for potential anchors and tenants for the park and to design the appropriate governance and financial models for developing the park. These preliminary studies will be completed in late fall 2002, and ORD anticipates beginning construction on the UMB Research Park in 2003.

AGENCY	#	FY 98 AMOUNT	#	FY 99 AMOUNT	#	FY 00 AMOUNT	#	FY 01 AMOUNT	#	FY 02 AMOUNT
NAT INST OF HEALTH	318	\$ 62,139,894	317	\$ 72,999,581	304	\$ 70,925,797	358	\$ 86,271,002	340	\$ 101,475,472
ADAMHA	28	5,487,157	35	8,505,873	50	13,222,266	58	13,261,981	63	16,000,247
HEALTH RES. & SERV. ADM.	21	3,816,671	23	3,676,124	28	4,519,129	21	3,551,574	23	5,205,948
HUMAN DEV SERVICES	3	680,977	4	847,742	2	592,000	3	609,276	6	1,123,442
HEALTH CARE FIN ADM	-	-	-	-	1	24,598	3	357,764	2	31,076
AGENCY HLTH CARE POL & RES	9	2,450,392	3	437,931	6	658,671	4	647,183	7	882,604
CENT FOR MENTAL HEALTH SERV.	4	1,113,207	1	48,999	2	557,117	1	64,800	7	151,835
CENT FOR DISEASE CONTROL	2	680,082	5	894,143	8	1,155,923	7	439,690	6	759,274
DHHS ADMIN / CHILDREN & FAM	4	271,046	2	249,818	3	349,057	2	236,357	-	-
FOOD AND DRUG ADM.	1	248,340	2	268,778	2	347,799	3	560,544	4	435,064
NOSH	1	232,726	1	221,323	2	430,941	5	985,307	6	1,200,472
OCCUPATIONAL SAFETY/HEALTH	-	-	-	-	-	-	-	-	-	-
NATL MARINE FIS. SERV.	-	-	-	-	-	-	-	-	-	-
NATIONAL VACCINE PROGRAM	-	-	-	-	-	-	-	-	-	-
TOTAL DHHS	391	77,120,492	394	88,175,311	408	92,783,448	465	\$ 106,985,458	464	\$ 127,265,434
AGENCY FOR INTERN DEV.	-	-	1	999,998	1	247,256	2	1,155,480	-	-
BUREAU OF CENSUS	-	-	-	-	-	-	1	16,813	-	-
DEPARTMENT OF THE TREASURY	-	-	-	-	-	-	-	-	-	-
DEPT. OF DEFENSE	23	2,019,550	24	2,387,867	33	3,527,417	29	2,993,043	40	5,825,276
DEPT OF LABOR	-	0	0	0	0	0	0	0	-	-
DEPARTMENT OF THE TREASURY	-	0	1	3,910	0	0	1	44332	1	52941
EMBASSY OF THE ARAB REPUBLIC	-	0	0	0	0	0	0	0	-	-
FEDERAL AVIATION ADMIN.	-	0	0	0	0	0	0	0	-	-
FEDERAL TRADE COMMISSION	-	0	3	545,867	2	26111	1	5,000	-	-
ENVIRON PROTECT AGENCY	-	-	1	23,000	4	533,703	2	520,541	2	173,699
NAT INST OF TECHNOLOGY	1	48,679	1	23,000	1	55,300	-	-	1	50,000
NAT SCIENCE FOUNDATION	13	1,013,540	10	880,199	8	617,497	8	1,225,156	5	538,436
NATIONAL RESEARCH COUNCIL	-	0	0	0	0	0	-	-	-	-
U. S. DEPT. OF EDUCATION	0	0	0	0	-	-	-	-	1	148,579
U. S. DEPT. OF ENERGY	0	0	0	0	1	434874	1	337,000	2	546,659
U. S. DEPT. OF JUSTICE	3	109,675	1	50,000	-	-	1	-	2	195,157
NASA	3	316,974	1	119,000	2	125,000	3	328,750	2	354,608
NATL HIGHWAY TRAFFIC SAFETY	4	558,698	2	490,149	2	546,229	3	612,511	3	578,921
U.S. AIR FORCE ARMSTONG LABS.	-	-	-	-	-	-	-	9,706	1	7,428
U.S. EGYPT S/T JOINT BOARD PROG.	-	-	2	22,486	3	33,610	1	14,820	1	4,922
U.S. DEPT. OF STATE OFFICE MED SE	-	-	-	-	-	-	-	-	3	276,615
U. S. DISTRICT COURT	2	125,000	2	329,256	1	332,581	1	225,336	5	349,794
U. S. DEPT. OF AGRICULTURE	1	54,545	5	457,852	4	887,627	3	662,377	-	-
U. S. DEPT. OF TRANS.	0	0	0	0	0	-	-	-	-	-
U. S. DEPT OF HOUSING/UR DEV	0	0	1	133,300	1	133,300	1	133,300	1	435,510
VETERANS ADM.	112	5,309,916	120	4,264,880	161	7,158,080	171	7,293,458	154	5,990,358
TOTAL FEDERAL AGENCIES	553	86,677,069	568	96,883,075	632	107,442,033	695	\$ 122,588,076	687	\$ 142,794,337
LOCAL GOVERNMENT	80	4,282,095	73	5,677,406	69	5,387,906	98	8,261,862	64	4,396,728
STATE OF MARYLAND	90	18,761,505	95	23,301,592	111	24,707,103	96	21,260,539	127	30,191,427
PRIVATE	593	35,897,040	589	37,435,655	639	44,501,164	708	60,820,712	795	72,674,090
TOTAL NON FEDERAL AGENCIES	763	58,940,640	757	66,414,653	819	74,596,173	902	90,343,113	986	107,262,245
TOTAL	1,316	145,617,709	1,325	165,297,728	1,451	182,038,206	1,597	212,931,189	1,673	\$ 250,056,582

	#	FY 98 AMOUNT	#	FY 99 AMOUNT	#	FY 00 AMOUNT	#	FY 01 AMOUNT	#	FY 02 AMOUNT
DENTAL SCHOOL										
NIH	24	\$2,532,926	20	\$3,032,996	11	\$1,846,326	29	\$4,544,635	34	\$6,818,797
ADAMHA	3	421,332	2	409,452	15	2,686,791	2	379,655	3	730,270
OTHER DHHS	3	289,185	3	81,334	8	355,214	5	258,131	3	149,989
TOTAL DHHS	30	\$3,243,443	25	\$3,523,782	34	\$4,888,331	36	\$5,182,421	40	\$7,699,056
SCHOOL OF LAW										
NIH	0	0	0	0	0	0	0	0	0	0
ADAMHA	0	0	0	0	0	0	0	0	0	0
OTHER DHHS	0	0	0	0	0	0	0	0	0	0
TOTAL DHHS	0	0	0	0	0	0	0	0	0	0
SCHOOL OF MEDICINE										
NIH	279	\$56,533,525	284	\$66,811,549	283	\$67,124,344	318	\$78,683,941	310	\$95,759,733
ADAMHA	20	4,232,889	27	7,439,795	27	10,154,989	35	10,131,081	34	8,872,857
OTHER DHHS	31	7,689,800	25	4,311,003	28	5,042,507	28	4,788,822	36	6,629,994
TOTAL DHHS	330	\$68,456,214	336	\$78,562,347	338	\$82,321,840	381	\$93,603,844	380	\$111,262,584
SCHOOL OF NURSING										
NIH	4	\$486,904	1	\$15,748	5	\$662,612	14	\$2,124,492	6	\$1,306,586
ADAMHA	1	178,921	0	0	0	0	0	0	1	74,250
OTHER DHHS	4	900,332	11	1,828,915	12	2,276,104	6	921,467	15	2,601,155
TOTAL DHHS	9	\$1,566,157	12	\$1,844,663	17	\$2,938,716	20	\$3,045,959	22	\$3,981,991
SCHOOL OF PHARMACY										
NIH	7	\$933,343	7	\$1,028,373	7	\$604,840	12	\$1,779,533	8	\$1,505,643
ADAMHA	4	654,015	6	656,626	4	380,486	6	699,833	3	346,734
OTHER DHHS	3	492,121	1	393,559	3	489,503	4	446,135	5	442,886
TOTAL DHHS	14	\$2,079,479	14	\$2,078,558	14	\$1,474,829	22	\$2,925,501	16	\$2,295,263
SCHOOL OF SOCIAL WORK										
NIH	0	0	0	0	0	0	0	0	0	0
ADAMHA	0	0	0	0	0	0	0	0	0	0
OTHER DHHS	4	394,051	4	377,823	4	472,057	3	359,337	3	163,633
TOTAL DHHS	4	\$394,051	4	\$377,823	4	\$472,057	3	\$359,337	3	\$163,633
MEMSS										
NIH	0	0	0	0	0	0	0	0	0	-
ADAMHA	0	0	0	0	0	0	0	0	0	0
OTHER DHHS	0	0	0	0	0	0	0	0	0	0
TOTAL DHHS	0	0	0	0	0	0	0	0	0	0
CAMPUS ADMINISTRATION										
NIH	4	\$1,381,148	3	\$1,788,138	2	\$687,675	3	\$1,868,396	3	\$1,862,907
ADAMHA	0	0	0	0	0	0	0	0	0	0
OTHER DHHS	0	0	0	0	0	0	0	0	0	0
TOTAL DHHS	4	\$1,381,148	3	\$1,788,138	2	\$687,675	3	\$1,868,396	3	\$1,862,907
TOTAL ALL SCHOOLS	391	\$77,120,492	394	\$88,175,311	409	\$92,783,448	465	\$106,985,458	464	\$127,265,434

		FY 97 - 98		FY 98 - 99		FY 99 - 00		FY 00 - 01		FY 01 - 02
	#	AMOUNT	#	AMOUNT	#	AMOUNT	#	AMOUNT	#	AMOUNT
DENTAL SCHOOL										
NEW	39	\$1,463,418	25	\$1,774,925	25	\$1,654,165	45	\$2,407,159	39	\$3,502,117
RENEWAL	8	691,835	7	613,903	12	1,465,417	13	746,264	6	1,115,250
CONTINUATION	35	3,032,791	40	3,267,688	40	3,700,782	31	4,382,875	41	5,419,434
TOTAL	82	5,188,044	72	5,656,516	77	6,820,364	89	7,536,298	86	10,036,801
LAW SCHOOL										
NEW	2	36,650	1	58,350	3	166,087	12	610,903	19	844,694
RENEWAL	1	70,482	1	77,530	1	83,250	1	40,000	2	124,684
CONTINUATION	1	30,000	0	0	1	19,425	-	0	1	5,000
TOTAL	4	137,132	2	135,880	5	268,762	13	650,903	22	1,019,378
SCHOOL OF MEDICINE										
NEW	589	50,917,894	427	45,592,138	499	47,885,447	686	87,194,935	654	90,416,087
RENEWAL	72	13,808,493	81	9,238,375	72	12,725,729	106	16,561,320	74	14,984,351
CONTINUATION	396	58,096,668	593	83,242,971	633	95,787,803	522	80,803,228	617	106,140,611
TOTAL	1,057	122,823,055	1,101	138,073,484	1,204	156,398,979	1,314	184,559,483	1,345	211,541,049
SCHOOL OF NURSING										
NEW	39	1,927,391	27	1,799,143	29	2,059,439	28	2,001,010	50	4,157,109
RENEWAL	2	77,338	5	287,212	6	313,112	4	123,487	3	420,703
CONTINUATION	13	1,249,677	15	972,556	26	1,959,104	24	2,368,910	13	2,305,496
TOTAL	54	3,254,406	47	3,058,911	61	4,331,655	56	4,493,407	66	6,883,308
SCHOOL OF PHARMACY										
NEW	44	1,977,405	27	2,449,774	28	1,505,243	54	2,891,894	65	3,436,865
RENEWAL	6	1,352,960	9	2,252,672	6	1,137,366	6	904,986	11	1,276,444
CONTINUATION	34	3,715,476	34	3,564,870	33	4,206,125	33	4,880,730	36	5,045,878
TOTAL	84	7,045,841	70	8,267,316	67	6,848,734	93	8,677,610	112	9,759,187
SCHOOL OF SOCIAL WORK										
NEW	16	2,633,234	6	227,626	12	2,390,847	14	447,049	17	3,352,216
RENEWAL	6	1,540,024	4	1,484,184	6	1,745,863	5	3,447,259	5	3,035,432
CONTINUATION	6	1,512,325	17	6,518,323	14	2,426,345	9	1,094,626	12	2,363,164
TOTAL	28	5,685,583	27	8,230,133	32	6,563,055	28	4,988,934	34	8,750,812
MIEMSS										
NEW	0	0	0	0	0	0	0	0	0	0
RENEWAL	0	0	0	0	0	0	0	0	0	0
CONTINUATION	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0
CAMPUS ADMINISTRATION										
NEW	7	1,483,148	1	27,350	1	28,500	-	-	7	1,922,684
RENEWAL	0	0	0	0	1	12,000	4	2,024,554	-	-
CONTINUATION	0	0	5	1,848,138	3	766,157	-	-	1	143,363
TOTAL	7	1,483,148	6	1,875,488	5	806,657	4	2,024,554	8	2,066,047
TOTAL ALL SCHOOLS										
NEW	736	60,439,640	514	51,929,306	597	55,689,728	838	95,552,950	851	107,631,772
RENEWAL	95	17,541,132	107	13,953,876	104	17,482,737	139	23,847,870	101	20,956,864
CONTINUATION	485	67,656,937	704	99,414,546	750	108,865,741	620	93,530,369	721	121,467,946
TOTAL	1,316	\$145,617,709	1,325	\$165,297,728	1,451	\$182,038,206	1,597	\$212,931,189	1,673	\$250,056,582

Appendix D

Awards by Type FY 98 – FY 02

SCHOOLS:	FY 97 – 98	FY 98 – 99	FY 99 – 00	FY 00 – 01	FY 01 – 02	%CHANGE OVER01
DENTAL SCHOOL						
RESEARCH	\$ 3,956,102	\$ 4,245,664	\$ 5,430,715	\$ 5,995,212	\$ 8,356,424	
SERVICE	971,903	1,006,447	884,721	1,067,822	930,265	
TRAINING	260,039	404,405	504,928	473,264	750,112	
TOTAL	5,188,044	5,656,516	6,820,364	7,536,298	10,036,801	33.18%
LAW						
RESEARCH	\$ 10,000	\$ 58,350	\$ 28,240	\$ 74,450	\$ 455,669	
SERVICE	127,132	77,530	240,522	534,403	455,009	
TRAINING	-	-	-	42,050	108,700	
TOTAL	137,132	135,880	268,762	650,903	1,019,378	56.61%
MEDICINE						
RESEARCH	\$ 99,539,971	\$ 117,251,889	\$ 126,869,018	\$ 149,817,036	\$ 177,835,563	
SERVICE	17,542,668	15,061,017	21,281,109	25,168,626	23,581,484	
TRAINING	5,740,416	5,760,578	8,248,852	9,573,821	10,124,002	
TOTAL	122,823,055	138,073,484	156,398,979	184,559,483	211,541,049	14.62%
NURSING						
RESEARCH	\$ 1,757,653	\$ 1,094,604	\$ 1,794,542	\$ 2,477,298	\$ 3,379,370	
SERVICE	825,769	971,531	1,033,558	1,104,533	1,746,806	
TRAINING	670,984	992,776	1,503,555	911,576	1,757,132	
TOTAL	3,254,406	3,058,911	4,331,655	4,493,407	6,883,308	53.19%
PHARMACY						
RESEARCH	\$ 4,008,826	\$ 4,646,168	\$ 3,687,288	\$ 6,065,855	\$ 6,495,328	
SERVICE	2,954,515	3,385,071	2,860,391	2,256,401	2,890,897	
TRAINING	82,500	236,077	301,055	355,354	372,962	
TOTAL	7,045,841	8,267,316	6,848,734	8,677,610	9,759,187	12.46%
SOCIAL WORK						
RESEARCH	\$ 2,721,270	\$ 5,025,576	\$ 2,993,951	\$ 1,087,357	\$ 4,199,523	
SERVICE	723,257	723,795	684,423	428,226	629,155	
TRAINING	2,241,056	2,480,762	2,884,681	3,473,351	3,922,134	
TOTAL	5,685,583	8,230,133	6,563,055	4,988,934	8,750,812	75.42%
MIEMSS						
RESEARCH	-	-	-	-	-	
SERVICE	-	-	-	-	-	
TRAINING	-	-	-	-	-	
TOTAL	-	-	-	-	-	0.00%
CAMPUS ADMINISTRATION						
RESEARCH	-	-	-	-	\$ 25,000	
SERVICE	1,481,148	1,865,488	794,657	2,024,554	2,038,047	
TRAINING	2,500	10,000	12,000	-	3,000	
TOTAL	1,483,648	1,875,488	806,657	2,024,554	2,066,047	2.05%
TOTAL ALL SCHOOLS						
RESEARCH	\$ 111,993,822	\$ 132,322,251	\$ 140,803,754	\$ 165,517,208	\$ 200,746,877	
SERVICE	24,626,392	23,090,879	27,779,381	32,584,565	32,271,663	
TRAINING	8,997,495	9,884,598	13,455,071	14,829,416	17,038,042	
TOTAL	\$ 145,617,709	\$ 165,297,728	\$ 182,038,206	\$ 212,931,189	\$ 250,056,582	17.42%

Appendix E

Awards by Department FY 01 – FY 02

	FY 00 – 01		FY 01 – 02		FY 01 – 02	FY 01 – 02
	#	AMOUNT	#	AMOUNT	DIRECT	INDIRECT
SCHOOL/DEPT/DIVISION						
DENTAL SCHOOL						
ENDODONTICS	0	0	0	0	0	0
DENTAL HYGIENE	4	26,859	2	39,342	36,821	2521
RESTORATIVE DENTISTRY	11	513,255	9	217,217	187,540	29,677
ORAL/CRANIOFACIAL BIO SCIENCE	29	4,577,337	37	7,364,489	5,235,852	2,128,637
DIAGNOSTIC SCIENCES & PATH.	15	908,837	15	1,389,253	1,088,572	300,681
ORAL HEALTH CARE DELIVERY	17	640,734	16	683,697	639,778	43,919
ORAL PATHOLOGY	1	253,690	-	-	-	-
ORTHODONTICS	1	15,000	-	-	-	-
ORAL-MAXILLOFACIAL SURGERY	3	336,380	-	-	-	0
PEDIATRIC DENTISTRY	6	320,784	4	99,371	95,014	4,357
PERIODONTICS	4	214,505	3	243,432	168,103	75,329
TOTAL	91	7,807,381	86	10,036,801	7,451,680	2,585,121
SCHOOL OF LAW						
CLINICAL LAW	8	302,510	14	561,542	553,826	7,716
COASTAL AND ENVIRONMENTAL POL.	1	91450	0	0	0	0
DEAN'S OFFICE	0	0	5	338269	322613	15656
LAW LIBRARY	2	28450	0	0	0	0
NO DEPARTMENT LEVEL	2	228,493	3	119,567	119567	0
TOTAL	13	650,903	22	1,019,378	996,006	23372
SCHOOL OF MEDICINE						
ANATOMY	31	5,721,084	29	6,932,704	4,837,202	2,095,502
ANESTHESIOLOGY	11	1,843,108	12	1,531,212	1,143,410	387,802
BIOCHEMISTRY	36	7,854,172	30	7,240,935	5,340,316	1,900,619
COMPARATIVE MEDICINE	4	2,966,730	4	1,220,322	986,030	234,292
COMPLEMENTARY MEDICINE	6	2,680,462	7	3,114,764	2,634,639	480,125
DEAN'S OFFICE	17	7,069,777	14	10,992,304	10,174,018	818,286
DERMATOLOGY	1	172,812	3	322,356	235,888	86468
EPIDEMIOLOGY & PREV MED	78	11,605,022	94	15,673,032	12,926,128	2,746,904
FAMILY MEDICINE	16	1,675,774	12	1,665,566	1,439,949	225,617
PROG/HUMAN HEALTH & ENVIRONMENT	2	400,474	1	245,463	169,496	75,967
MEDICINE	363	44,703,955	330	52,789,847	42,497,244	10,292,603
MEDICAL TECHNOLOGY	11	185,348	3	347,352	250,930	96,422
MICROBIOLOGY	44	5,998,953	43	7,402,009	5,230,288	2,171,721
NATIONAL STUDY CENTER	13	2,200,075	23	2,539,902	2,179,104	360,798
NEUROLOGY	70	6,434,180	65	6,523,421	5,317,175	1,206,246
OBSTETRICS & GYNECOLOGY	14	2,475,267	11	2,666,953	2,021,787	645,166
OPHTHALMOLOGY	11	1,095,878	13	1,250,598	1,031,989	218,609
PATHOLOGY	39	3,766,481	31	3,031,355	2,281,297	750,058
PEDIATRICS	132	18,771,662	141	18,776,953	15,550,216	3,226,737
PHARMACOLOGY	31	4,253,548	27	3,438,951	2,505,169	933,782
PHYSICAL THERAPY	11	329,315	7	354,159	266,259	87,900
PHYSIOLOGY	49	8,303,606	49	9,619,182	7,025,769	2,593,413
PROGRAM OF ONCOLOGY	110	11,754,205	118	15,065,662	13,357,785	1,707,877
PROGRAM OF TRAUMA	6	175,808	8	288,985	229,499	59,486
PSYCHIATRY	125	23,299,090	164	25,923,535	22,542,639	3,380,896
DIAGNOSTIC RADIOLOGY	8	456,017	11	1,031,371	725,073	306,298
RADIATION ONCOLOGY	18	1,934,878	25	2,711,857	2,005,745	706,112
STUDENT AFFAIRS	1	1000	-	-	-	-
NEUROLOGICAL SURGERY	3	357,206	4	408,815	314,424	94,391
SURGERY	51	5,802,513	66	8,431,484	6,505,888	1,925,596
TOTAL	1,312	184,288,400	1,345	211,541,049	171,725,356	39,815,693
SCHOOL OF NURSING						
	56	4,493,407	66	6,883,308	5,674,898	1,208,410
SCHOOL OF PHARMACY						
CTR ON DRUGS & PUBLIC POLICY	1	382,663	-	-	-	-
DEAN'S OFFICE	4	161179	1	81,010	81,010	-
PHARMACEUTICAL SCIENCES	51	4,397,999	49	4,093,616	3,037,623	1,055,993
PHARMACY PRACTICE & SCIENCE	37	3,735,769	61	5,584,561	4,729,538	855,023
TOTAL	93	8,677,610	112	9,759,187	7,848,171	1,911,016
SCH OF SOCIAL WORK & COMMUNITY PLANNING						
	28	4,988,934	34	8,750,812	8,105,842	644,970
CAMPUS ADMINISTRATION						
	4	2,024,554	8	2,066,047	1,812,439	253,608
TOTAL ALL SCHOOLS	1,597	212,931,189	1,673	250,056,582	203,614,392	46,442,190

Department	Competing Proposals	Projects Awarded	Success Rate	For Projects Awarded			Percent	Still				
				Requested	Awarded	Percent		Pending	Not Funded	Disapp	Withdrawn	
SCHOOL OF MEDICINE												
Anatomy & Neurobiology	28	10	35.7%	\$5,902,886	\$2,257,868	38.2%	16	0	3	0		
Anesthesiology	17	7	41.1%	\$2,408,150	\$671,013	27.8%	10	0	1	0		
Biochemistry/Molecular Biology	41	8	19.5%	\$10,874,156	\$2,106,706	19.3%	28	0	6	0		
Complementary Medicine	4	1	25.0%	\$1,293,644	\$363,609	28.1%	3	0	0	0		
Dean's Office	17	6	35.2%	\$14,712,410	\$8,679,999	58.9%	9	0	3	0		
Dermatology	1	1	100.0%	\$59,400	\$264,752	445.7%	0	0	0	0		
Diagnostic Radiology	9	4	44.4%	\$1,466,045	\$369,479	25.2%	5	0	0	0		
Epidemiology & Preventive Medicine	110	46	41.8%	\$22,472,006	\$6,410,886	28.5%	56	2	7	0		
Family Medicine	18	7	38.8%	\$3,691,616	\$1,154,392	31.2%	9	0	2	0		
Medical & Research Technology	4	1	25.0%	\$619,679	\$295,223	47.6%	2	1	0	0		
Medicine	302	147	48.6%	\$54,876,507	\$20,351,312	37.0%	146	1	13	0		
Microbiology and Immunology	46	11	23.9%	\$8,123,501	\$1,214,277	14.9%	30	0	6	0		
National Study Center	33	13	39.3%	\$3,870,303	\$721,952	18.6%	19	0	1	0		
Neurological Surgery	2	1	50.0%	\$265,378	\$48,148	18.1%	1	0	0	0		
Neurology	46	29	63.0%	\$5,778,483	\$2,467,656	42.7%	18	0	0	0		
Obstetrics/Gynecology	17	9	52.9%	\$4,279,097	\$1,713,615	40.0%	6	0	2	0		
Ophthalmology	12	6	50.0%	\$1,517,175	\$746,565	49.2%	5	0	1	0		
Pathology	50	19	38.0%	\$7,825,308	\$2,048,744	26.1%	26	0	4	1		
Pediatrics	119	59	49.5%	\$22,668,382	\$5,996,531	26.4%	53	1	8	0		
Pharmacology/Exp. Therapeutics	36	11	30.5%	\$5,763,904	\$890,850	15.4%	22	1	3	0		
Physical Therapy	10	5	50.0%	\$1,133,898	\$333,355	29.3%	6	0	0	0		
Physiology	49	25	51.0%	9,751,261	\$4,913,806	50.3%	18	0	7	1		
Program of Oncology	75	47	62.6%	\$9,118,523	\$3,754,274	41.1%	28	0	0	0		
Program of Trauma	8	6	75.0%	\$1,402,251	\$495,441	35.3%	2	0	0	0		
Psychiatry	157	79	50.3%	\$20,701,251	\$6,939,969	33.5%	77	0	6	0		
Radiation Oncology	40	16	40.0%	\$5,868,312	\$1,407,968	23.9%	23	1	0	0		
Surgery	70	29	41.4%	\$10,788,311	\$4,146,220	38.4%	39	0	3	0		
Vet Resources/Comparative Medicine	4	1	25.0%	\$3,690,326	\$26,797	0.7%	2	0	1	0		
School Total:	1325	604	45.5%	\$240,922,163	\$80,791,407	33.5%	659	7	77	2		
Graduate School												
No department level	1	0	0	70,000	0	0.0	1	0	0	0		
School Total:	1	0	0	70,000	0	0.0	1	0	0	0		

Department	Competing Proposals	Projects Awarded	Success Rate	Requested	Awarded	Percent	Still Pending	Not Funded	Disapp	Withdrawn
SCHOOL OF LAW										
Clinical Law	16	12	75%	\$557,420	\$442,842	79.4%	4	0	0	0
Dean's Office	5	5	100%	\$339,499	\$338,269	99.6%	0	0	0	0
No department level	1	1	100%	\$15,000	\$15,000	100%	0	0	0	0
School Total:	22	18	81.8%	\$911,919	\$796,111	87.3%	4	0	0	0
DENTAL SCHOOL										
Dean's Office	1	0	0.0%	\$1,000,000	0	0.0%	1	0	0	0
Dental Hygiene	4	2	50.0%	\$71,292	\$40,302	56.5%	2	0	0	0
Diagnostic Sciences & Path.	14	4	28.5%	\$1,608,787	\$262,757	16.3%	10	0	1	0
Endodontics	4	0	0.0%	\$408,223	0	0.0%	4	0	0	0
Oral Health Care Delivery	11	8	72.7%	\$704,838	\$403,538	57.2%	3	0	0	0
Oral-maxillofacial Surgery	2	0	0.0%	\$402,192	0	0.0%	2	0	0	0
Oral/Craniofacial Bio Sciences	29	11	37.9%	\$7,641,389	\$2,998,195	39.2%	14	0	4	1
Orthodontics	1	0	0.0%	\$15,000	0	0.0%	1	0	0	0
Pediatric Dentistry	5	1	20.0%	\$767,567	\$23,000	2.9%	3	0	0	1
Periodontics	4	3	75.0%	\$357,764	\$243,432	68.0%	1	0	0	0
Restorative Dentistry	11	7	63.6%	\$207,552	\$114,012	54.9%	4	0	0	0
School Total:	86	36	41.8%	\$13,184,604	\$4,085,236	30.9%	45	0	5	2
SCHOOL OF NURSING										
Academic Affairs	3	3	100.0%	\$353,722	\$230,000	65.0%	0	0	0	0
Adult/Health Nursing	20	6	30.0%	\$3,346,744	\$633,645	18.9%	11	0	3	0
Behavioral & Community Health	18	13	72.2%	\$2,815,397	\$1,918,399	68.1%	4	0	2	0
Center for Research	4	4	100.0%	\$287,850	\$276,482	96.0%	0	0	0	0
Child, Women & Family Health	13	6	46.1%	\$1,084,106	\$3,284,900	35.5%	7	0	0	0
Clinical Practice and Services	4	3	75.0%	\$327,968	\$301,542	91.9%	1	0	0	0
Dean's Office	3	3	33.3%	\$10,604,715	\$301,048	2.8%	2	0	0	0
Educ. Admin. & Health Policy	3	1	33.3%	\$904,881	\$30,000	3.3%	1	0	1	1
Maternal and Child Health	2	1	50.0%	\$64,616	\$62,464	96.6%	1	0	0	0
No department level	5	2	40.0%	\$745,548	\$11,356	1.5%	3	0	0	0
Policy & Workforce Development	1	0	0.0%	\$185,625	0	0.0%	1	0	0	0
School Total:	76	40	52.6%	\$20,721,172	\$4,149,836	20.0%	31	0	6	1

Department	Competing Proposals	Projects Awarded	Success Rate	For Projects Awarded		Percent	For Projects Not Awarded			
				Requested	Awarded		Still Pending	Not Funded	Disapp	Withdrawn
SCHOOL OF PHARMACY										
Dean's Office	1	1	100.0%	\$81,010	\$81,010	100.0%	0	0	0	0
Pharmaceutical Sciences	61	26	42.6%	\$7,365,462	\$1,893,231	25.7%	27	1	7	0
Pharmaceutics	3	0	0.0%	\$70,500	0	0.0%	3	0	0	0
Pharmacy Practice & Science	66	40	60.6%	\$5,777,904	\$2,603,988	45.0%	28	0	0	0
School Total:	131	67	51.1%	\$13,294,876	\$4,578,229	34.4%	58	1	7	0
SCHOOL OF SOCIAL WORK										
Community Planning Program	4	2	50.0%	\$362,519	\$183,191	50.5%	2	0	0	0
Dean's Office	2	1	50.0%	\$54,514	\$23,607	43.3%	1	0	0	0
No department level	25	16	64.0%	\$4,403,656	\$3,563,760	80.9%	7	0	1	1
Training	1	0	0.0%	\$88,322	0	0.0%	1	0	0	0
School Total:	32	19	59.3%	44,909,011	\$3,770,558	76.8%	11	0	1	1
UMB CAMPUS ADMINISTRATION										
Campus Police	1	1	100.0%	\$3,000	\$3,000	100.0%	0	0	0	0
Health Sciences Library	1	0	0.0%	\$140,155	0	0.0%	1	0	0	0
Human Resource Services	1	1	100.0%	\$15,000	\$15,000	100.0%	0	0	0	0
National Museum of Dentistry	1	0	0.0%	\$56,250	0	0.0%	1	0	0	0
Office of the President	2	2	100.0%	\$41,777	\$41,777	100.0%	0	0	0	0
Professional Schools Comp. Ctr.	1	0	0.0%	\$114,993	0	0.0%	1	0	0	0
Total:	7	4	57.1%	\$377,175	\$59,777	16.1%	3	0	0	0
Total, All Schools:	1,680	788	46.9%	\$294,384,920	\$98,231,154	33.3%	812	8	96	6

Inventor(s)	School	Department	IP Type	Country	Technology Title	Issue Number	Date of Issuance
Ross, Doyle, Abruzzo	Medicine	Medicine; Pathology	Non- Provisional Patent	US	Breast Cancer Resistance Protein (BCRP) and the DNA Which Encodes It	6,313,277	11/06/2001
Earl, Shepard	Medicine	Radiation Oncology	Copyright	US	Direct Aperture Optimization	TXu 1-001-506	12/14/2001
Litkowski, Hack, Greenspan	Dental	Restorative Dentistry	Non- Provisional Patent	US	Compositions Containing Bioactive Glass and Their Use in Treating Tooth Hypersensitivity	6,338,751	01/15/2002
Jarrell, Skinner, Raczek, Jarrell	Medicine	Surgery	Copyright	US	Computer Based Interactive Teaching Tool	Txu 1-025-751	02/15/2002
Fasano, Maurelli, Fernandez, Bloch	Medicine	Pediatrics	Non- Provisional Patent	US	Method of Identifying Bacterial Genes Incompatible with Bacterial Pathogenicity and the Use of Such Genes Such as cadA to Reduce Pathogenicity in a Bacteria or to Combat Pathogenic Bacterial Infections	6,344,201	02/05/2002
Litkowski, Hack, Greenspan	Dental	Restorative Dentistry	Foreign Patent	AU	Methods and Compositions for Whitening Teeth	741,771	03/21/2002
Litkowski, Hack, Greenspan	Dental	Restorative Dentistry	Non- Provisional Patent	US	Methods and Compositions for Whitening Teeth	6,356,132	04/02/2002
Aurelian	Medicine	Pharmacology and Experimental Therapeutics	Foreign Patent	AU	Vaccine Composition for Herpes Simplex Virus and Methods of Use	742,281	04/04/2002
Keay, Warren, Hise	Medicine	Medicine	Non- Provisional Patent	US	Diagnosis of Interstitial Cystitis	6,376,197	04/23/2002

Agreement Type	Exclusive vs Non-Exclusive	Company or Institution	Co. Size	on UMB Technology	UMB Equity	PI	UMB School	Department	Technology	IP Type	Date Executed
License	Exclusive	Altarex	Small	No	No	Mann	Medicine	Medicine	Therapeutic Method and Composition Utilizing Antigen-Antibody Complexation and Presentation by Dendritic Cells	Patent	09/27/2001
License	Exclusive	Artemis	Start-Up	Yes	Yes	Schwarz	Medicine	Psychiatry	NMDA Antagonists	Patent	10/24/2001
IIA		University of Mississippi				Ghandehari	Pharmacy	Pharmaceutical Sciences	Targeted delivery of polyamine analogs for cancer chemotherapy	Patent	10/29/2001
Option	Exclusive	Xenoport	Small	No		Poli	Pharmacy	Pharmaceutical Sciences	A Bile Acid Pro-drug of Acyclovir	Patent	03/13/2002
IIA		University of Minnesota; UC Davis				Dumler	Medicine	Pathology	Cloned genes of Ehrlichia equi and the agent of human granulocytic ehrlichiosis	Patent	03/26/2002
License	Exclusive	FOCUS	Small	No	No	Dumler	Medicine	Pathology	Cloned genes of Ehrlichia equi and the agent of human granulocytic ehrlichiosis	Patent	03/26/2002
IIA		Dartmouth University				Hassel	Medicine	UMCC	Cancer therapy or prevention pathway involving UBEL, ISG15, UBP43	Patent	05/01/2002
License	Exclusive	IPBL	Small	No	No	Bucci	Medicine	Biochemistry	Controlled Polymerization of Hemoglobin	Patent	05/20/2002
License	Exclusive	Articulation Innovations	Start-Up	Yes	No	Siegel	Dental	Restorative Dentistry	Cast Mounting Stabilizers; Caslix®	Patent; Trademark	06/12/2002