

# OMRF 2009

Wide Ruled •  $9\frac{3}{4} \times 7\frac{1}{2}$  • 24.7 x 19.0 cm



# New beginnings

Since OMRF first opened its doors more than a half-century ago, our scientists have helped change the face of medicine. They've given the world the first treatment for a deadly blood infection that claims a half-million lives each year. A powerful test to predict the risk of developing breast cancer. Groundbreaking advances in the battles against HIV and lupus. And, most recently, an experimental drug that offers real hope for stopping Alzheimer's disease.

These discoveries have touched and saved countless lives. They've come about because OMRF is an institution that places the highest priority on innovation, on refusing to accept the status quo. It's precisely this spirit that drives the newest chapter in OMRF's history.

This past year, we broke ground on a new research tower. Crowned by 24 DNA-shaped turbines, it will be the first medical research facility anywhere to

harness the wind to help power its labs. When we complete construction in 2011, it will also represent the largest campus expansion in OMRF history.

The tower will add 186,000 square feet of laboratory and clinical research space. It will house a state-of-the-art research clinic for patients suffering from multiple sclerosis and other autoimmune diseases. In its 34 new labs, scientists will probe medical problems ranging from heart disease and stroke to arthritis and immunology.

I'm just counting down the days until we cut the ribbon. Thanks to the generosity of so many, this facility will ensure that our scientists stay on the leading edge of research. And that OMRF will keep making discoveries that make a difference.

*Stephen M. Prescott*

Stephen M. Prescott, MD  
President

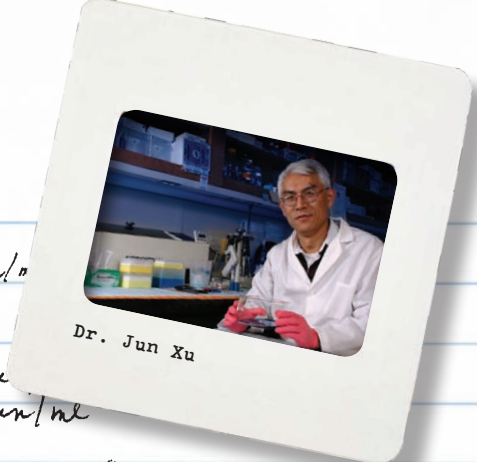


Hemglac col.

E I 1:10 .045  $\frac{N}{.027}$  135  $\mu\text{m}/\text{ml}$   
1  $\lambda$  of col from all 0

E II 2% 1:50 - 30' = .042 = .027 N 12  $\mu\text{m}$

E III 2% " = .031 = .01 N 50  $\mu\text{m}/\text{ml}$



washed HP DIPT w/ 2M NaCl - read these + piled 5 s of 1M  
using 2  $\lambda$  s.s. still 0  
- need deturg, PL in away?  
hi salt kill?  
still on col?

10/8 - Washed Hemglac w/ pH 7.2 glyc-acet 1M NaCl

10/9

A. Hemglac E II - 5% applied to 12 GHE col 2.5 x 1.35 cm

120101 9m 25' + 120V 29

Cof. pools

15mg/gel

No. 66 Native + 59 Lubrol

Name

1. 80 RT p. 45-61 SA = 109,400

2. 80 cold p. 24-33 SA = 41,700

3. " " p. 34-55 SA = 39,900

4. old DIPT p. 25-37 SA = 99,000

5. " " p. 38-54 SA = 90,700

Retouched 6. Fyung p. 27-33 SA = 5,000

Order Finished 7. " " p. 34-60 SA = 109,400

Reorder

8. 80 RT Grad EI. 14 blank gel

9. 2m elute old DIPT blank gel

10. DIPT Ag 23 blank gel

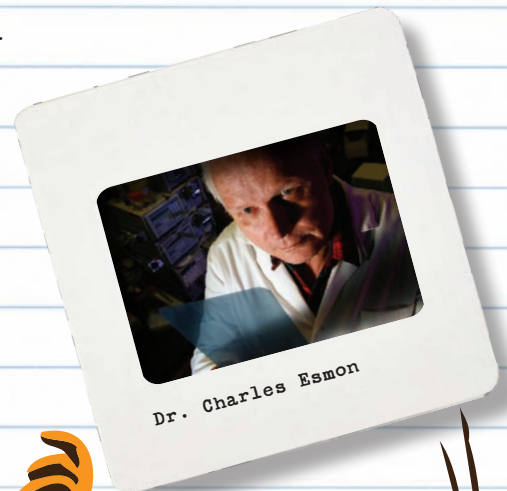
# Promising path to treating traumas

Last year, more than 1,000 roadside bombs and other improvised explosive devices were detonated in Iraq. In Afghanistan, the numbers were similar. With those totals came too many victims—soldiers and civilians who lost limbs, organ function and, often, lives. But a new discovery by OMRF scientists could help change those grim statistics.

While studying the blood of patients suffering from severe blood infections, OMRF's Dr. Jun Xu noticed fragments of proteins called histones. The proteins normally keep DNA tightly wound inside a cell's nucleus, so Xu and his mentor, Dr. Charles Esmon, wondered what they were doing floating in the bloodstream. "People had seen histones in the blood before," says Xu, "but no one realized they might be causing some of the trauma."

The OMRF scientists found that when cells become damaged and burst—either through traumatic injury, infection or diseases such as diabetes—histones can enter the bloodstream and kill the lining of blood vessels. Working with collaborators at Temple University, the researchers developed an antibody that blocks the histones' ability to kill. In preclinical testing, it has showed promising results and no adverse effects.

"We hope this work will lead to new ways to save lives," says Esmon.





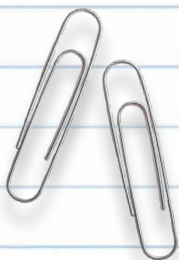
## Unlocking clues to H1N1

As a new strain of H1N1 influenza emerged in 2009, experts feared it might follow the pattern of the 1918 flu, the world's deadliest epidemic. So the Centers for Disease Control and Prevention turned to select medical research centers around the country for help.

Among those the CDC enlisted were OMRF's Drs. Linda Thompson and Judith James. Their assignment: Help gather antibodies—key players for diagnosis, prevention and treatment—against the virus.

Within days, OMRF sent 67 antibodies to the government agency. Subsequent efforts generated another 29 antibodies. “There aren't very many places that generate these antibodies, so we were a major source,” says Thompson.

While the H1N1 flu that appeared had symptoms similar to ordinary seasonal influenza, efforts to combat H1N1 remain a CDC priority, as the virus could mutate to a more dangerous form. So the OMRF researchers are carrying on their work. “If we could find an antibody that neutralizes H1N1, it could play a big role in treating the people who are the sickest or who are having trouble getting rid of the virus,” says Thompson.



3/26/09 Transfection II p1500134p1

A01H A05H A06H B01H C01H C02H C03H C04H C05H

D02H D03H D04H D05H E02H E05H F01H F02H F03H G05H

3/27/09 Split 293x cells 1:8 (1 → 1)

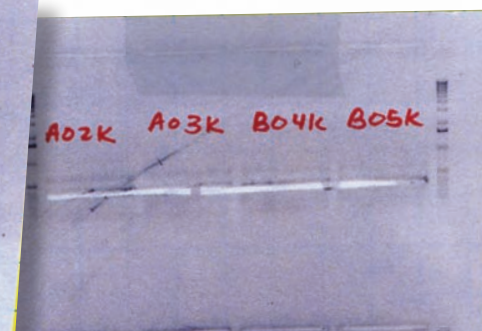
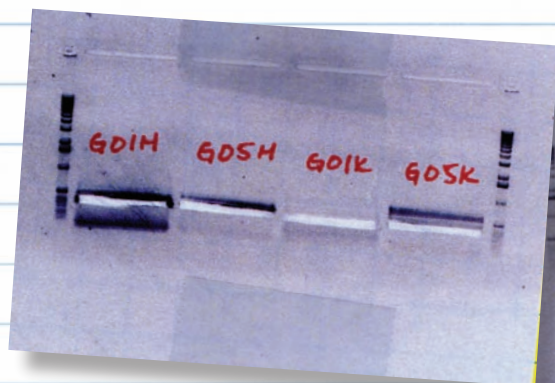
Changed Media

041206p162C04 2-500225Ap1D03 3-500060Cp1C02  
 041206p162G04 2-590038Cp1G02 3-500060Cp2C05  
 2-500134Ap1E03 3-500060Cp1B02

Mini Prep p1500134p1

A01H C01H C05H D05H F02H  
 A05H C02H D02H E02H F03H  
 A06H C03H D03H E05H G05H  
 B01H C04H D04H F01H

3/30/09 Split 293x cells 1:4 (1 → 1)



Protein Purification

| antibody       | ug/ml | antibody       | ug/ml |
|----------------|-------|----------------|-------|
| 2-590005Ap1B04 | 310   | 2-590044Ap1G05 | 800   |
| 2-590005Ap1C01 | 220   | 2-500156Ap1E05 | 320   |
| 2-590005Ap1E05 | 460   | 2-500156Ap1G01 | 380   |
| 2-590044Ap1B03 | 660   | 2-500134Ap1E03 | 430   |

50 mL of 1/10K rabbit anti 5µL dilute to 50mL  
 24µL of 1/500K rabbit anti 480µL dilute to 24mL } for 1° (HMGB1)

15mL of 1/5K rabbit anti 3µL dilute to 15mL (β-actin)  
 30mL of 1/500K rabbit anti 5µL dilute to 30mL

24mL of 1/2K rabbit anti 12µL dilute to 24mL for 1° (HIF-1α)

HMGB1 2° (rabbit) 1/30K rabbit anti 1.67µL dilute to 50mL

β-actin 2° (mouse) 1/10K rabbit anti 5µL dilute to 50mL

HIF-1α 2° (mouse) 1/20K rabbit anti 2.5µL dilute to 50mL

5/29

AF β ACTIN

AB β ACTIN

AF HMGB1

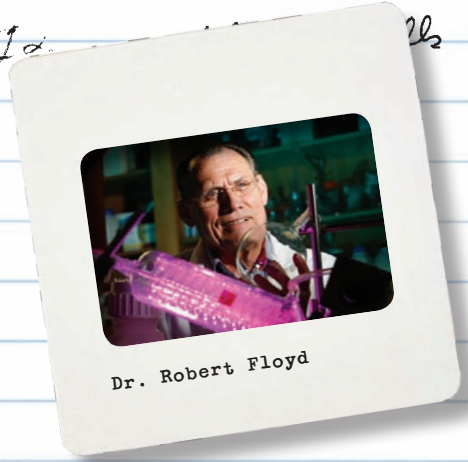
AB HMGB1

MCF7 cells

SF HIF-1α

SB HIF-1α

I think the problem could be the equipment!  
 Let's try this again please  
 RAF



Dr. Robert Floyd

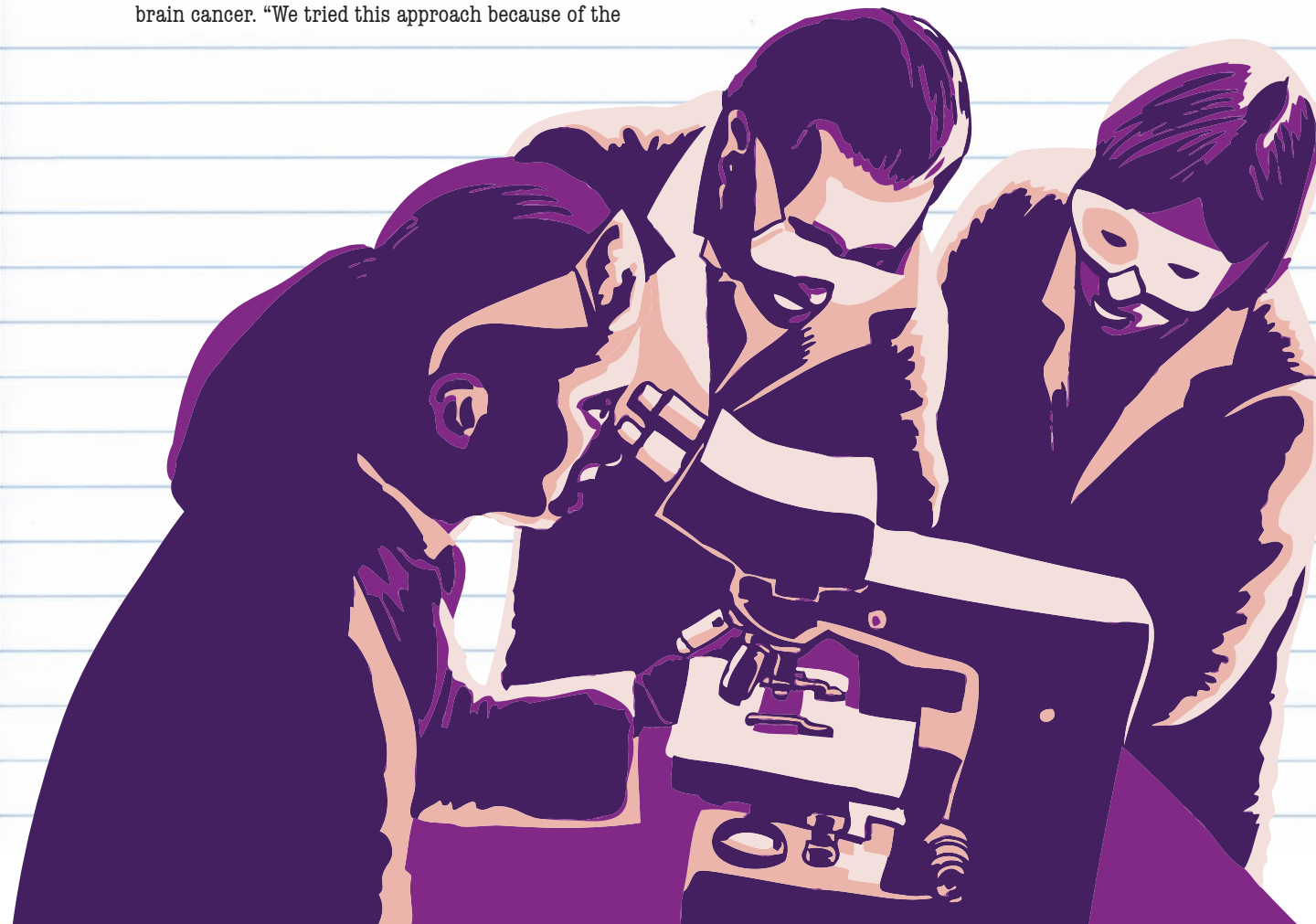
# A novel treatment for breast cancer

Most breast cancer treatments fail to kill the small number of cancer stem cells that exist within the tumor. That means those stem cells can grow and multiply, resulting in additional tumors at the original site and throughout the body.

Led by Dr. Robert Floyd, OMRF scientists have discovered a new method that may inhibit those cells' ability to grow and spread. The research involves using a compound that Floyd and Dr. Rheel Towner developed for treating glioblastoma, a deadly form of brain cancer. "We tried this approach because of the

similarities in the outer coating of brain cancer and breast cancer cells," says Floyd. "So far it seems to work in the same way in both forms of cancer."

The scientists' next step will be to study the compound's effectiveness in treating mice bred to develop breast cancer. "No one has looked at blocking cancers by this method," says Floyd. "We're excited to move ahead." With 192,000 new breast cancer cases expected in the U.S. this year, progress can't come fast enough.



# Fighting a rare disease

Each year, the National Organization for Rare Disorders salutes those who have made watershed contributions toward improving the lives of people affected by little-known diseases. At its 2009 banquet at the National Press Club in Washington, DC, the group honored a drug discovered by OMRF's Drs. Naomi and Charles Esmon.

The drug, Ceprotin, combats a genetic deficiency of protein C. Left untreated, the deficiency causes blood clots that lead to amputations and ultimately death. Ceprotin was the first drug approved by the European Union's joint licensing protocol. In 2007, it received marketing in the U.S. from the Food and Drug Administration.

Genetic protein C deficiency affects about 1 in 300 people. Insufficient levels of the protein are first seen as blood clots in the blood vessels of the skin, eyes, brain and kidneys, but the clots can occur anywhere in the body where blood flows.

"Without this drug, babies with protein C deficiency would die within the first week of life," says Naomi Esmon. "We're just happy knowing Ceprotin is out there."



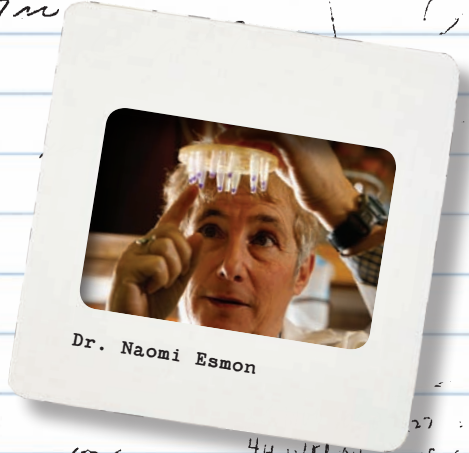
C5x5 Thru washed w/ ~500 ml .1Nall .5%Ca .5kubrol  
 .02Tr 1m6z

Applied EII C1 + EII C2 + EII C3 Tot ~ 500 ml  
washed w/ 400 ml .1Nall

Extr may be dead I don't know .5% Kubrol can solubilize  
 it Or, maybe too much st. solubilized + killed (unlikely, as  
 column run in it are OK)

⇒ Extr I pull fr. EII C1 w/ .5% Tri in sucrose + Ca  
 " " " EII C2 w/ .5% Tri @ pH 9.5

| App | Ext I Col. | C+T = .033 | N    |
|-----|------------|------------|------|
| Prn | 4 1:50     | .031       | 0    |
|     | 8          | .032       |      |
|     | 12         | .032       |      |
|     | 16         | .032       |      |
|     | 20         | .032       |      |
| Ly  | 25 1:100   | .030       |      |
|     | 28         | .031       |      |
|     | 30         | .034       |      |
|     | 33         | .048       | .015 |
|     | 36         | .058       | .025 |
|     | 41         | .065       | .032 |
|     | 49         | .037       | .004 |



Dr. Naomi Esmon

|            |        |       |       |
|------------|--------|-------|-------|
| Ext II C 2 | 1:50   | .065  | .032  |
|            | 1:100  | .050  | .017  |
| Ext II C 3 | 1:50   | .066  | .033  |
| Rate/step  | 1:500  | .067  | .031  |
| conc       | 1:2000 | ≥.141 | ≥.108 |
|            | 1:5000 | .088  | *.055 |

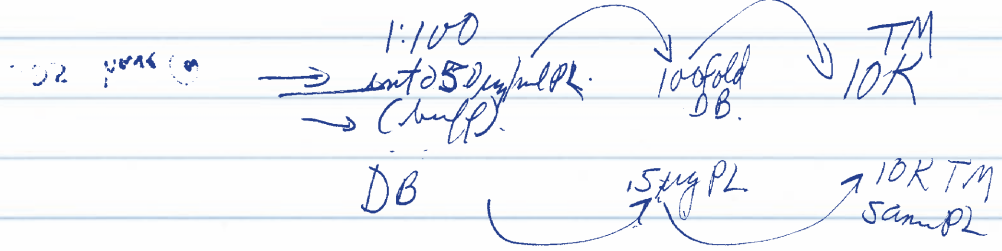
150  
250  
320  
70

160, 165 x 210 } 43,200  
170 }  
165 x 55

1550 x 22  
= 21,600  
27,500 = 81% Rec  
S.A = 95,000

final TM →

final PL

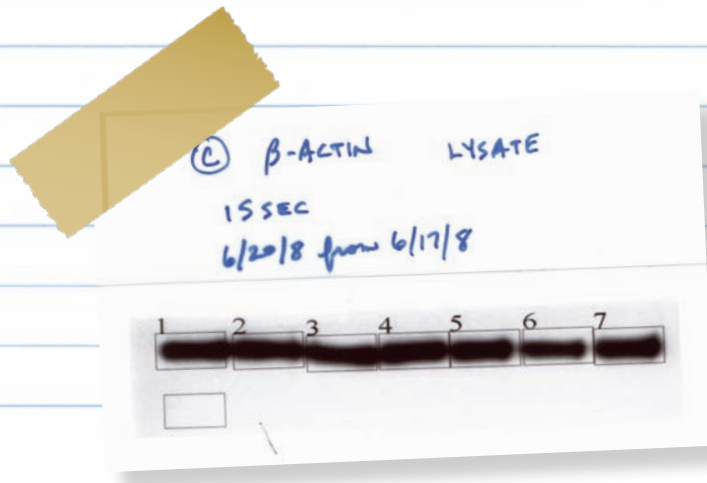


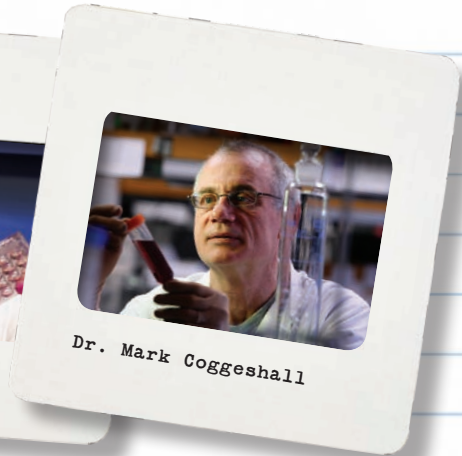
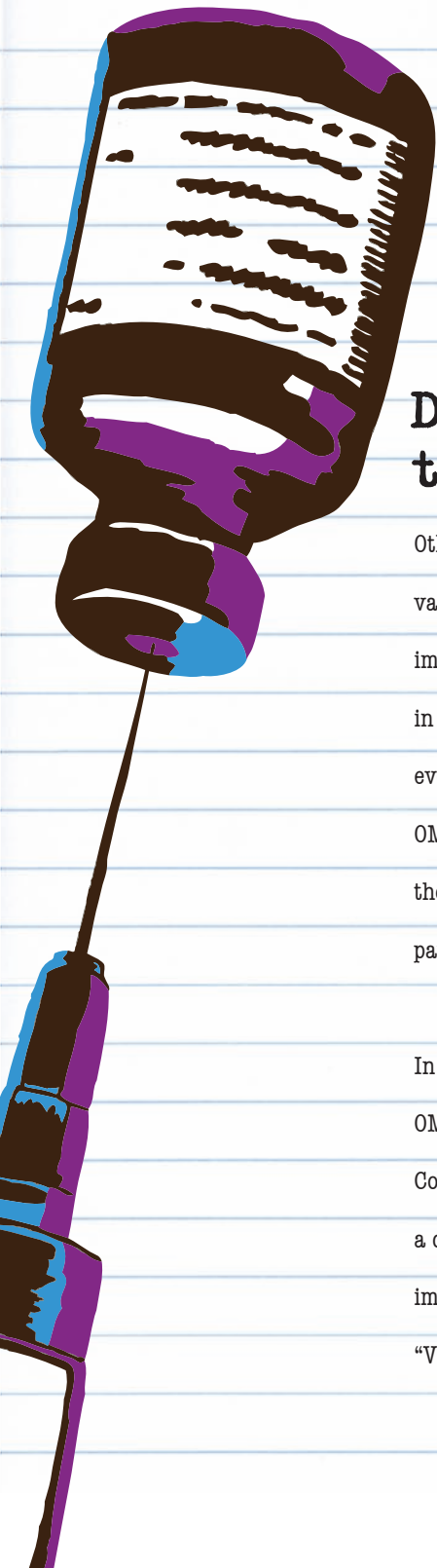
PC-KLH Internalization Assay 9/2/09

Data 3 samples:

|        |                          |                    |
|--------|--------------------------|--------------------|
| 1.     | unstained                | stay @ 4°C         |
| 2.     | positive                 | 37°C for 30'       |
| 3.     | unstimulated (no pc-KLH) | stay @ 4°C         |
| 4.     | stim w/pc-KLH            | stay @ 4°C         |
| 10' 5. |                          | incubate @ 37°C 5' |
| 5' 6.  |                          | 10'                |
| 7.     |                          | 15'                |
| 8.     |                          | 20'                |
| 9.     |                          | 30'                |

- count: used  $0.833 \times 10^6$  for # 1-3  
used  $1.25 \times 10^6$  for # 4-9
- stim / 1°: #2 pos w/ 20ug/ml of unlabeled F(ab')<sub>2</sub> GαM IgM  
# 4-9 stim w/ 5ug/ml PC-KLH
- incubate @ 4°C for 30'
- wash 2X (samples #2, 4-9)
- incubate @ 37°C only samples: #2 pos + stim #5-9 for indicated times (above)
- wash 37°C incubated samples 1X (+ #3)
- stain #2 w/ cy3 F(ab')<sub>2</sub> DαG IgG (to 15ug/ml)  
# 3-9 w/ PE F(ab')<sub>2</sub> GαM IgM
- wash 1X
- fix w/ 2% paraformaldehyde : incubate @ 4°C for 5min then RT for 10min
- wash 2X w/ FSB → filter → Ready for flow





## Discovery could lead to improved vaccines

Other than safe drinking water, vaccines rank as perhaps the most important public health intervention in history. But they don't work for everyone. Now a new discovery by OMRF scientists has shed light on why they may prove ineffective in some patients.

In the *Journal of Biological Chemistry*, OMRF's Drs. Susan Kovats and Mark Coggeshall described for the first time a crucial part of the process—when immune cells take in the vaccine. “Virtually nothing was known about

this process we've identified,” says Coggeshall. “We need to know how it works correctly so we can start figuring out why it sometimes goes wrong.”

Going forward, the researchers will study reactions to influenza and anthrax vaccines and see if those who react poorly are missing crucial proteins. They hope the work will help predict which vaccines will protect against those infectious agents. It could also prove crucial in developing treatments to help patients who might not react properly to vaccines.



## OMRF named one of nine U.S. centers of excellence

In May 2009, OMRF was selected by the National Institutes of Health as one of the country's nine Autoimmunity Centers of Excellence. OMRF joined Yale University, Stanford University, Duke University and five other institutions pursuing projects to develop treatments for conditions like lupus, multiple sclerosis, rheumatoid arthritis and type I diabetes.

The designation also came with a grant award. Led by Dr. Judith James, OMRF researchers will use the funds to expand their efforts to better understand and treat autoimmune diseases. Those illnesses affect 5 to 8 percent of the U.S. population and are responsible for tens of billions of dollars in annual medical bills.

“By integrating clinical trials and other patient-oriented research,” says James, “we hope to accelerate the process of delivering new therapies to the patients who need them most.”



2-590044Ap1B03 2-590044Ap1D02 2-590044Ap1G05  
 2-500156Ap1E05 2-500156Ap1G01 2-500134Ap1E03  
 3-500225Ap3B04 3-500225Ap3D05 3-500225Ap3F01  
 3-500225Ap3F03 3-500225Ap3F05 3-500225Ap3G01  
 3-500225Ap3G02 3-500225Ap3C03

Max

| sample        | H $\mu$ g/ml | K $\mu$ g/ml |
|---------------|--------------|--------------|
| pn500134p1D03 | 2456.5       | 2290.1       |
| pn500134p1D05 | 2488.3       | 2477.2       |
| pn500134p1E05 | 2412.4       | 2380.3       |
| pn500134p1F01 | 2467.7       | 2728.4       |
| pn500134p1G05 | 2724.3       | 2633.3       |
| pn500134p2C02 | 2567.1       | 2911.8       |



Ligation 1:7

pn500225p1F02H/K G05H/K

pn500225p2A02H/K C02H/K D04H/K E05H/K

Started Protein Purification

2-590005Ap1B04 2-590005Ap1C01 2-590005Ap1E05

2-590044Ap1B03 2-590044Ap1G05 2-500156Ap1E05

2-500156Ap1G01 2-500134Ap1E03

5/6/09 Transformation I

pn500225p1F02H/K G05H/K

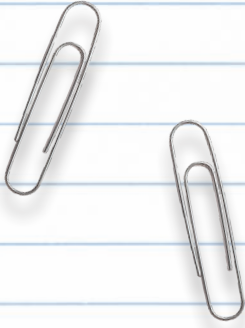
pn500225p2A02H/K C02H/K D04H/K E05H/K

Split 293x cells 1:3 (28  $\rightarrow$  74)

Protein Purification

| antibody       | $\mu$ g/ml |
|----------------|------------|
| 2-590005Ap1B04 | 310        |
| 2-590005Ap1C01 | 220        |
| 2-590005Ap1E05 | 460        |
| 2-590044Ap1B03 | 660        |

| antibody       | $\mu$ g/ml |
|----------------|------------|
| 2-590044Ap1G05 | 800        |
| 2-500156Ap1E05 | 320        |
| 2-500156Ap1G01 | 380        |
| 2-500134Ap1E03 | 430        |



Ⓒ β-ACTIN LYSATE  
5SEC  
6/24/8 from 6/17/8 cells

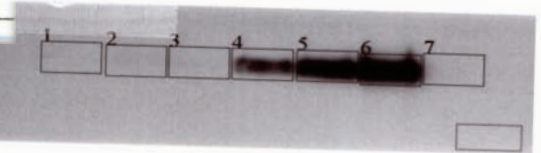
Cells finished 04/02

| cell lysate   | TV (mg/ml) | β-actin Intensity | HMGBI Intensity / mgTP | gTP            |
|---------------|------------|-------------------|------------------------|----------------|
| ① control     | 7360       | 6874              | $1.69 \times 10^8$     | 0 <sup>b</sup> |
| 2 H           | 7580       | 5916              | $1.49 \times 10^8$     | 0 <sup>b</sup> |
| 3 P           | 7030       | 25111             | $5.88 \times 10^8$     | 0 <sup>s</sup> |
| 4 P+H         | 4580       | 25101             | $3.83 \times 10^8$     | 0 <sup>b</sup> |
| 5 SP          | 5790       | 16482             | $3.18 \times 10^8$     | 0 <sup>s</sup> |
| 6 SP+H        | 4530       | 18090             | $2.73 \times 10^8$     | 0 <sup>s</sup> |
| 7 KTR         | 4030       | 18952             | $2.54 \times 10^8$     | 0 <sup>b</sup> |
| W/β-EST (7+2) |            |                   |                        |                |
| W/β-EST       |            |                   |                        |                |



HMGBI LYSATE  
5SEC

6/24/8 from 6/17/8 cells



Ⓒ HMGBI MEDIA  
2min  
6/24/8 from 6/17/8 cells  
 $10^{-7}$  M β-EST

Pool# Sample  
mg based on 100K/mg or 50 when SA ≥ 100K

|     |   |                  |
|-----|---|------------------|
| 2   | 1 | R9 (8-50) main   |
| 2.8 | 2 | R9B (23-34) main |
| 1.3 | 3 | Tail from 9+9B   |

Donor and  
financial information

ik card)

00

1955

# Honor roll

Between July 1, 2008, and December 31, 2009, more than 10,000 individuals, corporations, foundations and organizations made gifts to OMRF. Each one of those donations made a difference. In this Honor Roll, we have recognized gifts of \$500 and above.

## \$5,000,000.00 and above

Anonymous  
Association of Central Oklahoma Governments  
J. A. and Leta Chapman Trusts  
State of Oklahoma Opportunity Fund

## \$1,000,000 - \$4,999,999

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The Anne and Henry Zarrow Foundation

## \$500,000 - \$999,999

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Estate of Evelyn Wynn Woodruff  
Bonnie Young Trust

## \$25,000 - \$49,999

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## \$5,000 - \$9,999

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Mr. and Mrs. Stanley R. Crites  
Drs. Dean Dawson and Susannah Rankin  
Mr. and Mrs. Thomas A. Dearmon  
Dan L. and Kay C. Dillingham  
Thang C. and Laurie Do  
The Dolese Brothers Company  
The Dolese Foundation  
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Mr. and Mrs. Claude M. Harris III  
Mr. and Mrs. Frank X. Henke III  
Governor and Mrs. Brad Henry  
Gene and Myra Henry  
Frank D. and Bette Jo Hill  
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OMRF is poised to play a key role in the revolution in biomedical science that tomorrow will bring. With our staff of world-renowned scientists, we will perform the research that drives the next generation of life-changing discoveries. To this end, OMRF has launched the most ambitious expansion in our 64-year history: the Discoveries Campaign.

We have set the total fundraising goal for the Discoveries Campaign at \$125 million: \$85 million to construct and furnish the building and \$40 million to recruit 30 world-class scientists and equip their labs. Achieving this goal will ensure that Oklahoma stays on the leading edge of biomedical research. And that OMRF scientists continue making discoveries that make a difference.

The centerpiece of this effort will be a new “green” research tower, the first lab building in North America to tap both wind and solar energy as power sources. This new structure will nearly double the size of OMRF’s laboratory and clinical facilities, and it will serve as a home to the most precious resource in biomedicine: human capital.

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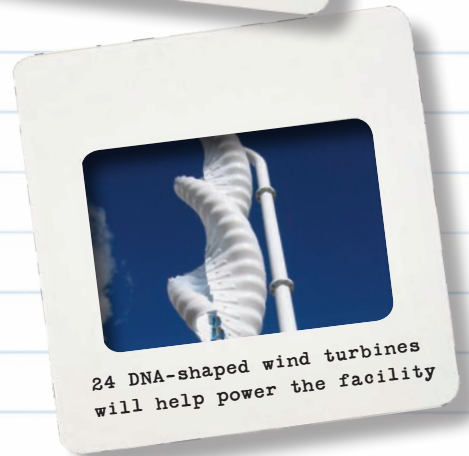
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### \$100,000 - \$499,999

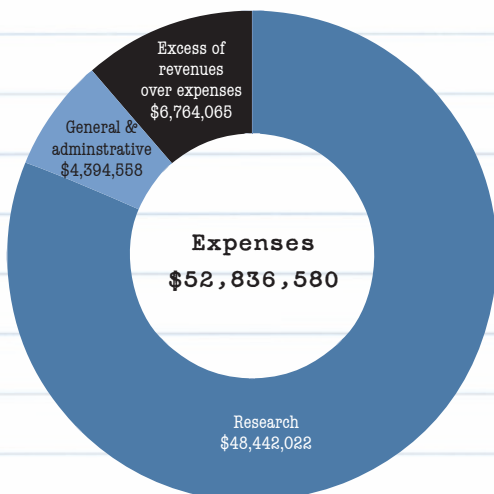
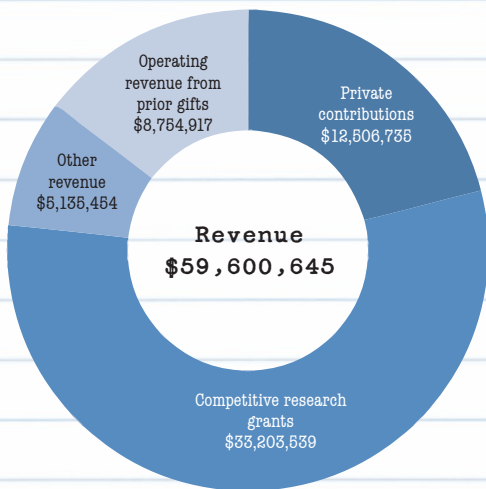
Charles and Naomi Esmon  
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# Selected financial information

For the eighth consecutive year, OMRF has received the highest possible rating from Charity Navigator, the nation's largest charity evaluator. Using publicly available financial information, Charity Navigator promotes intelligent giving by providing report cards for U.S. and international charities. Of the 115 medical research organizations evaluated nationwide, OMRF ranked 6th overall.

"Savvy donors are demanding more accountability, transparency and quantifiable results from the charities they choose to support with their hard-earned dollars," says Ken Berger, President and CEO of Charity Navigator. "This 'exceptional' designation from Charity Navigator differentiates Oklahoma Medical Research Foundation from its peers and demonstrates to the public that it is worthy of their trust."



## OPERATING REVENUE

|                                      |                  |
|--------------------------------------|------------------|
| Competitive research grants:         |                  |
| National Institutes of Health grants | \$ 24,694,387    |
| Other competitive research grants    | <u>8,509,152</u> |
| Total grants                         | 33,203,539       |

|                              |                |
|------------------------------|----------------|
| Private contributions:       |                |
| Income and gifts from trusts | 7,096,699      |
| Gifts & bequests             | 3,587,466      |
| Contributions                | 1,163,595      |
| Memorials                    | <u>658,975</u> |
| Total private contributions  | 12,506,735     |

|   |                  |
|---|------------------|
| Other revenue:                          |                  |
| Interest and investment income          | 2,151,687        |
| Mineral income                          | 1,281,496        |
| Royalties and licensing income          | 344,218          |
| Rent, analytical lab, and miscellaneous | <u>1,358,053</u> |
| Total other revenue                     | 5,135,454        |

|               |            |
|---------------|------------|
| Total revenue | 50,845,728 |
|---------------|------------|

|   |           |
|---|-----------|
| Operating revenue from wills, pledges, and other restricted gifts recorded in prior years | 8,764,917 |
|---|-----------|

|                         |            |
|-------------------------|------------|
| Total operating revenue | 59,600,645 |
|-------------------------|------------|

## OPERATING EXPENSES

|   |                  |
|---|------------------|
| Program Services - Research                   | 48,442,022       |
| Support Services - General and administrative | <u>4,394,558</u> |
| Total operating expenses                      | 52,836,580       |

|                                  |              |
|----------------------------------|--------------|
| Excess of revenues over expenses | \$ 6,764,065 |
|----------------------------------|--------------|

# Selected scientific publications

In 2009, OMRF researchers' work appeared in more than 200 peer-reviewed scientific journals. The topics of their research studies ran the gamut from prostate and colorectal cancer to the effects of high doses of vitamin D on heart disease. The following is a selection of those publications.

## Advanced Magnetic Resonance Center

Griffiths J, Tesiram YA, Reid GE, Saunders D, Floyd RA, Towner RA. In vivo magnetic resonance spectroscopy (MRS) assessment of altered fatty acyl unsaturation in liver tumor formation of a TGF $\alpha$  /c-myc transgenic mouse model. *J Lipid Res* 50:611-622, 2009.

## Arthritis and Immunology

Dozmorov I, Lefkovits I. Internal standard-based analysis of microarray data. Part 1: analysis of differential gene expressions. *Nucleic Acids Res* 37:6323-6339, 2009.

Harley IT, Kaufman KM, Langefeld CD, Harley JB, Kelly JA. Genetic susceptibility to SLE: new insights from fine mapping and genome-wide association studies. *Nat Rev Genet* 10:285-290, 2009.

Nguyen ML, Terzyan S, Ballard JD, James JA, Farris AD. The major neutralizing antibody responses to recombinant anthrax lethal factor and edema factors are directed to non-cross-reactive epitopes. *Infect Immun* 77:4714-4723, 2009.

Nock NL, Wang X, Thompson CL, Song Y, Baechle D, Raska P, Stein CM, Gray-McGuire C. Defining genetic determinants of the Metabolic Syndrome in the Framingham Heart Study using association and structural equation modeling methods. *BMC Proc* 3 Suppl 7:S50, 2009.

Sawalha AH, Harley JB, Scofield RH. Autoimmunity and Klinefelter's syndrome: when men have two X chromosomes. *J Autoimmun* 33:31-34, 2009.

Yin H, Borghi MO, Delgado-Vega AM, Tincani A, Meroni PL, Alarcón-Riquelme ME. Association of STAT4 and BLK, but not BANK1 or IRF5, with primary antiphospholipid syndrome. *Arthritis Rheum* 60:2468-2471, 2009.

## Cardiovascular Biology

Delvaeye M, Noris M, De Vriese A, Esmon CT, Esmon NL, Ferrell G, Del-Favero J, Plaisance S, Claes B, Lambrechts D, Zoja C, Remuzzi G, Conway EM. Thrombomodulin mutations in atypical hemolytic-uremic syndrome. *N Engl J Med* 361:345-357, 2009.

Moore KL. Protein tyrosine sulfation: a critical posttranslation modification in plants and animals. *Proc Natl Acad Sci USA* 106:14741-14742, 2009.

Stowell SR, Karmakar S, Arthur CM, Ju T, Rodrigues LC, Riul TB, Dias-Baruffi M, Miner J, McEver RP, Cummings RD. Galectin-1 induces reversible phosphatidylserine exposure at the plasma membrane. *Mol Biol Cell* 20:1408-1418, 2009.

Xu J, Zhang X, Pelayo R, Monestier M, Ammolio CT, Semeraro F, Taylor FB, Esmon NL, Lupu F, Esmon CT. Extracellular histones are major mediators of death in sepsis. *Nat Med* 15:1318-1321, 2009.

## Cell Cycle and Cancer Biology

Daum JR, Wren JD, Daniel JJ, Sivakumar S, McAvoy JN, Potapova TA, Gorbsky GJ. Ska3 is required for spindle checkpoint silencing and the maintenance of chromosome cohesion in mitosis. *Curr Biol* 19:1467-1472, 2009.

Gladstone MN, Obeso D, Chuong H, Dawson DS. The synaptonemal complex protein Zip1 promotes bi-orientation of centromeres at meiosis I. *PLoS Genet* 5:e1000771, 2009.

## Clinical Immunology

Bates JS, Lessard CJ, Leon JM, Nguyen T, Battisti LJ, Rodgers J, Kaufman KM, James JA, Gilkeson GS, Kelly JA, Humphrey MB, Harley JB, Gray-McGuire C, Moser KL, Gaffney PM. Meta-analysis and imputation identifies a 109 kb risk haplotype spanning TNFAIP3 associated with lupus nephritis and hematologic manifestations. *Genes Immun* 10:470-477, 2009.

Feng J, Gulati U, Zhang X, Keitel WA, Thompson DM, James JA, Thompson LF, Air GM. Antibody quantity versus quality after influenza vaccination. *Vaccine* 27:6358-6362, 2009.

## Clinical Pharmacology

Gladd DA, Olech E. Antiphospholipid antibodies in rheumatoid arthritis: identifying the dominoes. *Curr Rheumatol Rep* 11:43-51, 2009.

## Free Radical Biology and Aging

Griffin TM, Huebner JL, Kraus VB, Guilak F. Extreme obesity due to impaired leptin signaling in mice does not cause knee osteoarthritis. *Arthritis Rheum* 60:2935-2944, 2009.

Matsuzaki S, Szewda LI, Humphries KM. Mitochondrial superoxide production and respiratory activity: biphasic response to ischemic duration. *Arch Biochem Biophys* 484:87-93, 2009.

## Genetic Models of Disease

Edwards SL, Charlie NK, Richmond JE, Hegermann J, Eimer S, Miller KG. Impaired dense core vesicle maturation in *Caenorhabditis elegans* mutants lacking Rab2. *J Cell Biol* 186:881-895, 2009.

## Immunobiology and Cancer

Dudley DD, Wang HC, Sun XH. Hes1 potentiates T cell lymphomagenesis by up-regulating a subset of notch target genes. *PLoS ONE* 4:e6878, 2009.

Esplin BL, Welner RS, Zhang Q, Borghesi LA, Kincade PW. A differentiation pathway for B1 cells in adult bone marrow. *Proc Natl Acad Sci USA* 106:5773-5778, 2009.

Maeda K, Malykhin A, Teague-Weber BN, Sun XH, Farris AD, Coggeshall KM. Interleukin 6 aborts lymphopoiesis and elevates production of myeloid cells in systemic lupus erythematosus-prone B6.Sle1.Yaa animals. *Blood* 113:4534-4540, 2009.

Malhotra S, Kincade PW. Wnt-related molecules and signaling pathway equilibrium in hematopoiesis. *Cell Stem Cell* 4:27-36, 2009.

Malhotra S, Kovats S, Zhang W, Coggeshall KM. B cell antigen receptor endocytosis and antigen presentation to T cells requires Vav and dynamin. *J Biol Chem* 284:24088-24097, 2009.

## Protein Studies

Ghosh AK, Kulkarni S, Anderson DD, Hong L, Baldrige A, Wang YF, Chumanevich AA, Kovalevsky AY, Tojo Y, Amano M, Koh Y, Tang J, Weber IT, Mitsuya H. Design, synthesis, protein-ligand X-ray structure, and biological evaluation of a series of novel macrocyclic human immunodeficiency virus-1 protease inhibitors to combat drug resistance. *J Med Chem* 52:7689-7705, 2009.

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## Discoveries that make a difference

Since 1946, OMRF has been dedicated to understanding and developing more effective treatments for human disease.

Our scientists focus on such critical research areas as heart disease, cancer, lupus and Alzheimer's disease.

Discoveries at OMRF have helped create three FDA-approved drugs, including the first and only treatment for a deadly blood infection that kills 200,000 Americans each year.

OMRF researchers have also identified the enzyme believed responsible for Alzheimer's disease, and an experimental drug based on that discovery is now progressing through human clinical trials.



Rayna DuBose

Alive today  
because of  
OMRF  
discoveries



Meagan McLain

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