Mechanisms of MRN-100 Against Gastric Cancer

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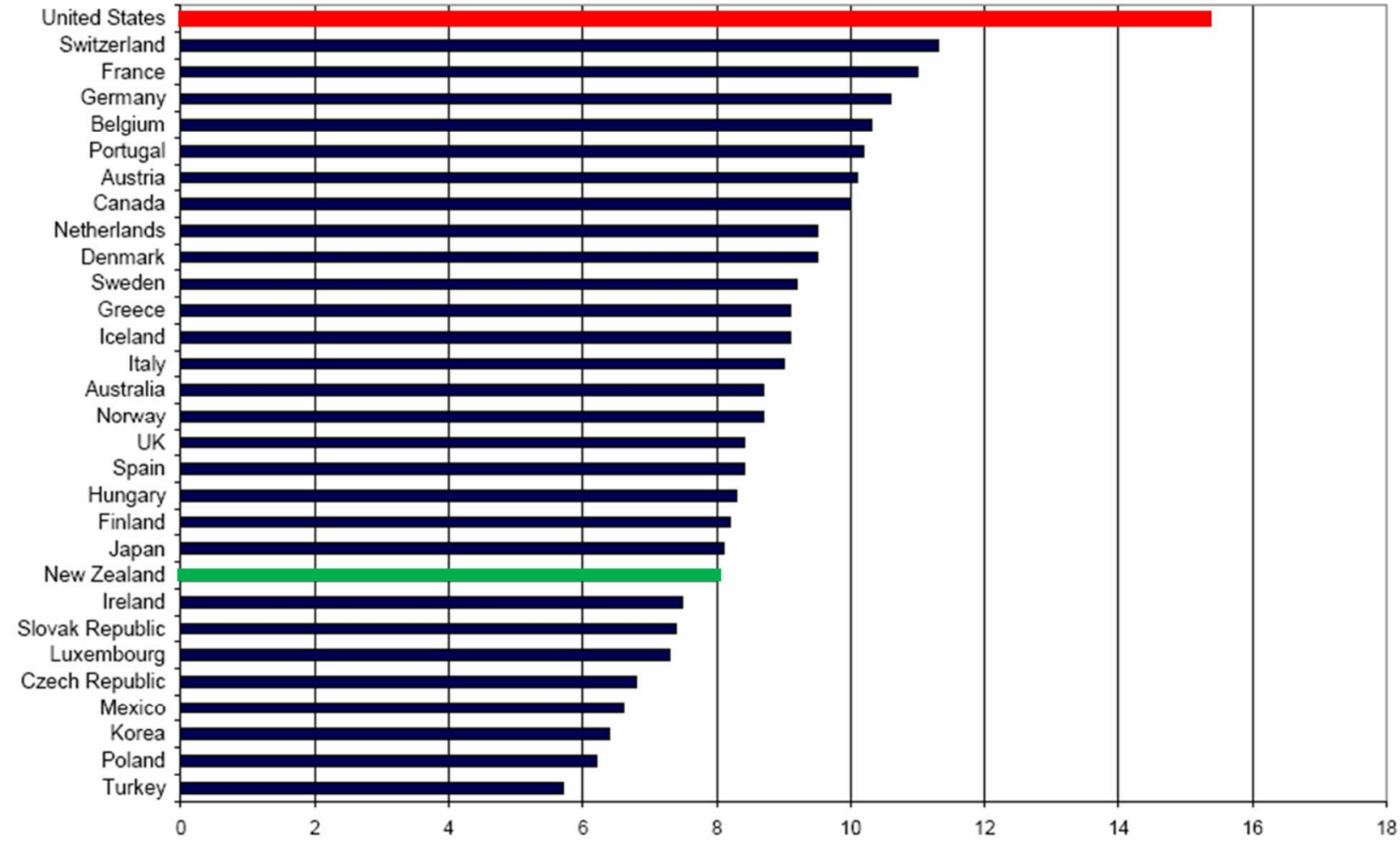
Outline

1. **Healthcare Systems Worldwide**
2. **Cancer History and Statistics**
3. **Esophogeal Cancer**
    - A) Histopathology
    - B) Number of cancer cell foci
4. **Gastric Cancer**
    - A) Histopathology
    - B) Number of cancer cell foci
5. **Mechanisms of protection against cancer**
    - A) Antioxidant Activity
    - B) Immunomodulatory Effect

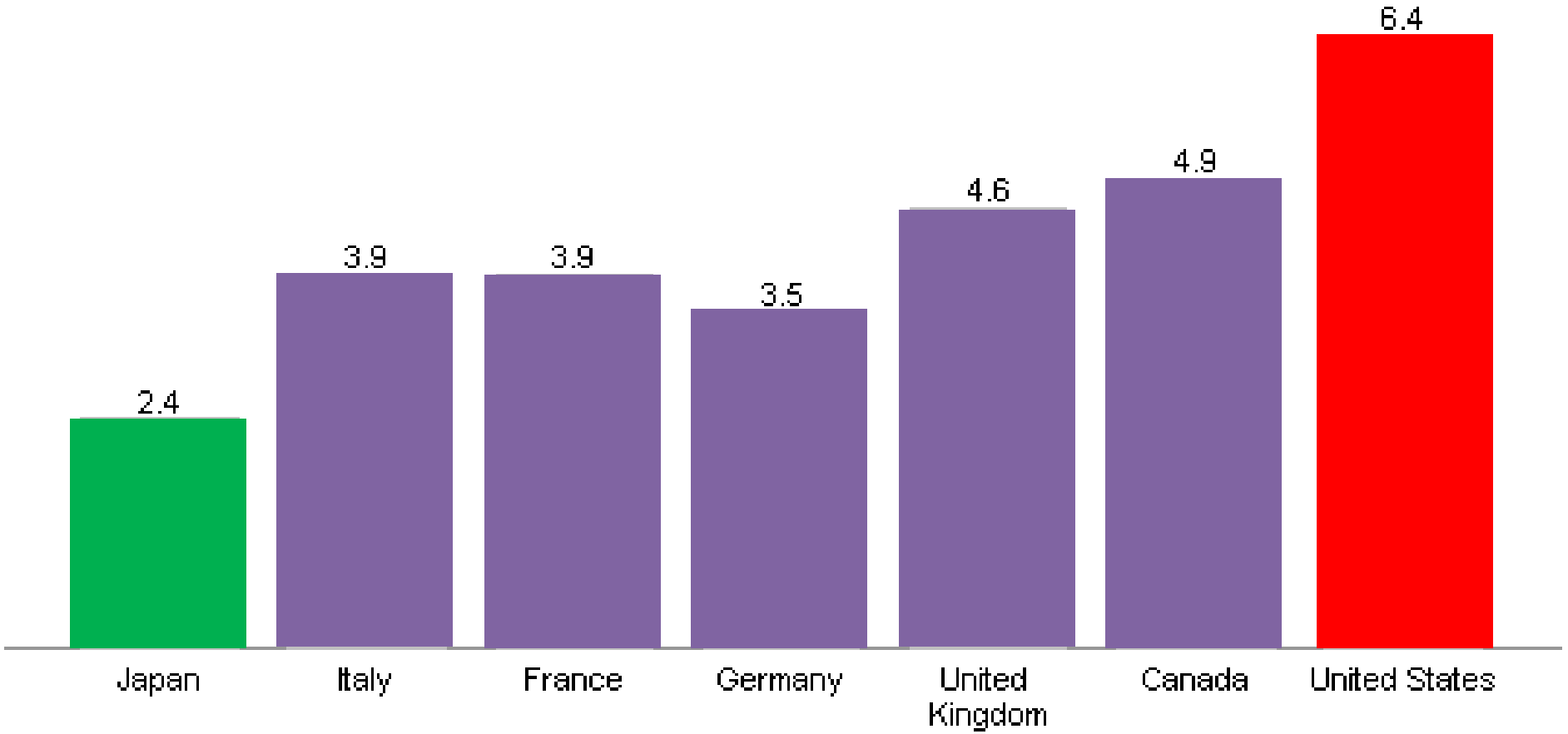
Healthcare Spending as % GDP (Gross Domestic Product)

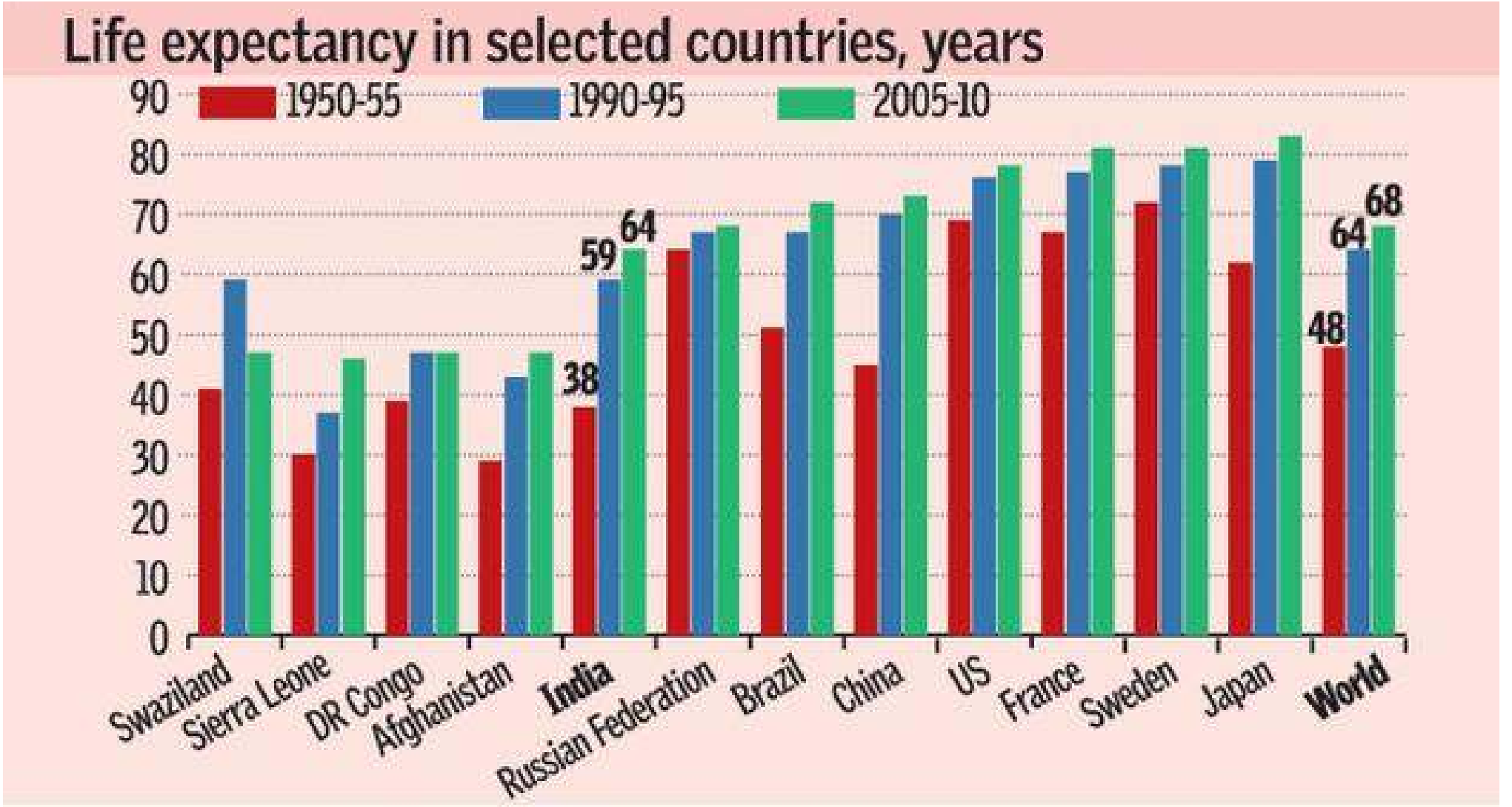


Source: Organization for Economic Cooperation and Development, OECD Health Data, 2008 (Paris: OECD, 2008).
Note: For countries not reporting 2006 data, data from previous years is substituted.

Gross domestic product (GDP) is the market value of all officially recognized final goods and services produced within a country in a year, or over a given period of time. GDP per capita is often used as an indicator of a country's material standard of living.

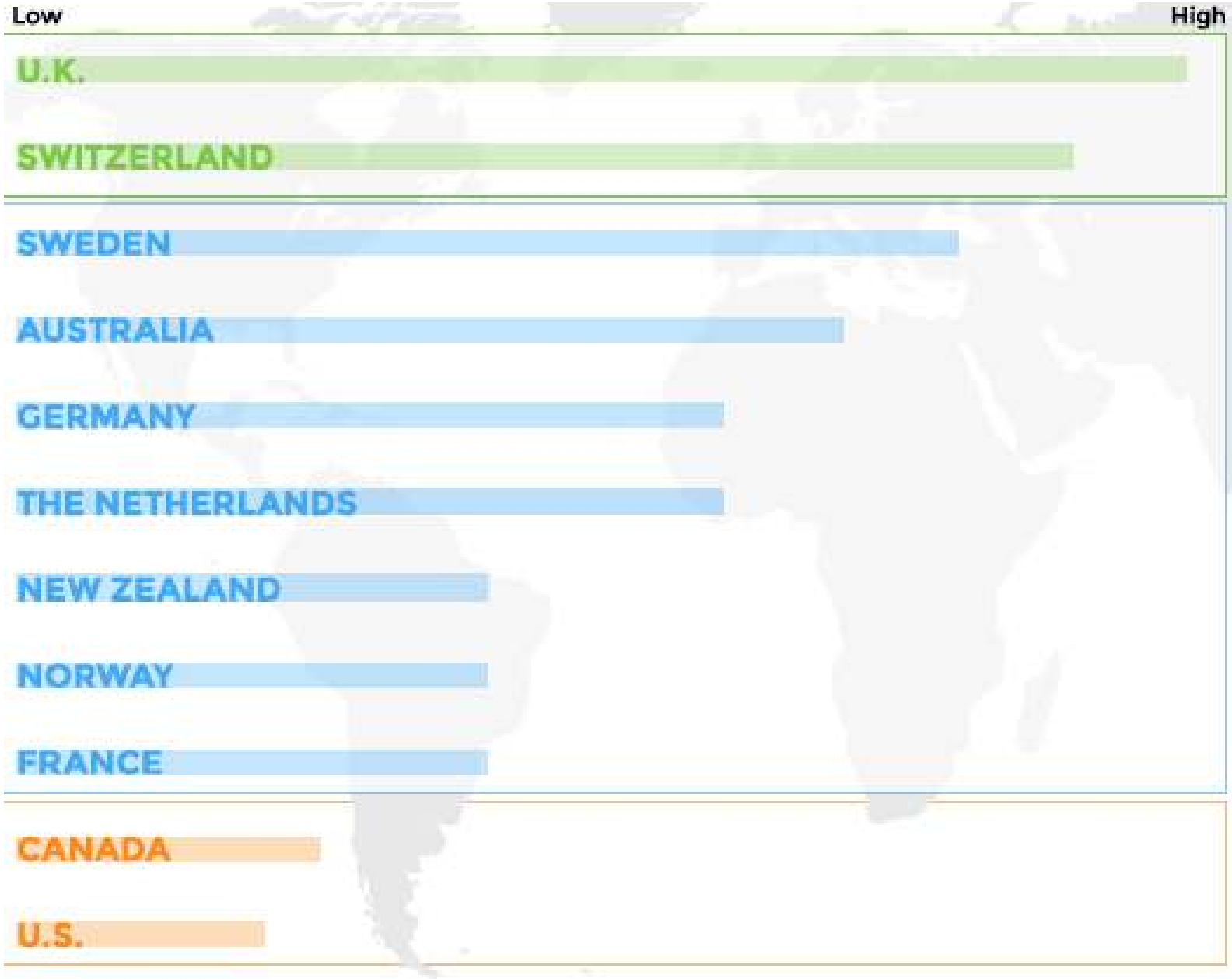
Infant Mortality 2009
(Per 1,000 Live Births)





Life expectancy is the US slowly increases, while in Japan the life expectancy steadily increases, and is the highest in the world at the moment

Overall Satisfaction of Health Care (2013)



Source: K. Davis, K. Stremikis, D. Squires, and C. Schoen, *Mirror, Mirror on the Wall: How the Performance of the U.S. Health Care System Compares Internationally, 2014 Update*, The Commonwealth Fund, June 2014.

Commonwealth Fund Study

- **The main way the U.S. differs from other industrialized countries is the absence of universal health insurance coverage**

The U.S. Health System is “challenged” on many fronts…..

- Compared to other industrialized countries the U.S. health care system …..
  - Is more expensive: >$2.0 trillion/year, 18% GDP
  - Has the highest inflation (> 8%/yr)
  - Does not produce the best outcomes
  - Is not rated highly by its citizens or doctors
  - Does not cover all of its citizens…. ~15% uninsured (~46 Million)

Preventive Care

We should think of new therapies for the purpose of preventive care

MRN-100:

MRN-100 may be a novel adjuvant for the treatment of gastric or esophageal cancers.

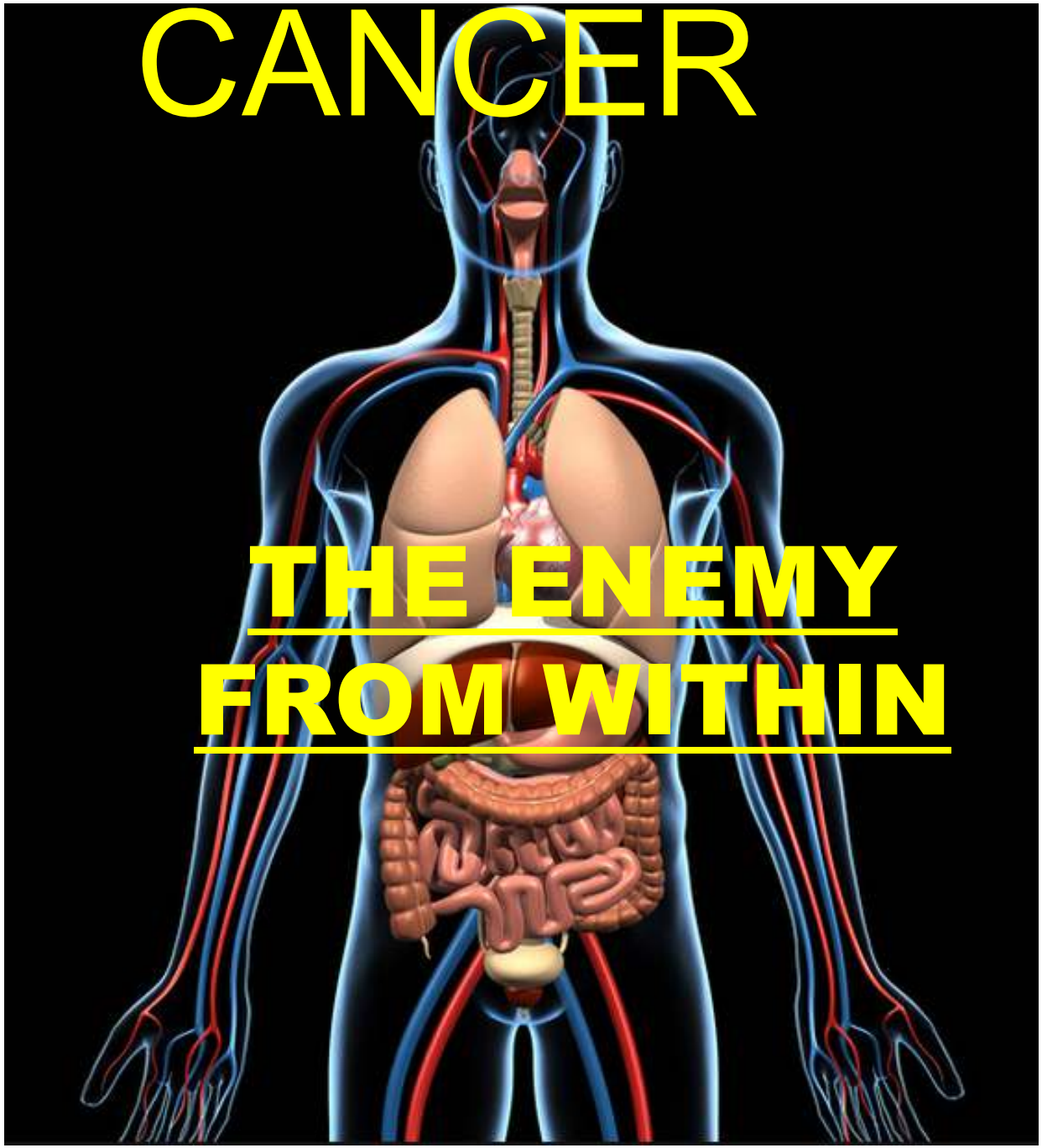
<u>It is characterized as:</u>

1- Highly effective

2- Safe

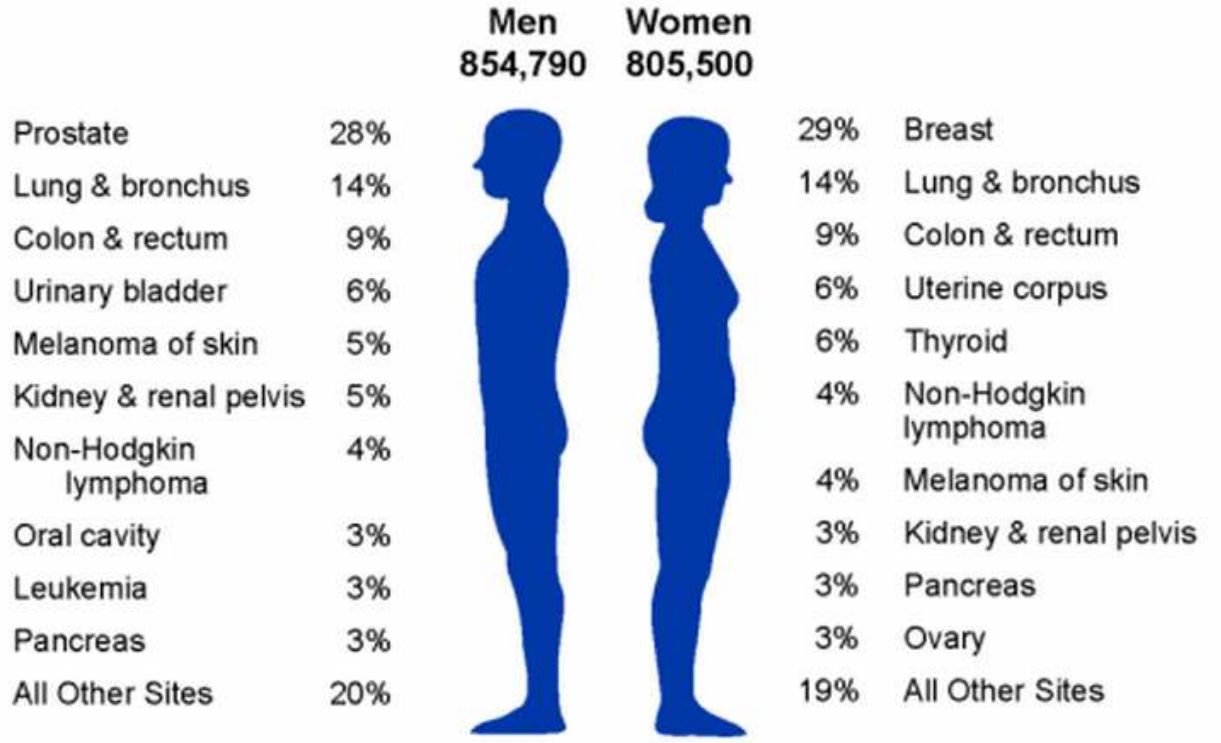
3- Low cost

CANCER

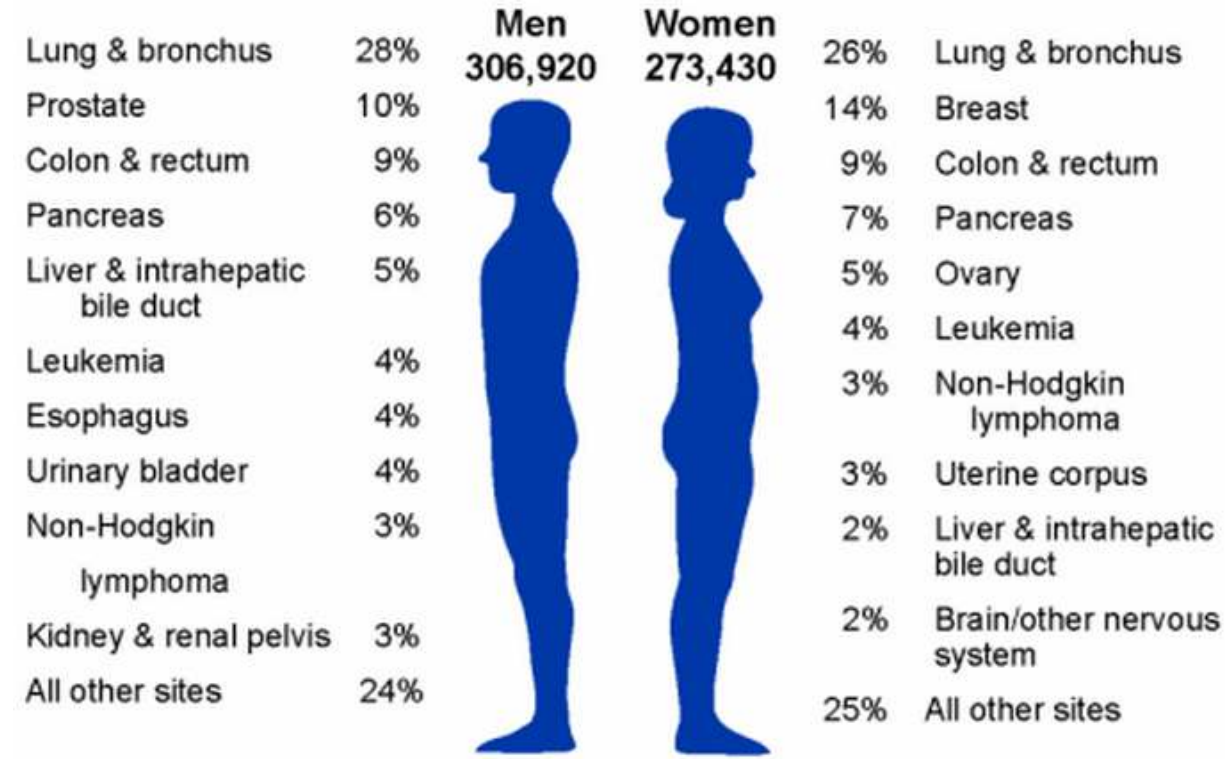


THE ENEMY FROM WITHIN

Estimated New Cancer Cases in the US in 2013



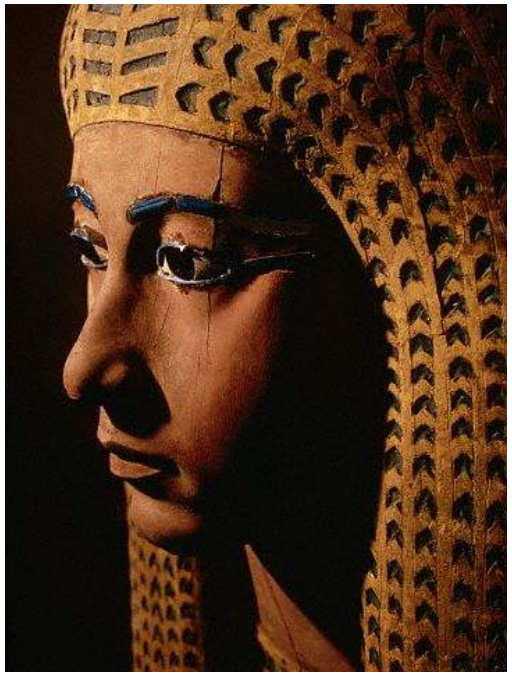
Estimated Cancer Deaths in the US in 2013



Reasons

1. Smoking
2. Diet
3. Stress
4. Genetic
5. Hepatitis C Virus
6. Pollution

Lack of Effective Cancer Treatment Since 1500 BC



-The world's oldest recorded case of breast cancer hails from ancient Egypt in 1500 BC.

-It was recorded that there was no treatment for the cancer, only palliative treatment.

U.S. Cancer Deaths

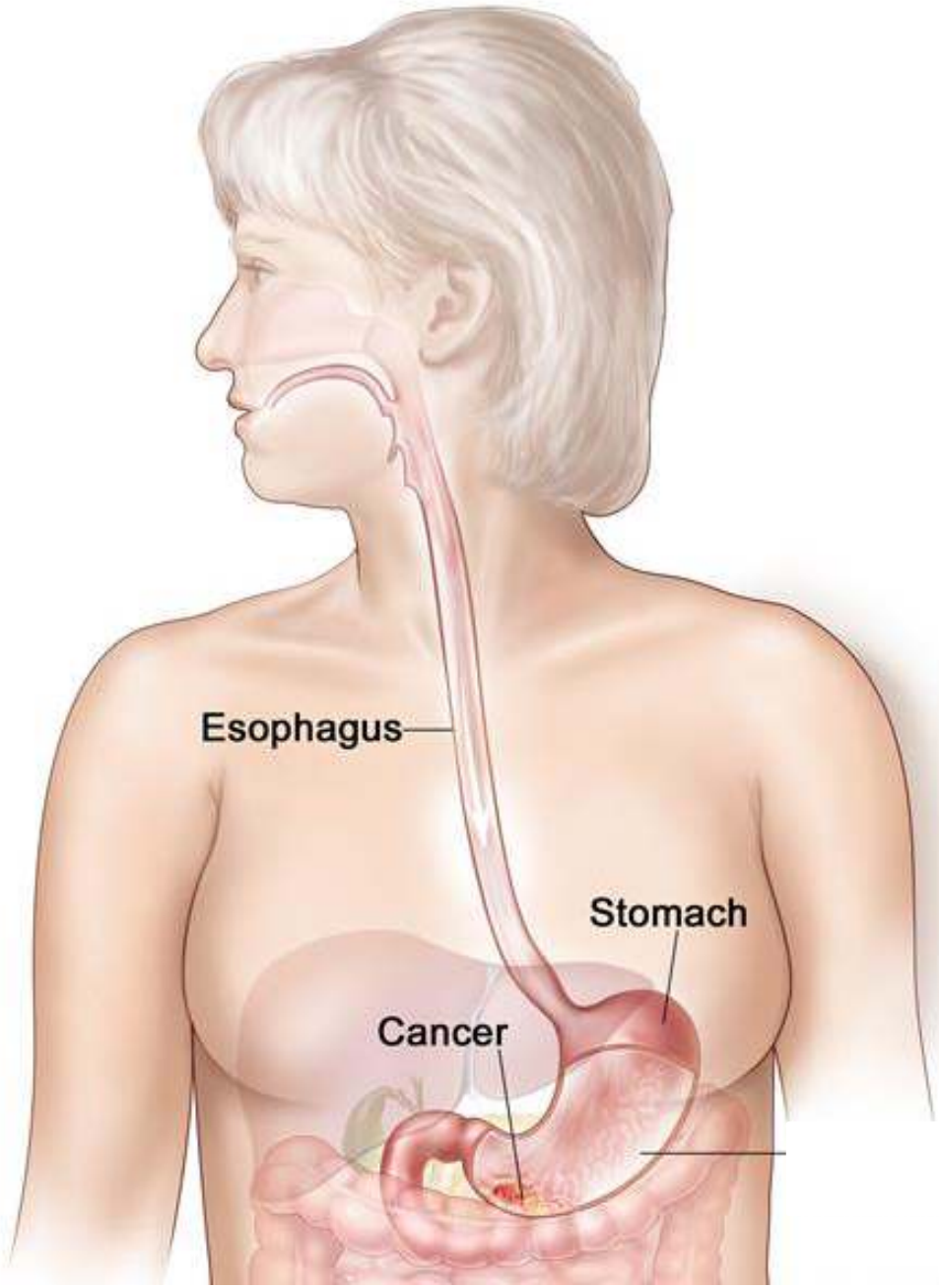
	2005	2013
Daily		1600
Yearly	570,280	580,350

2008

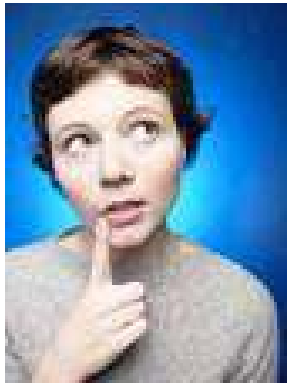
NIH Estimation of Annual Cost of Cancer

- **Total cost:** $228.1 billion
  - **Direct medical costs (total of all health expenditures):** $ 93.2 billion
  - **Indirect morbidity costs (cost of lost productivity due to illness):** $ 18.8 billion
  - **Indirect mortality costs (cost of lost productivity due to premature death):** $116.1 billion

American Cancer Society. *Cancer Facts & Figures 2009*. Atlanta, GA. 2009.


Esophagus
Stomach
Cancer

Do You Know ?



1. Gastric and esophageal cancers are two leading causes of cancer-related deaths throughout the world
2. The 5-year survival rates are 17% for esophogeal cancer and 27% for gastric cancer (Howlader et al, 2013, de Martel et al, 2013).
3. In Japan in 2013,
   approximately 60,000 total people had gastric cancer and 17,500 new cases of esophogeal cancer were diagnosed
4. In the United States in 2013,
   approximately 40,000 people were diagnosed with esophagus or stomach cancer

Chemotherapy and Radiation Therapy

Exhibit an indiscriminative killing that

involves cancer cells and many normal cells

We should think of new therapies for the treatment of CANCER

Hydroferrate fluid, MRN-100, protects against chemical-induced gastric and esophageal cancer in Wistar rats.

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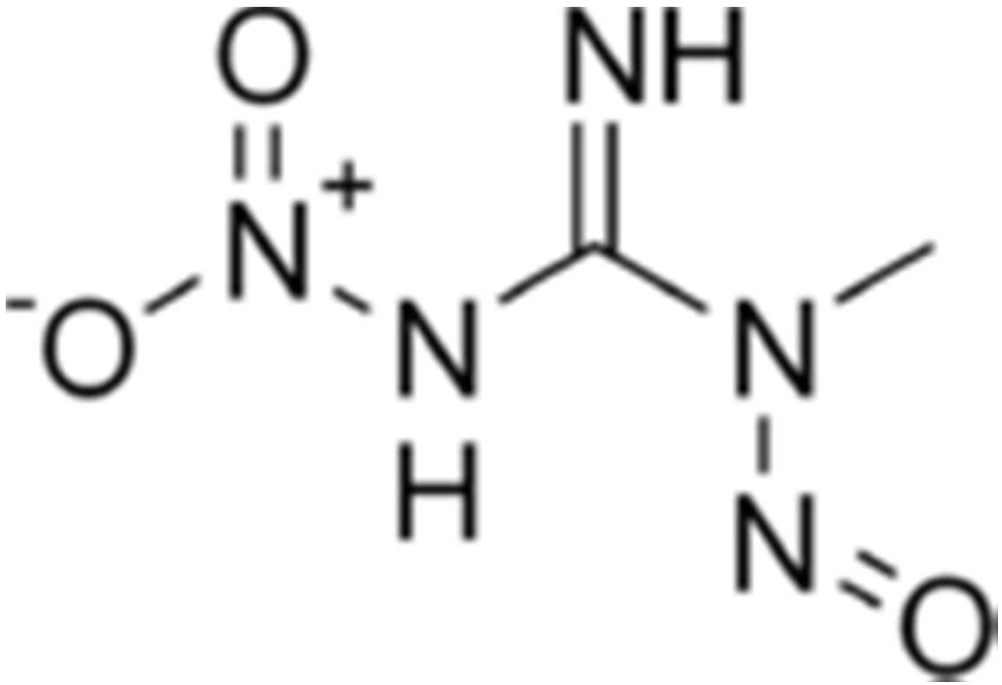
Carcinogen

MethylNitronitrosoguanidine

(MNNG)



Experimental Design

20 Rats

10 Rats
Carcinogen
+
MRN-100

10 Rats
Carcinogen
Alone

8 months

End of Experiment

Tumor Growth

Mechanisms of Action

Immune
Modulation

Antioxidant

Ghoneum et al. (2014) Neutrion and Cancer.

14th Int. Conference of Functional Food Center (FFC)
2nd Int. Academic Symposium for the Functional Food and Bioactive Compounds (ASFFBC)

UCLA

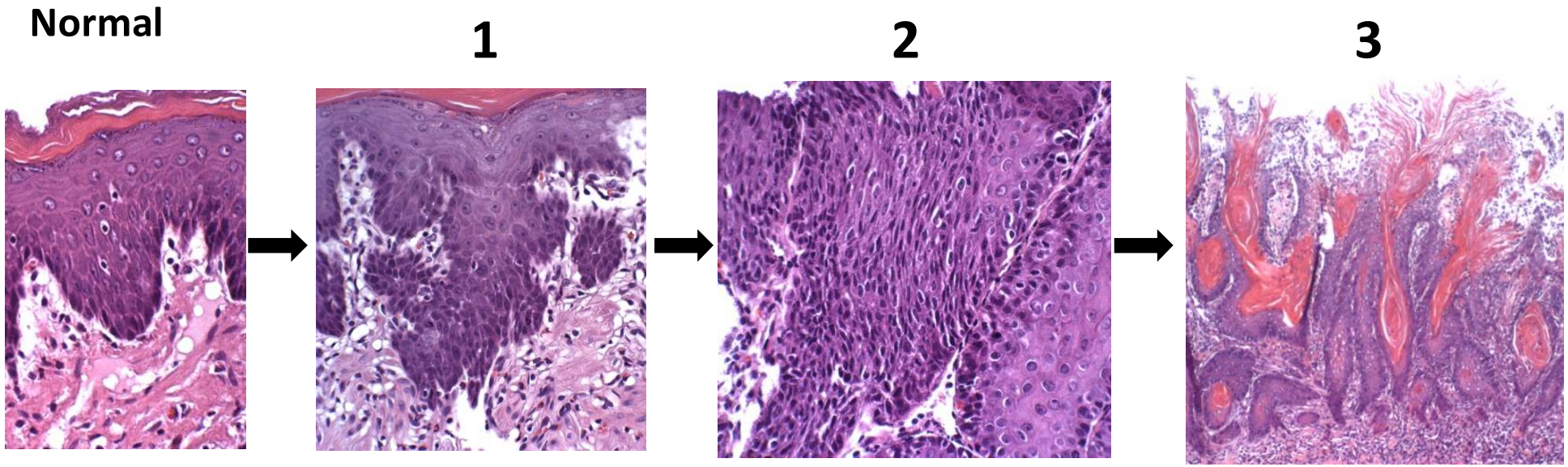

HOLLYWOOD

Hydroferrate fluid, MRN-100, provides protection against chemical-induced gastric and esophageal cancer in Wistar rats

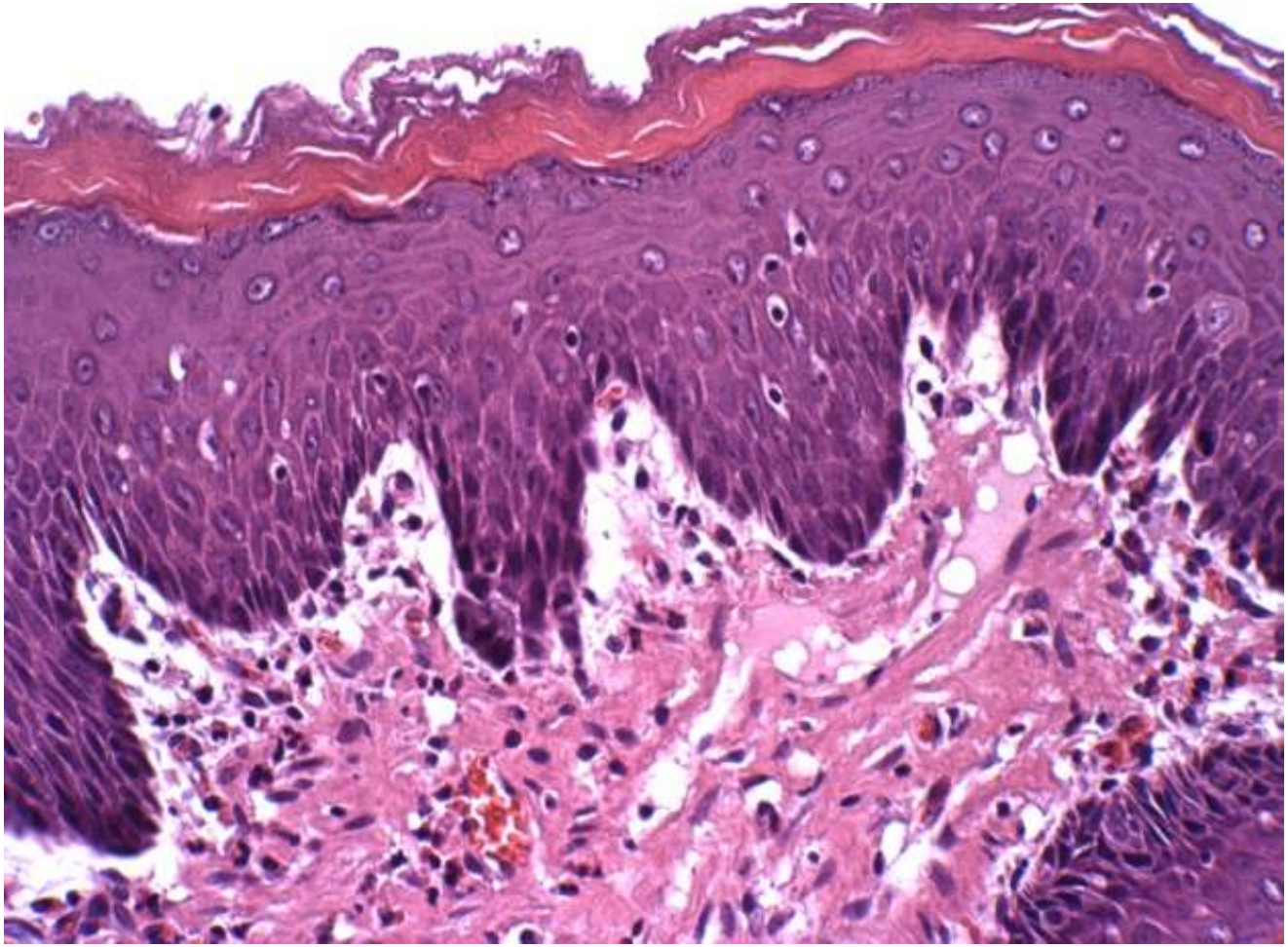
RESULTS

Induction of Esophageal and Gastric Cancer

Stages of esophageal cancer

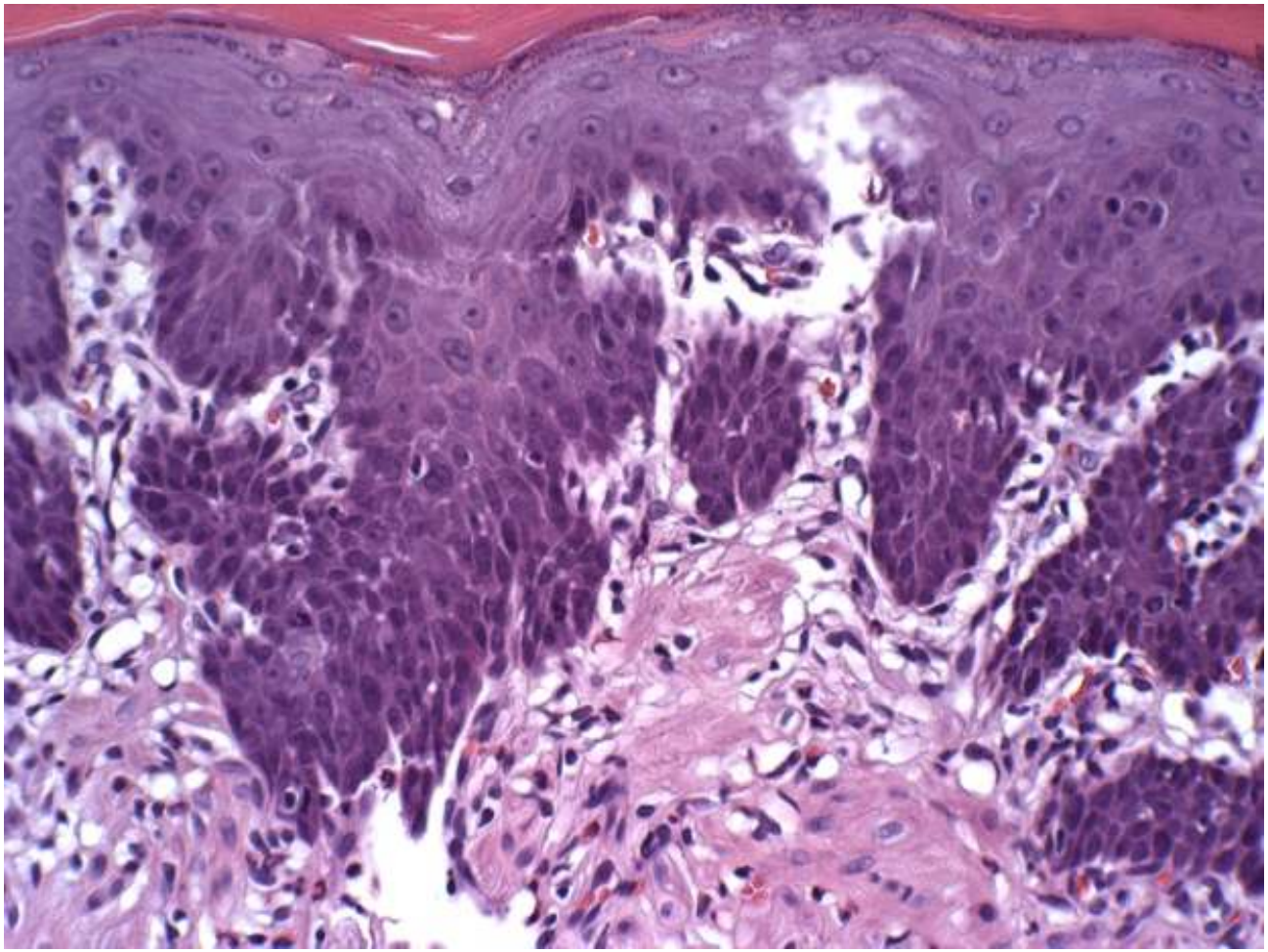


Normal or healthy esophogus



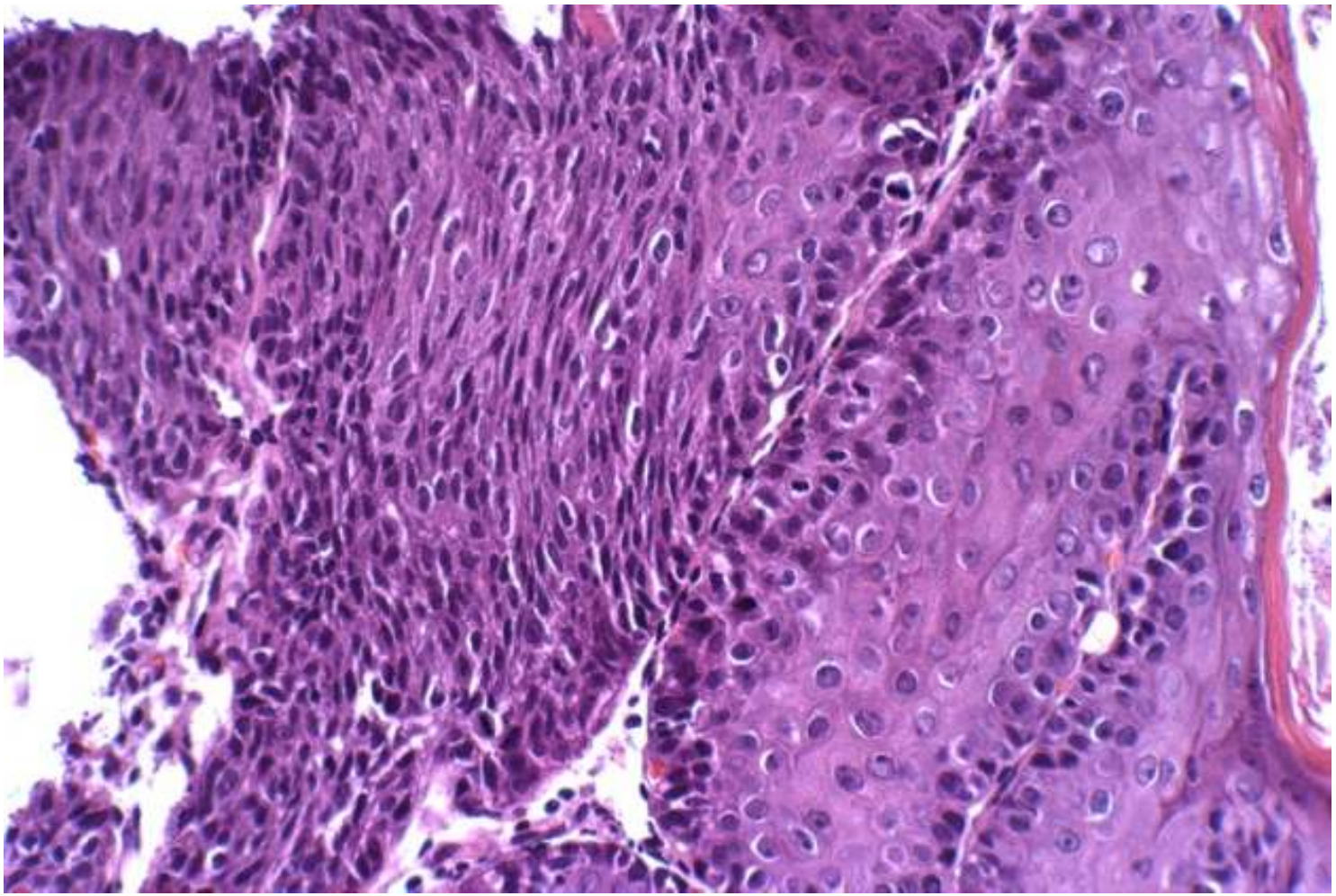
Esophageal mucosa (foregut) showing hyperkeratosis and squamous hyperplasia. Intraepithelial lymphocytes and stromal lymphocytes and eosinophils are present.

1-mild squamous dysplasia



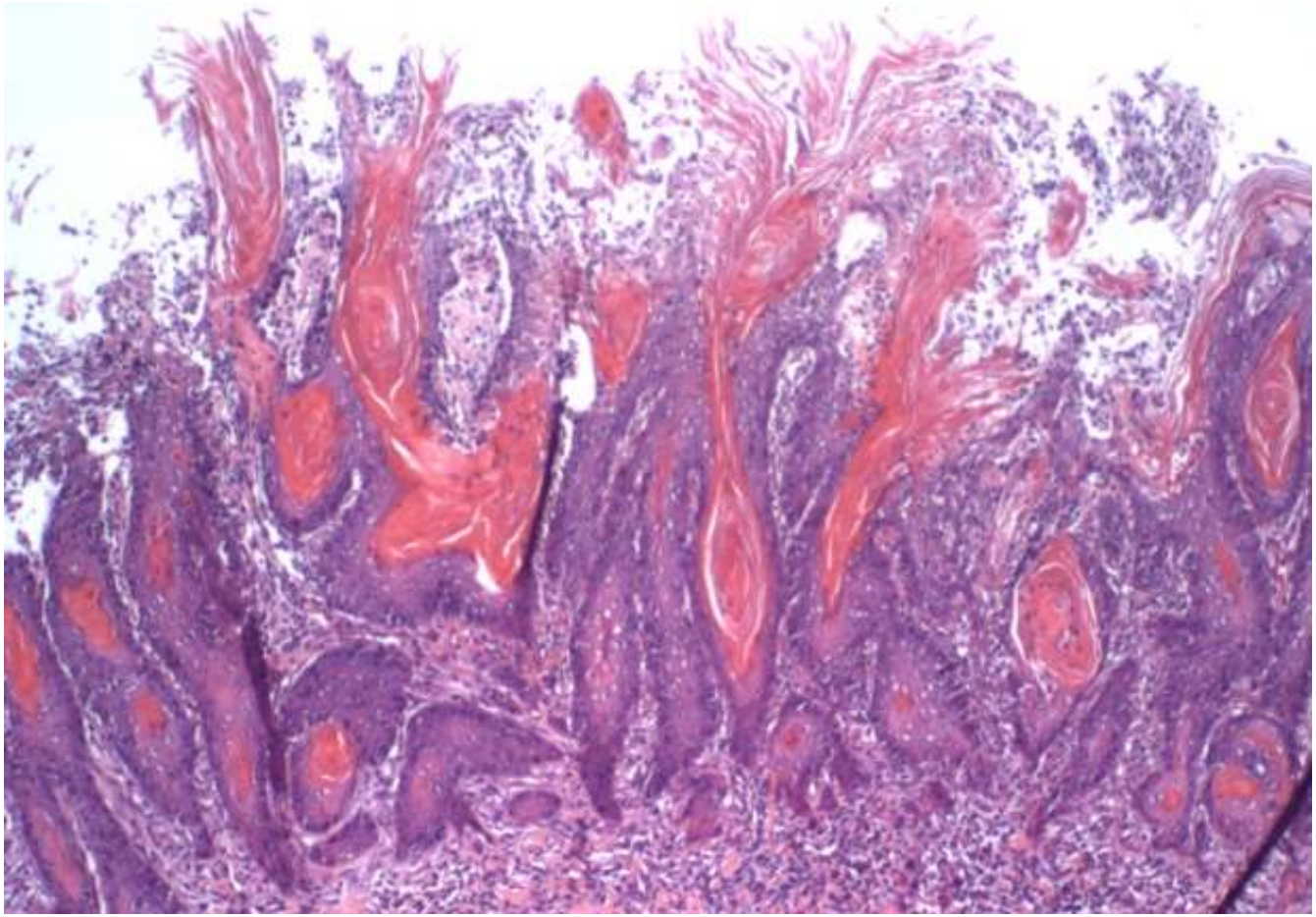
Esophageal mucosa showing hyperkeratosis, squamous hyperplasia and mild squamous dysplasia. Intraepithelial lymphocytes and stromal lymphocytes and eosinophils are present.

2-high grade squamous dysplasia



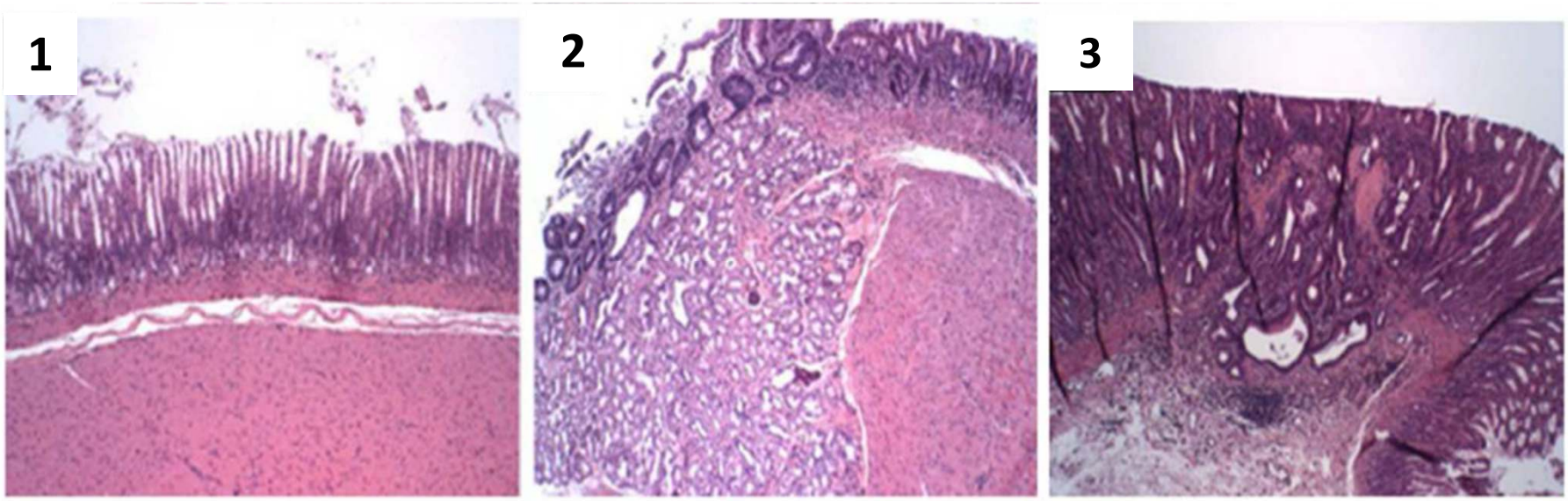
Esophageal mucosa showing hyperkeratosis, squamous hyperplasia, and high grade squamous dysplasia

3- squamous cell carcinoma.



Esophageal mucosa showing invasive well-differentiated keratinizing squamous cell carcinoma.

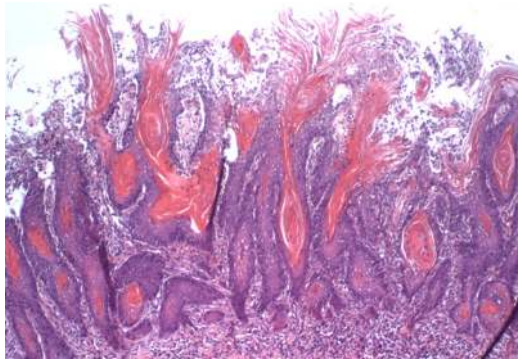
Stages of Gastric cancer



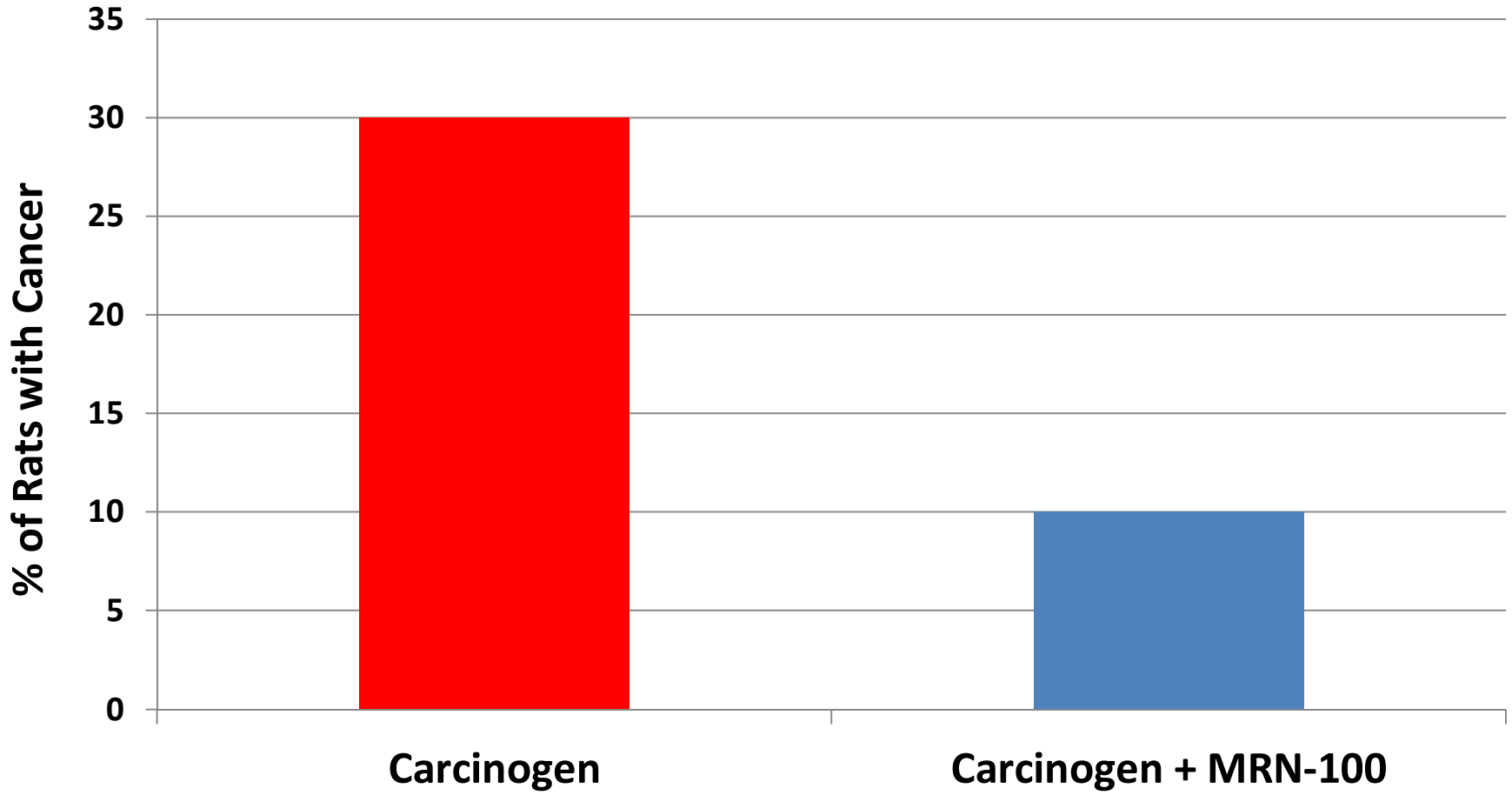
MRN-100 Protects Against Gastroesophageal Cancer

1:

Evidence from tumor tissues



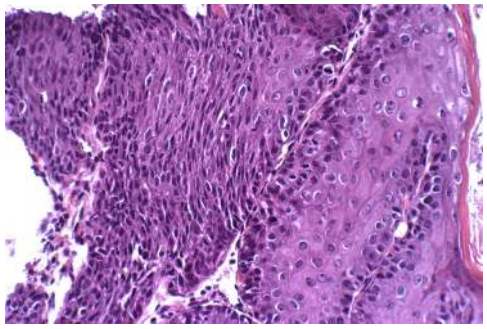
% Gastroesophageal Cancer



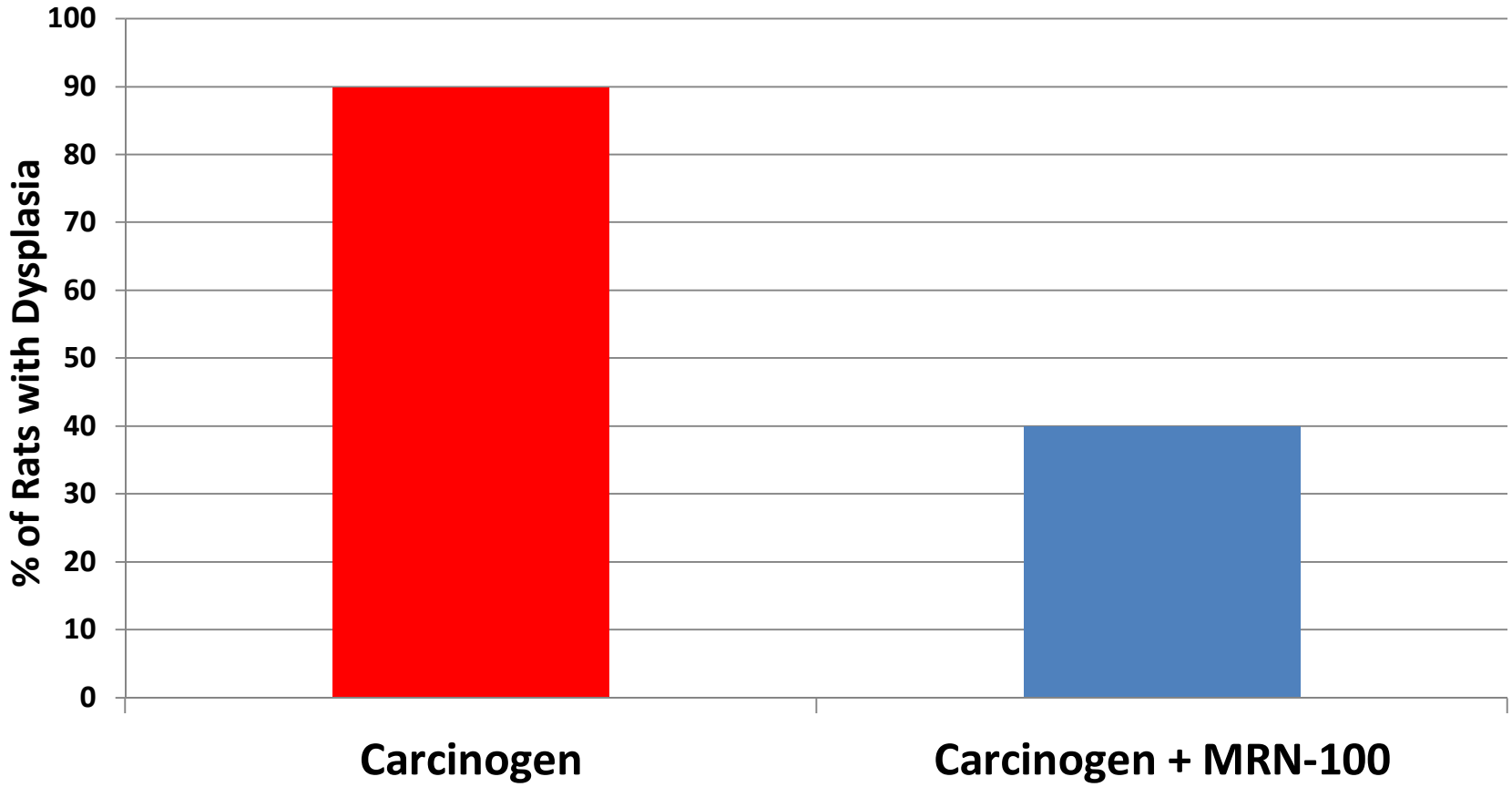
MRN-100 Protects Against Gastroesophageal Cancer

2:

Evidence from Tissue Dysplasia



% Gastroesophageal Dysplasia

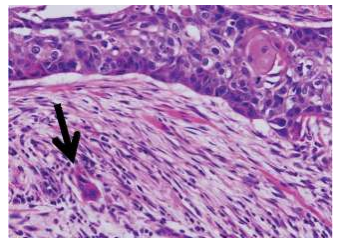


MRN-100 Protects Against Gastroesophageal Cancer

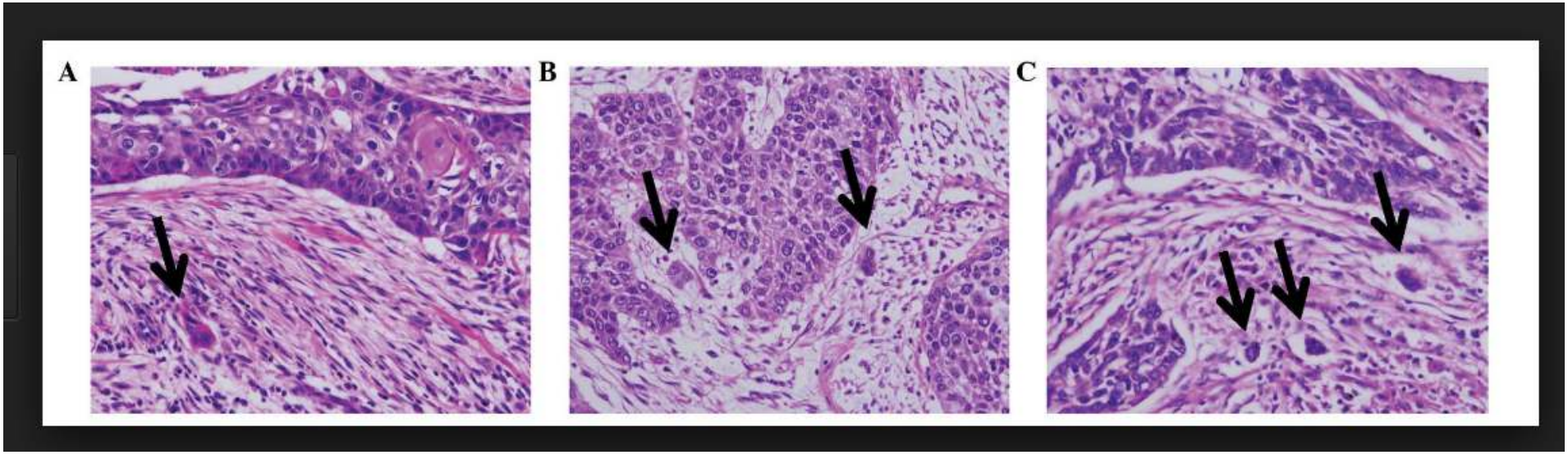
3- New Data

Evidence from the cancer cell level (foci)

The study of foci is very important because it is one of the prerequisites of developing cancer, such as family history

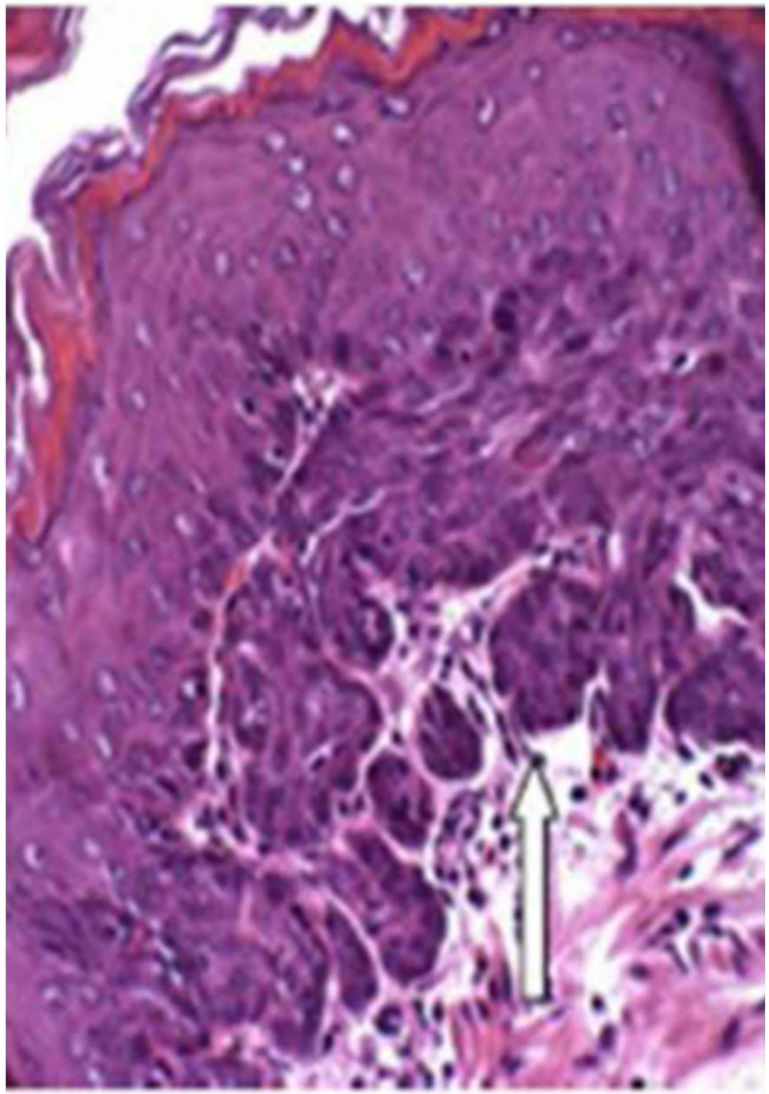


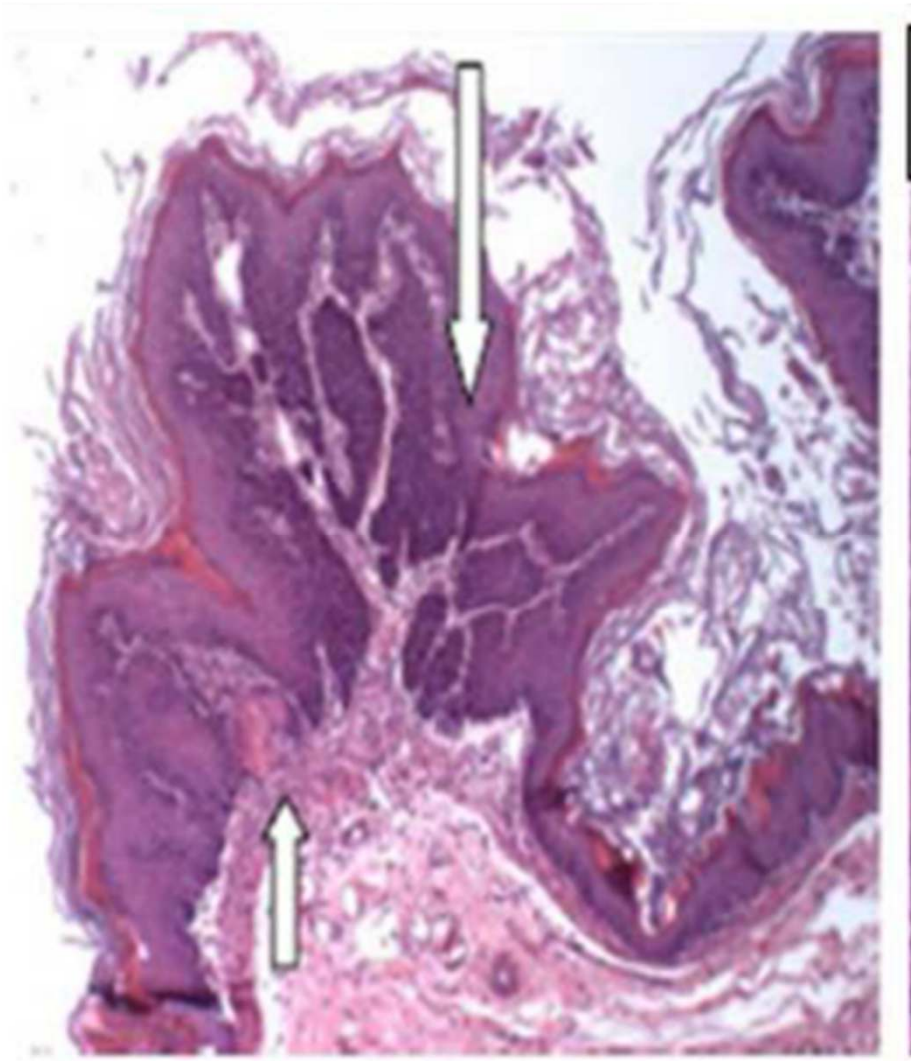
(foci)



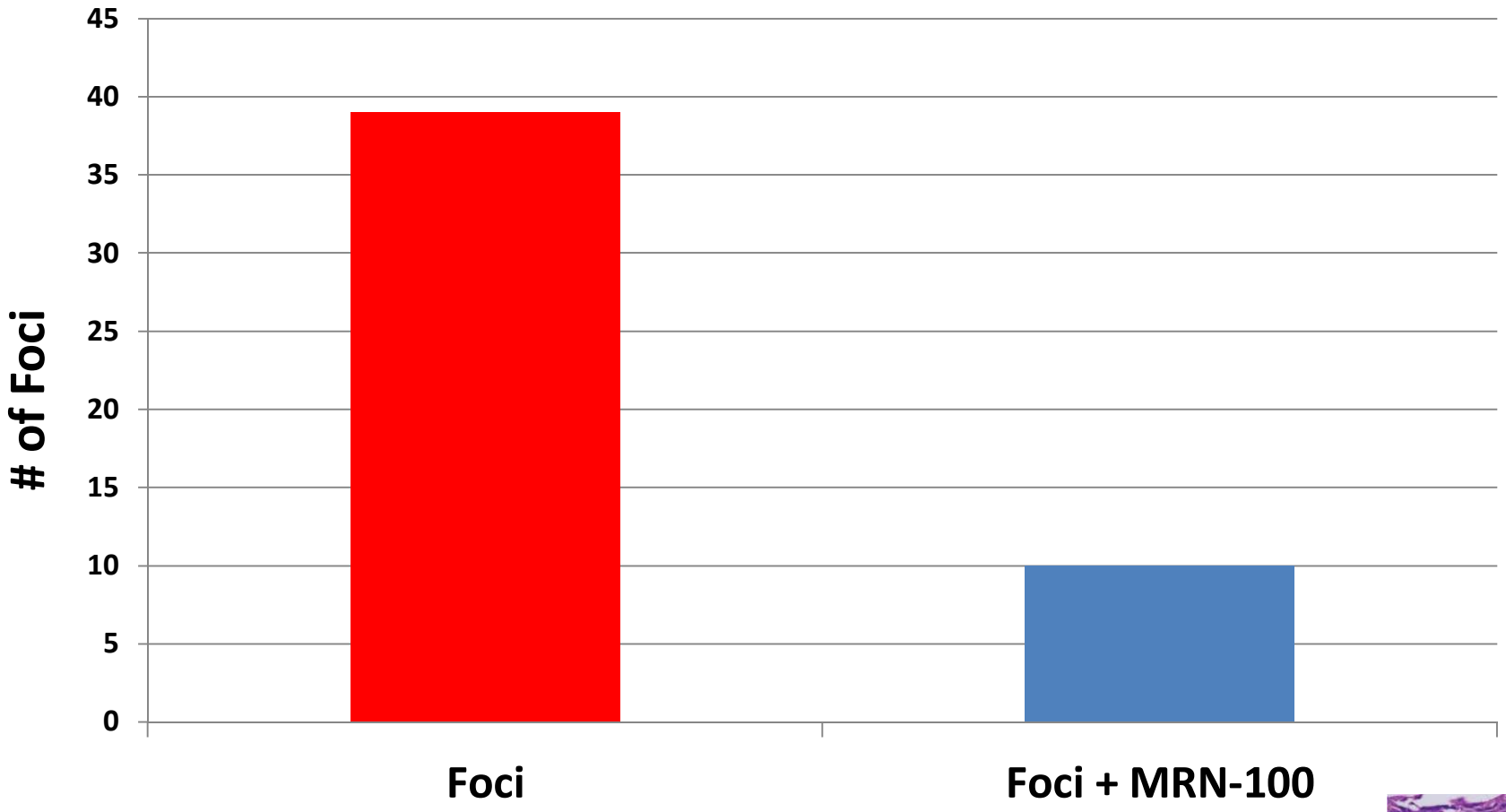
Tumor budding is defined as single cancer cells and/or clusters composed of up to four cancer cells

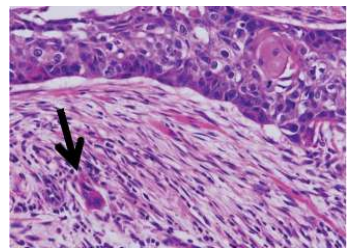
2126 × 547 - spandidos-publications





MRN-100 Suppresses Number of Foci





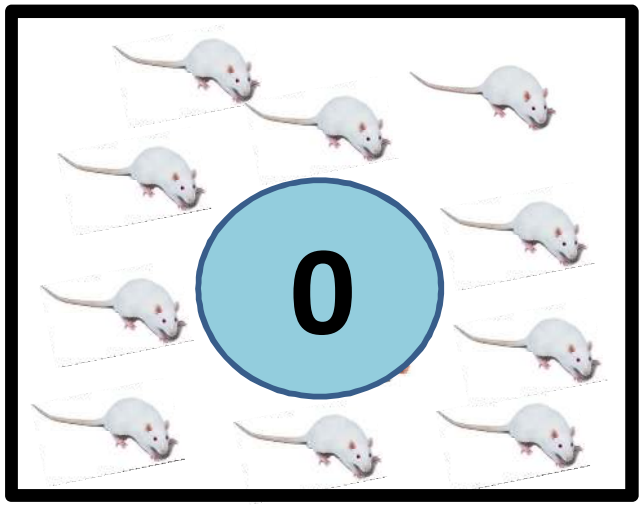
Extent of dysplasia and cancer (Number of Foci)

GROUP	NO. OF RATS	NO. OF TISSUES	NO. OF FOCI						
			ESOPHAGUS				GASTRIC		
			SQUAMOUS DYSPLASIA		SQUAMOUS CELL CARCINOMA	TOTAL RATS WITH FOCI	GLANDULAR DYSPLASIA	ADENO-CARCINOMA	TOTAL RATS WITH FOCI
			MILD	SEVERE					
CONTROL	7	14	0	0	0	0/7	0	0	0/7
MRN-100	9	18	0	0	0	0/9	0	0	0/9
CARCINOGEN	10	20				9/10			2/10
Rat #3			10	2	3		1	1	
Rat #4			8	5	0		1	1	
Rats #2, 5-10			1	0	0		0	0	
Rat #1			0	0	0		0	0	
CARCINOGEN + MRN-100	10	20				4/10			0/10
Rat #5			2	6	1		0	0	
Rats #1, 2, 4			1	0	0		0	0	
Rats #3, 6-10			0	0	0		0	0	

Table I. Number of rats in each group with variable degree and extent of dysplasia and cancer.

Fishers exact test shows significant difference between carcinogen group and carcinogen plus MRN-100 group ($p<0.01$).

Esophogus: Total Rats with Foci



CONTROL

8 month

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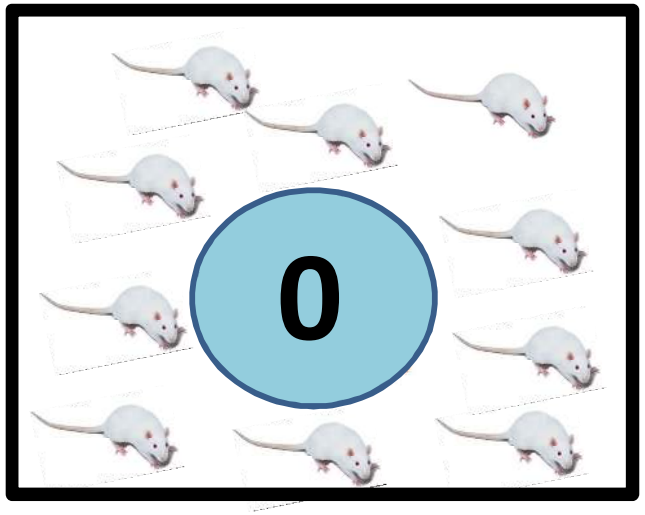
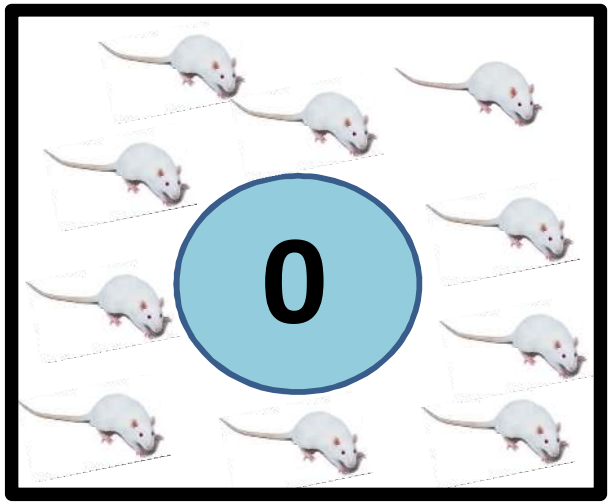
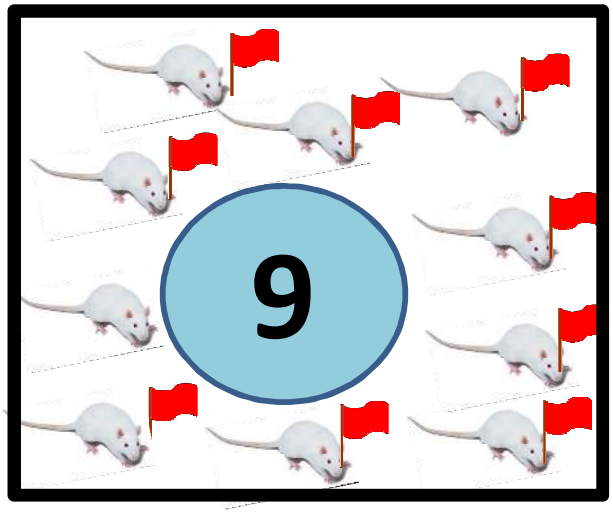


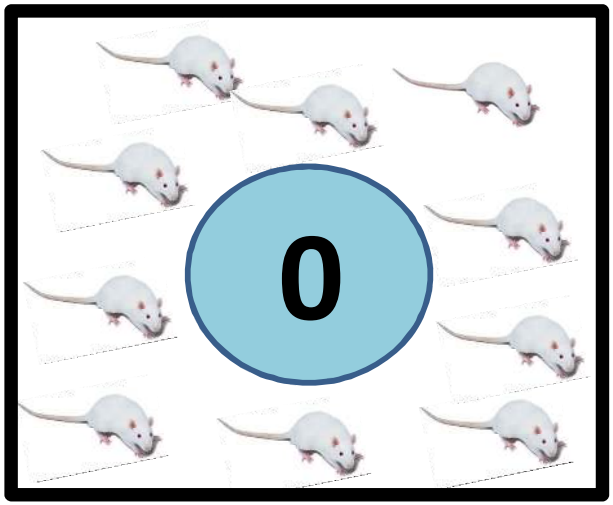


Carcinogen

8 month

□8□□□□





Carcinogen + MRN-100

8 month

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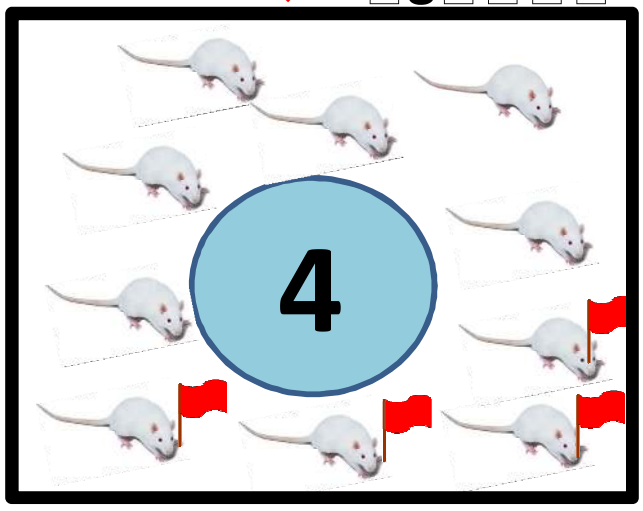
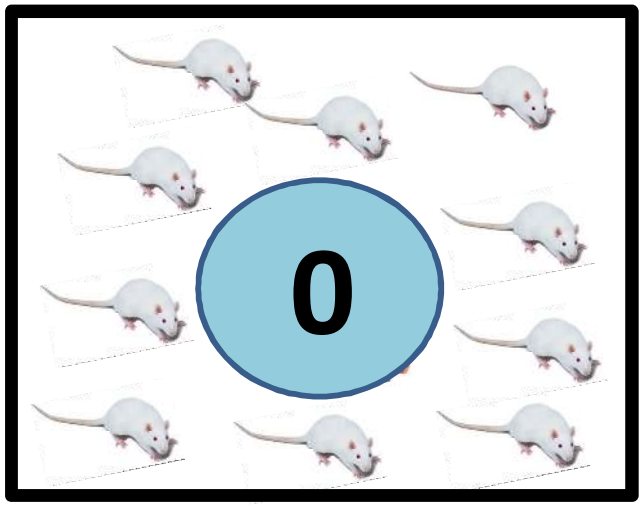


Esophogus: Total Number of Foci



CONTROL

8 month

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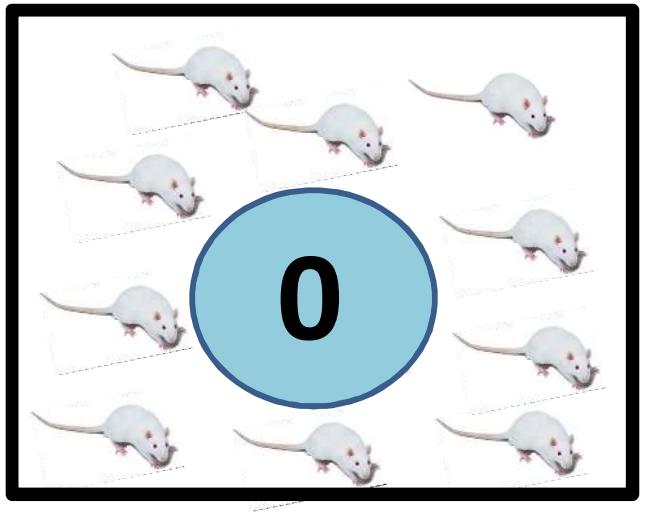
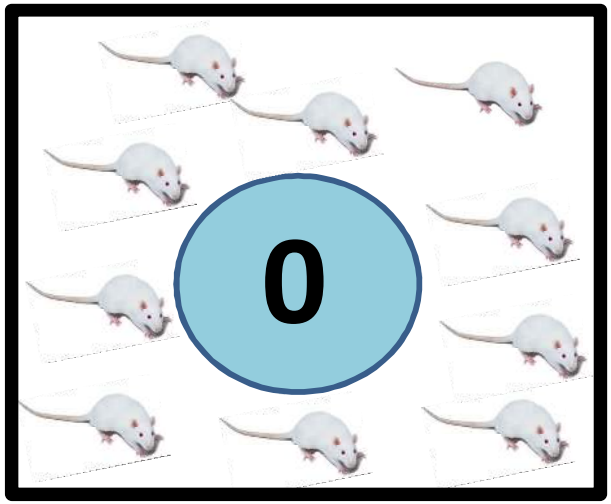
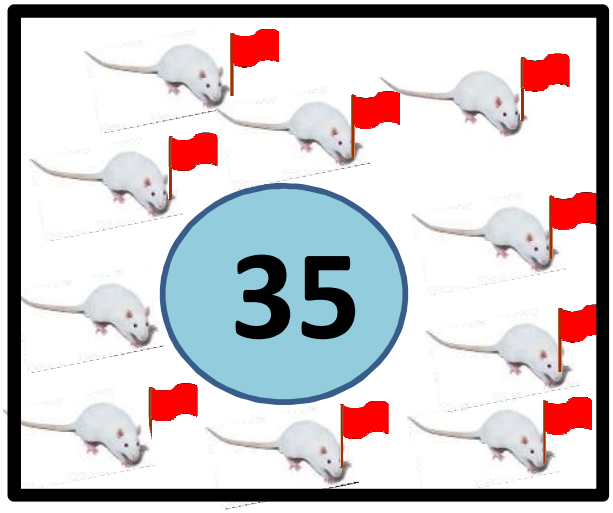


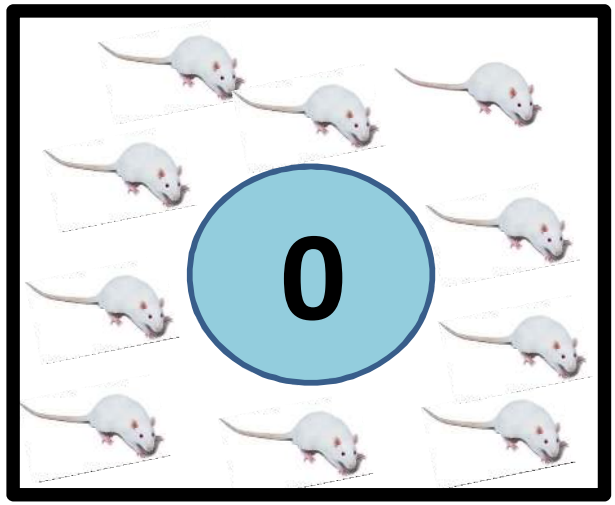


Carcinogen

8 month

□8□□□□

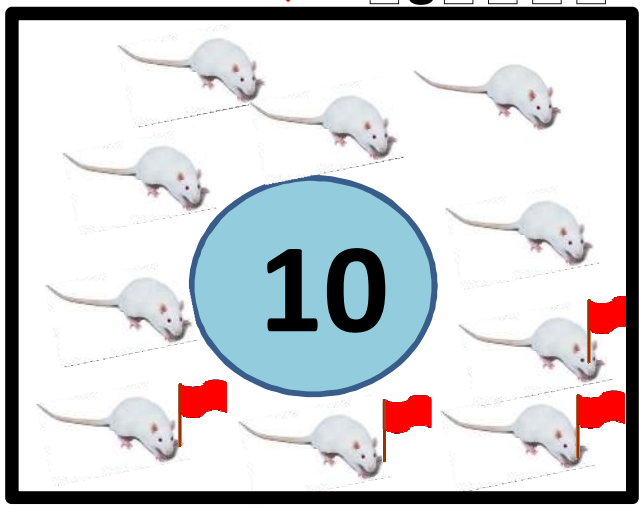




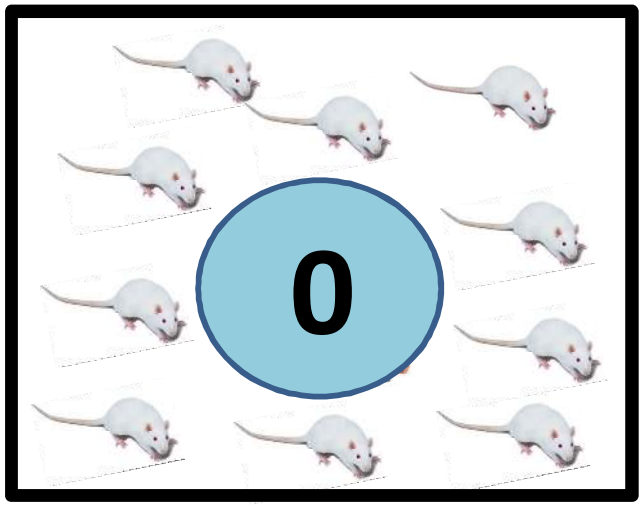
Carcinogen + MRN-100

8 month

□8□□□□



Stomach: Total Rats with Foci



CONTROL

8 month

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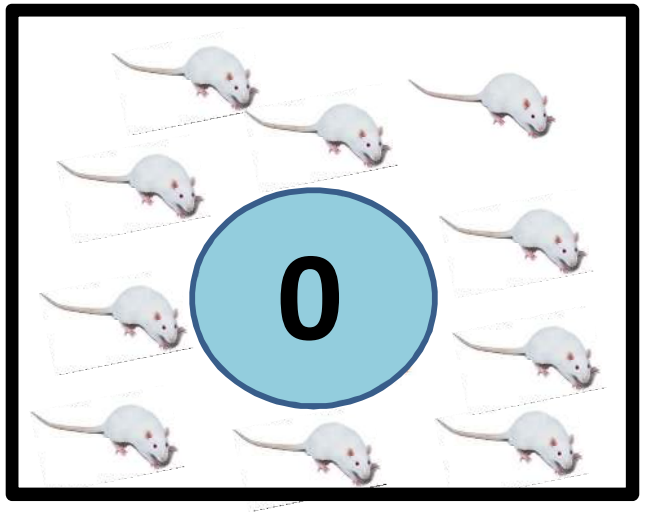
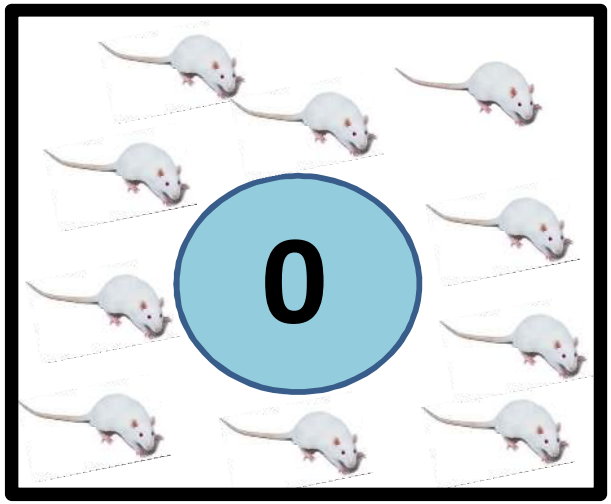
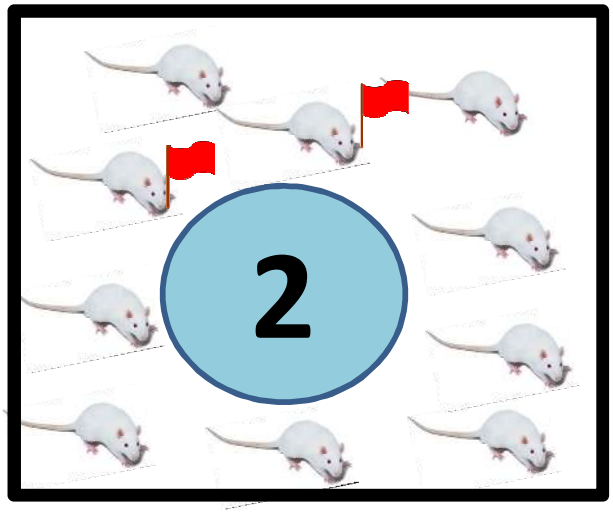


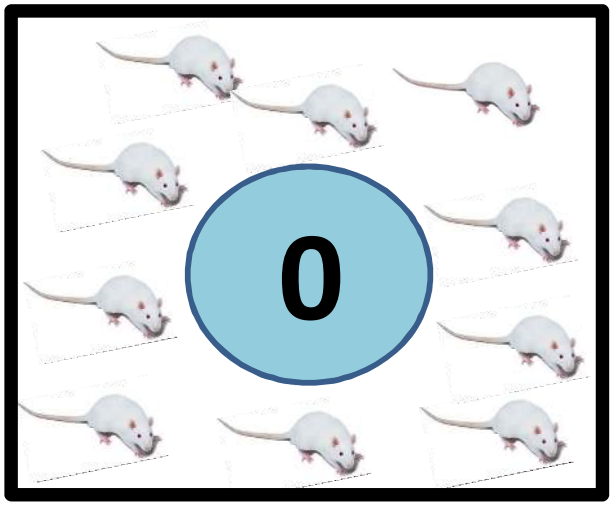


Carcinogen

8 month

□8□□□□

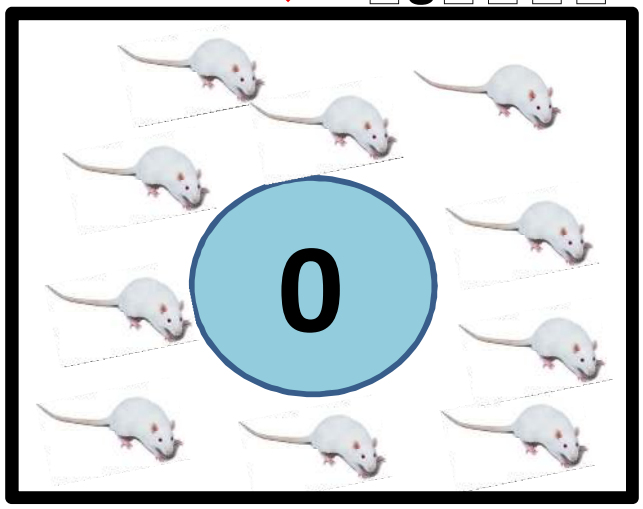




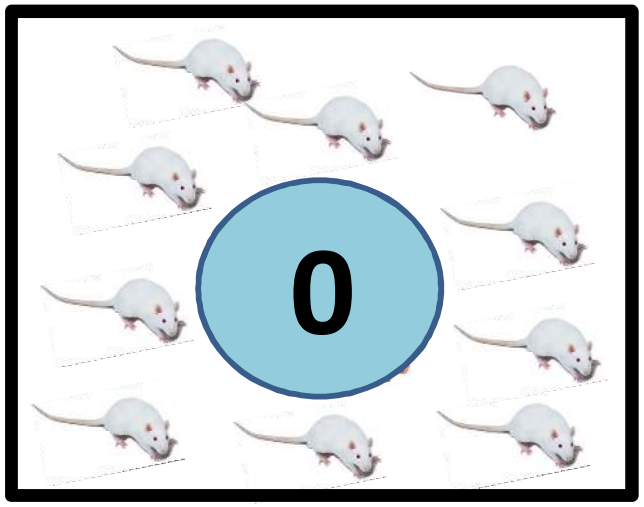
Carcinogen + MRN-100

8 month

□8□□□□



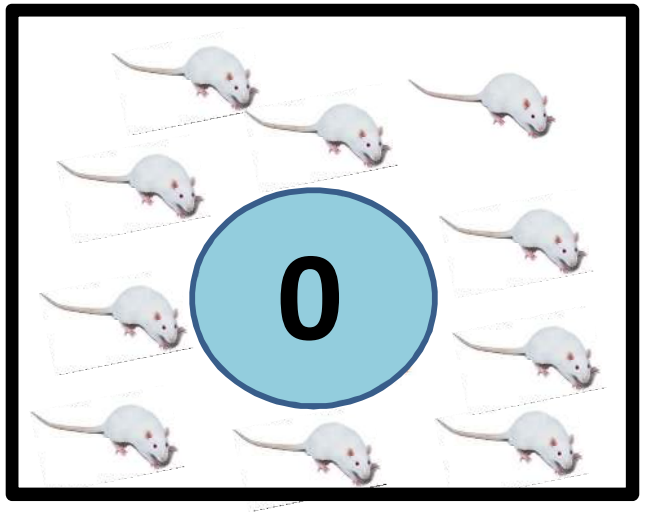
Stomach: Total Number of Foci

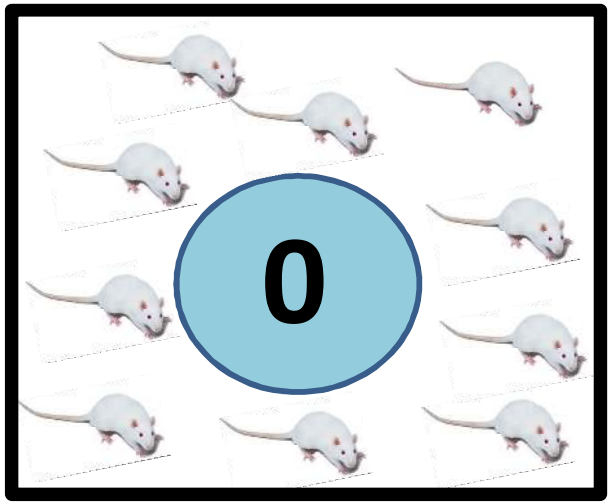


CONTROL

8 month

□8□□□□

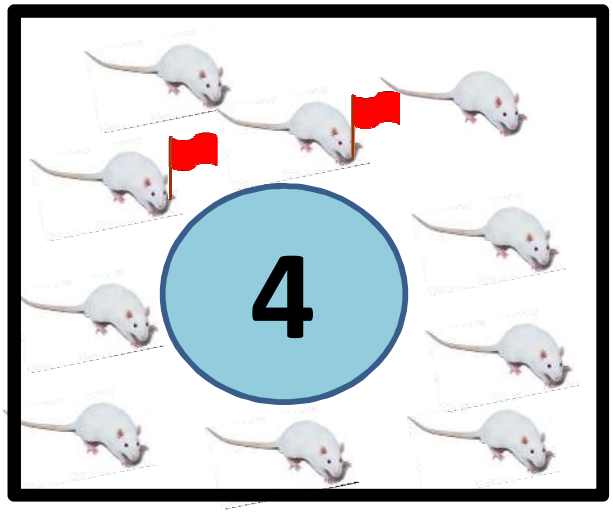


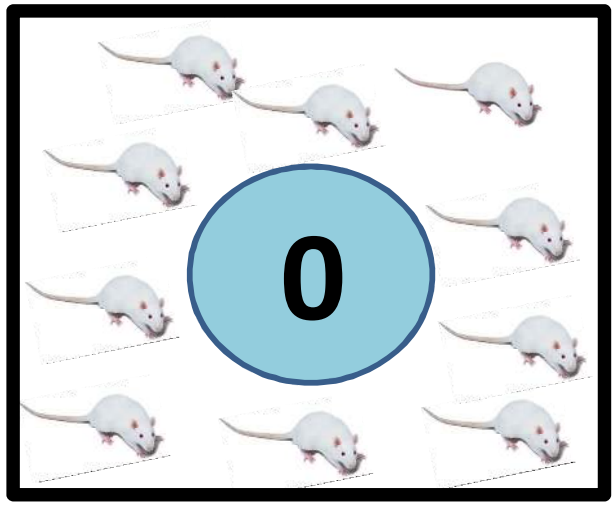


Carcinogen

8 month

□8□□□□

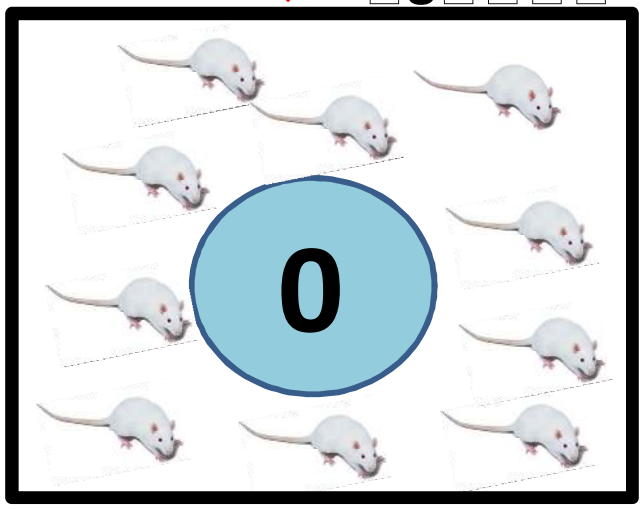




Carcinogen + MRN-100

8 month

□8□□□□

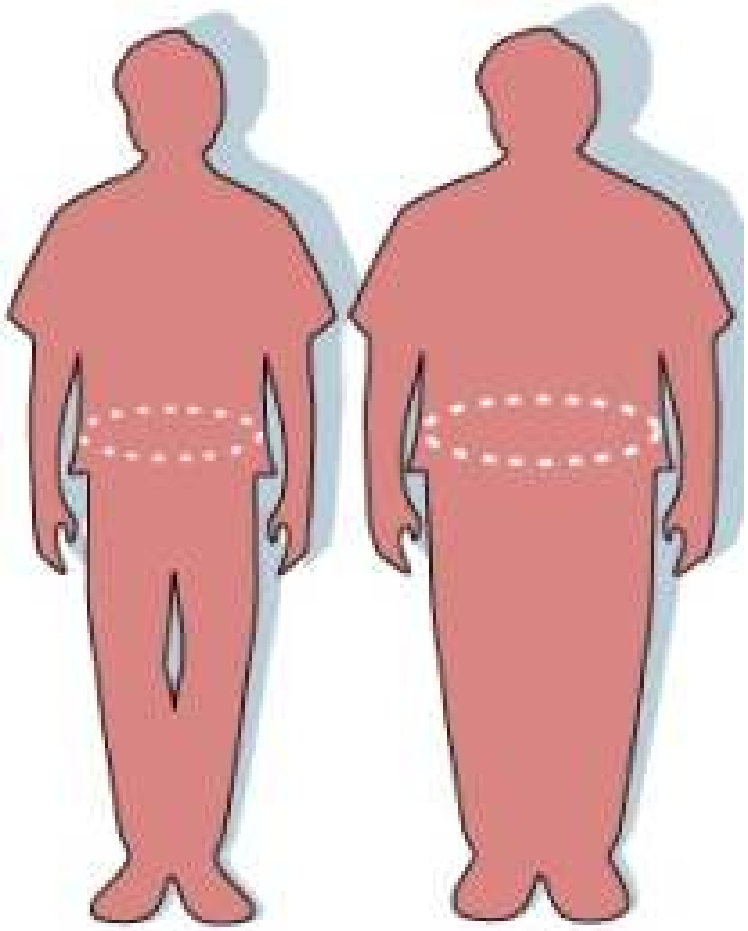


Characteristic Body Weight Loss in Cancer Patients

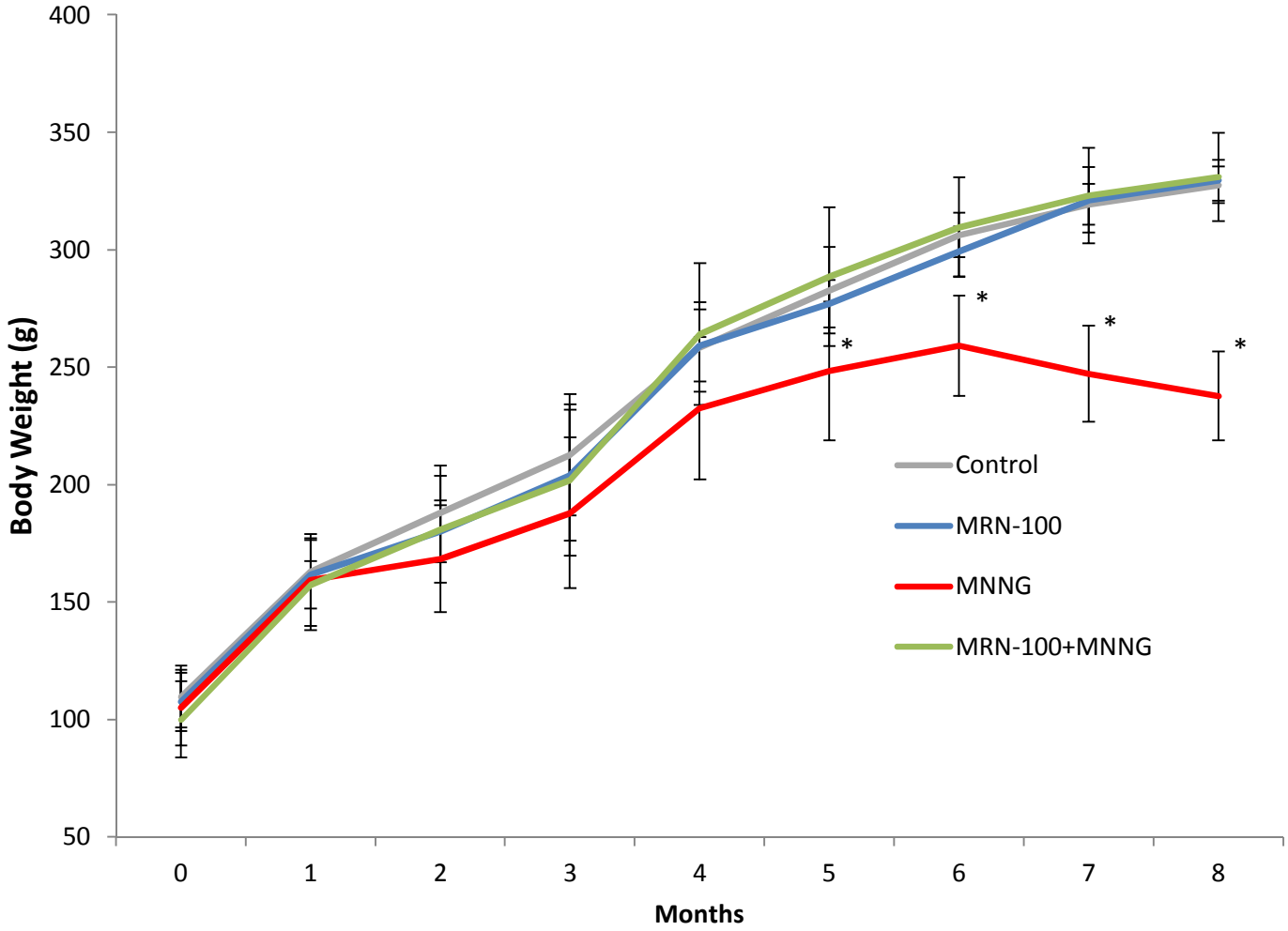
Almost one-half of hospitalized adult cancer patients have lost at least 10 percent of their body weight.

One-quarter of these patients have lost 20 percent or more.

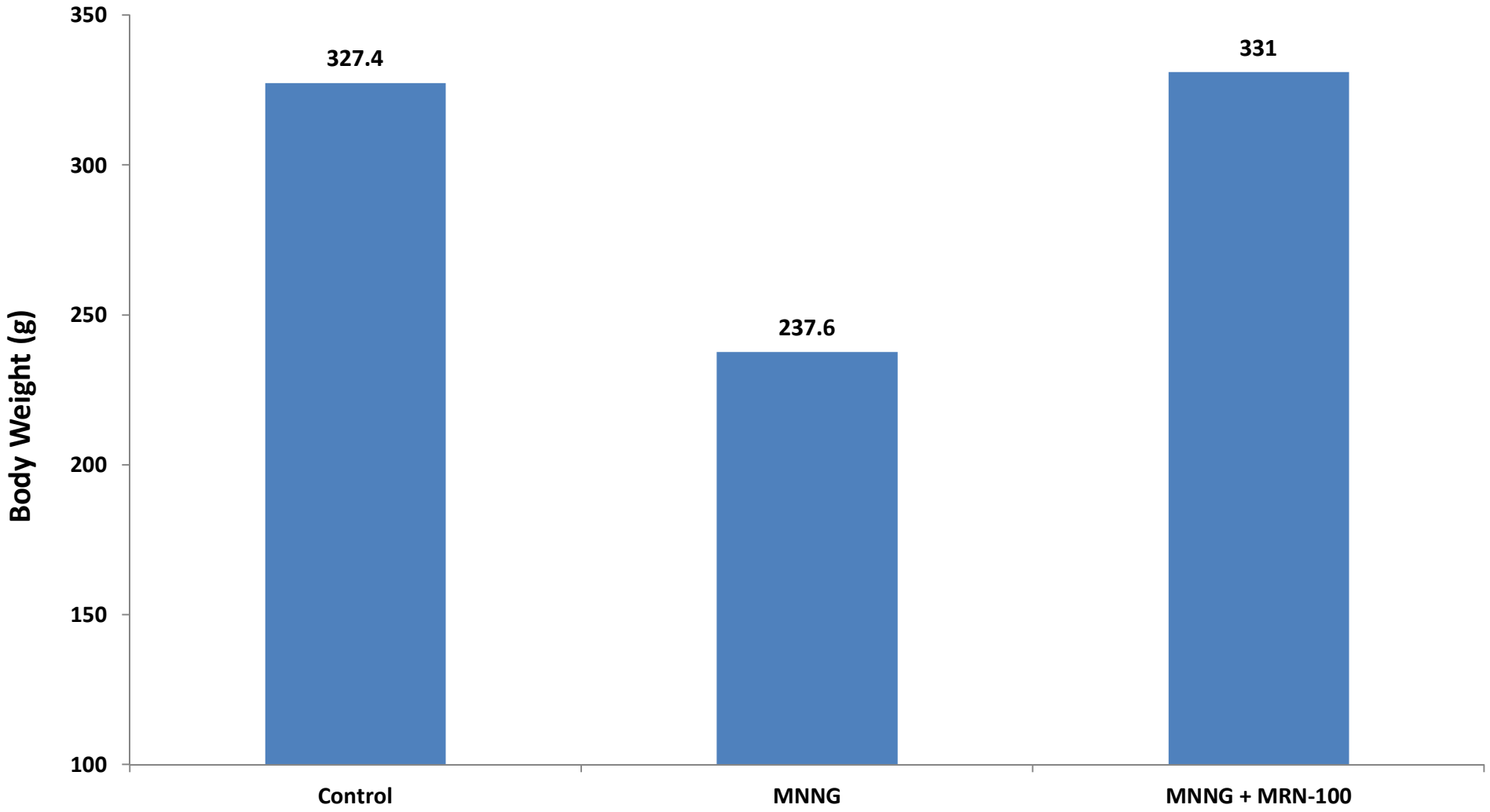
Virtually all patients with disseminated (scattered and abundant) metastasis show evidence of involuntary weight loss.



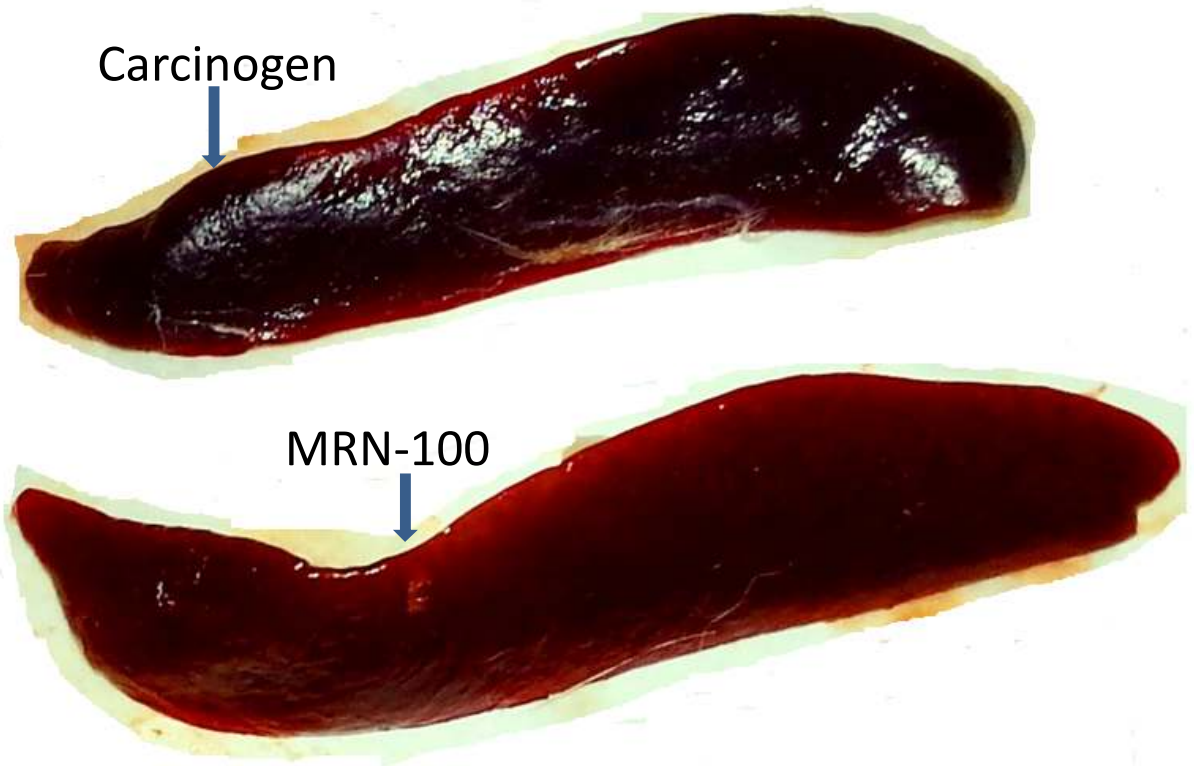
Body Weight

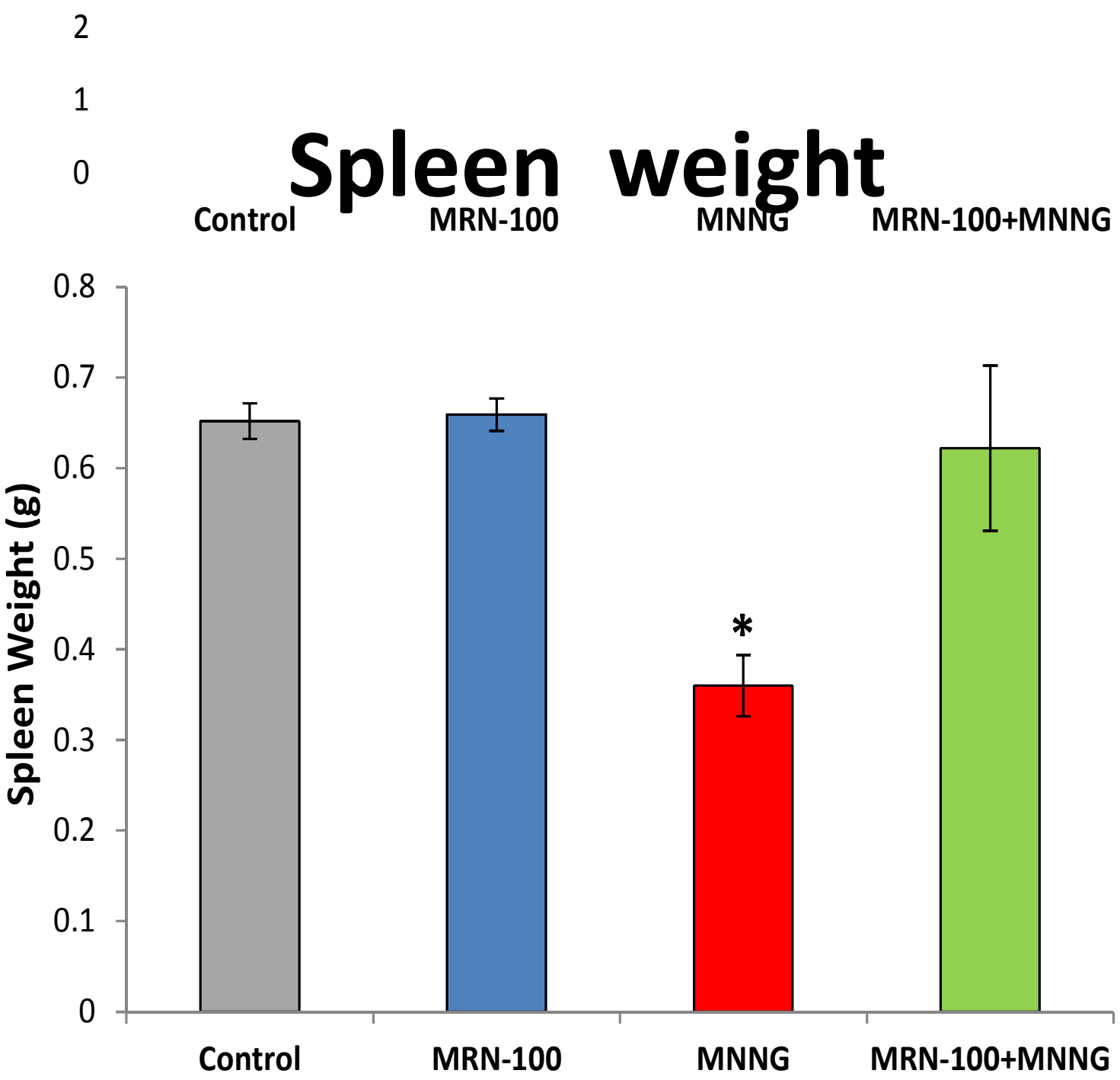

400
350
300
250
200
150
100
50
Body Weight (g)
0
1
2
3
4
5
6
7
8
Months
Control
MRN-100
MNNG
MRN-100+MNNG
*
*
*
*

MRN-100 Prevents Body Weight Loss from Gastric Cancer in Rats After 8 Months

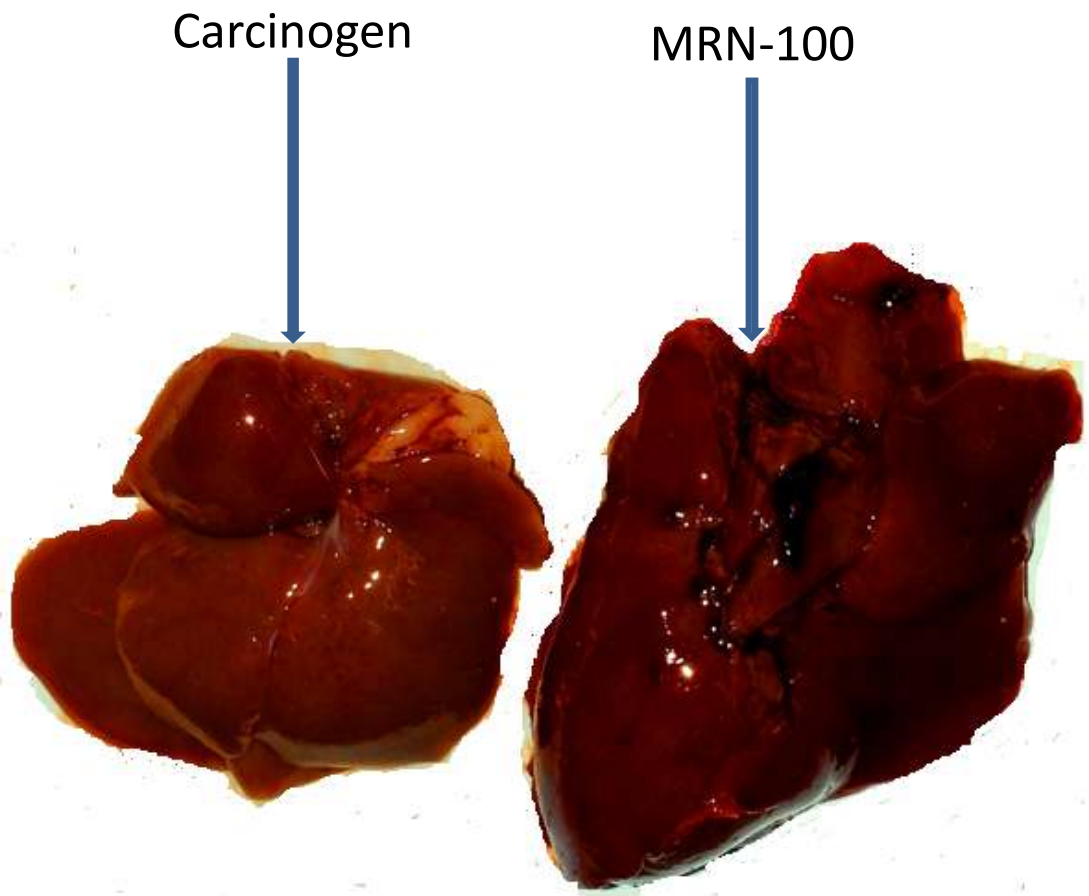


Spleen weight

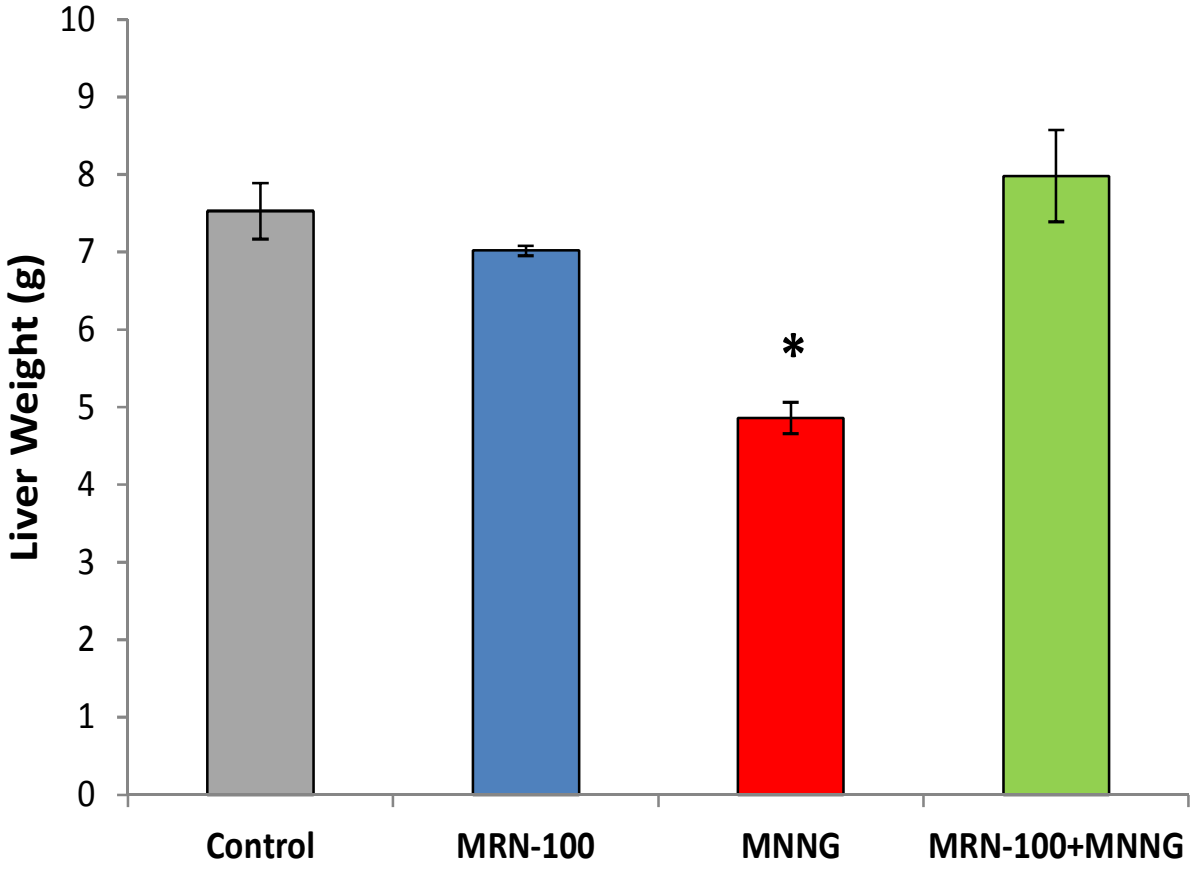


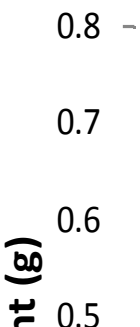

Spleen weight
Control
MRN-100
MNNG
MRN-100+MNNG
Spleen Weight (g)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
*
Control
MRN-100
MNNG
MRN-100+MNNG

Liver weight



Liver weight





The major problem
concerning the
natural antitumor agents
is to define
their mechanisms of action

Mechanisms of protection against esophageal and gastric cancer by MRN-100

is via

Anticancer by MRN-100
Mechanisms of action

Antioxidant

Immune modulator

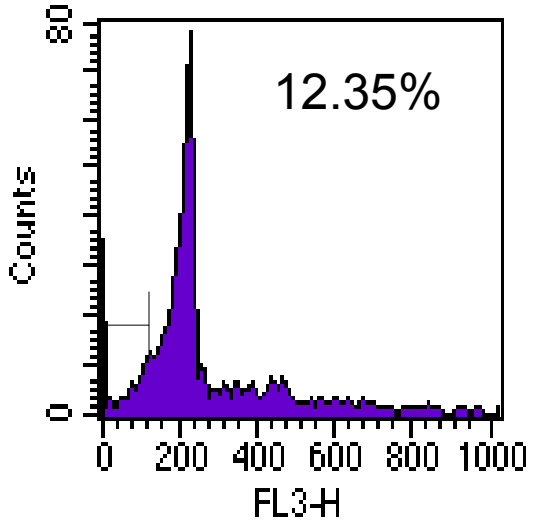
Future studies

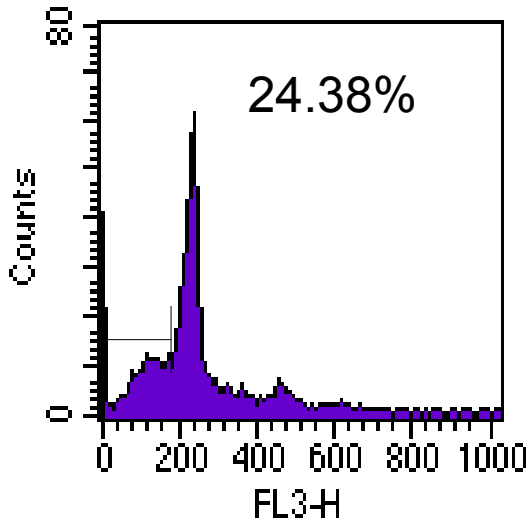
1-

Antioxidant Potential

Cells

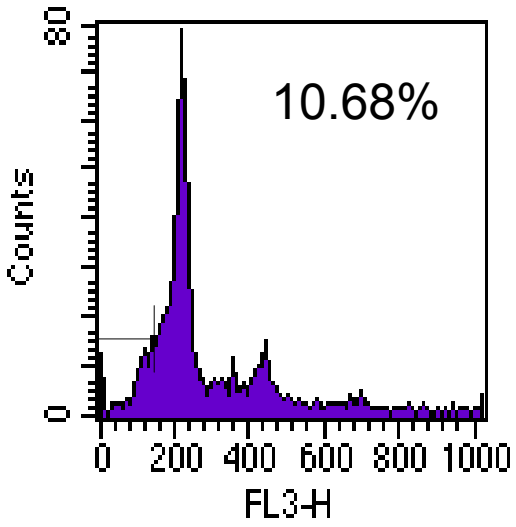
Cells+ H2O2

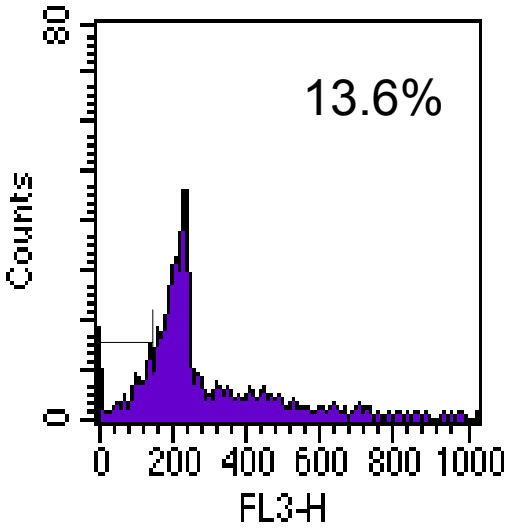




ACM System Water

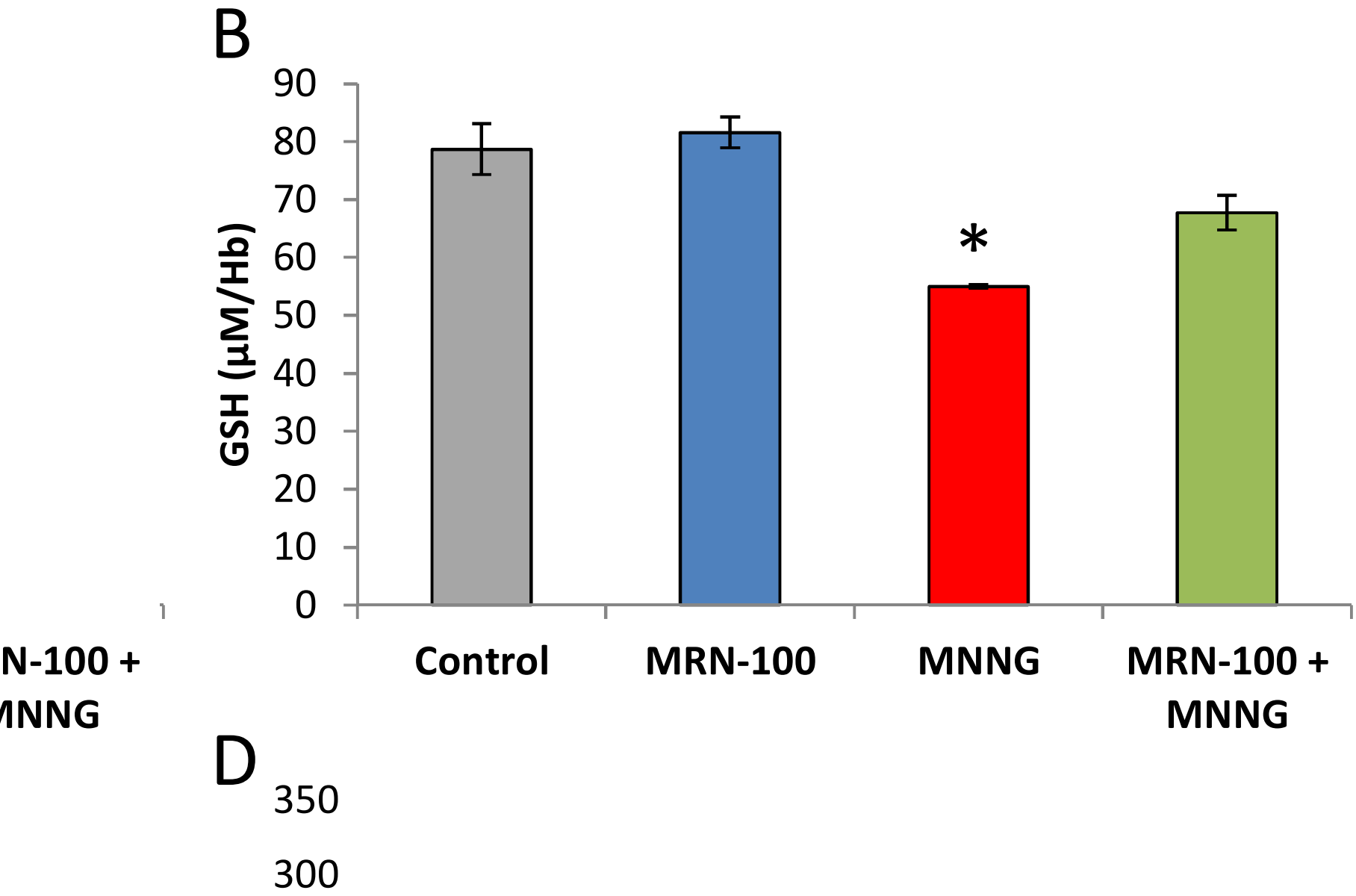
ACM Water + H2O2





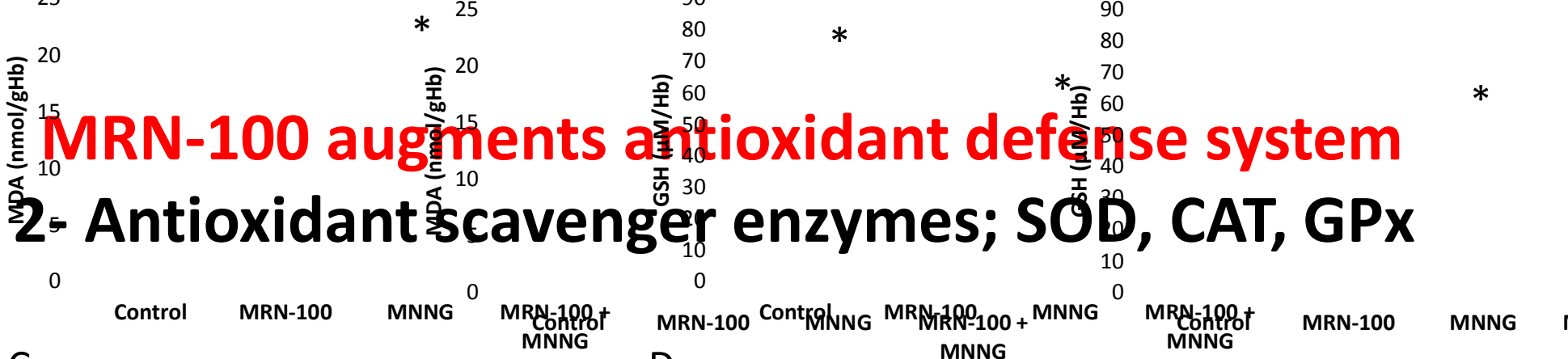
MRN-100 augments antioxidant defense system

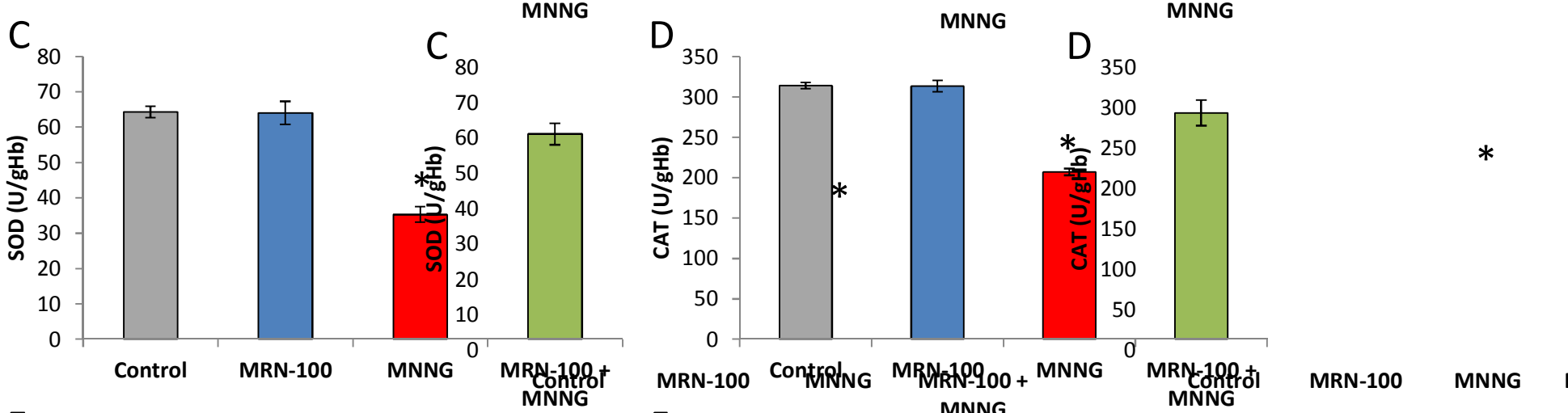
1- Free radical scavenger (GSH)

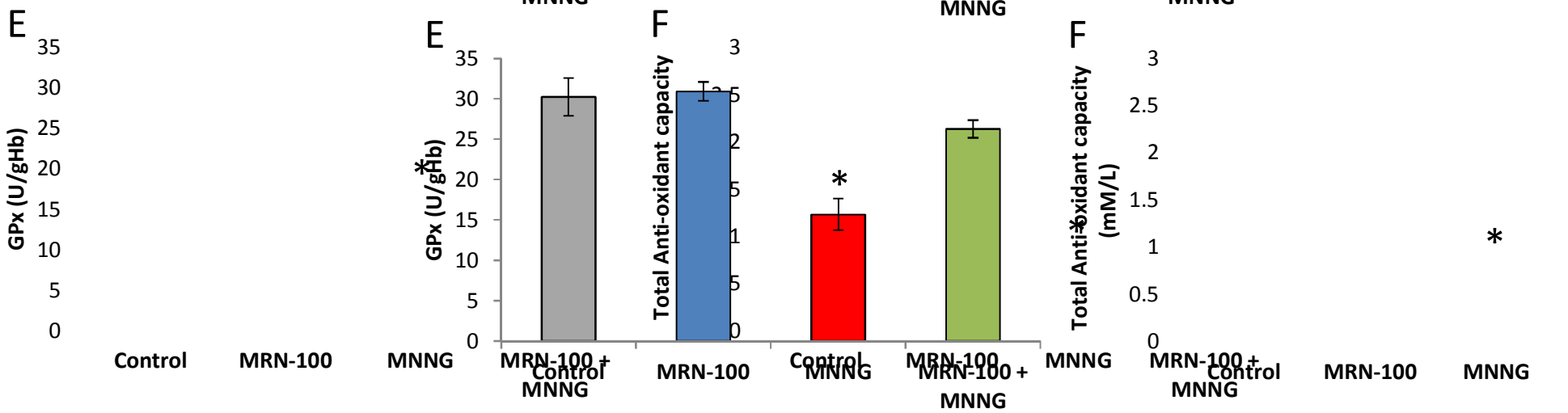


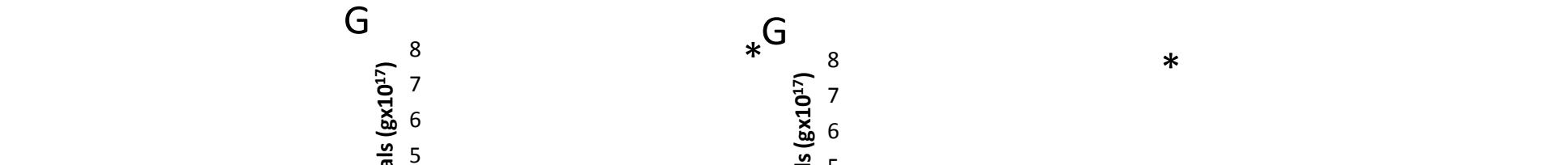
MRN-100 augments antioxidant defense system

2- Antioxidant scavenger enzymes; SOD, CAT, GPx









100

50

0

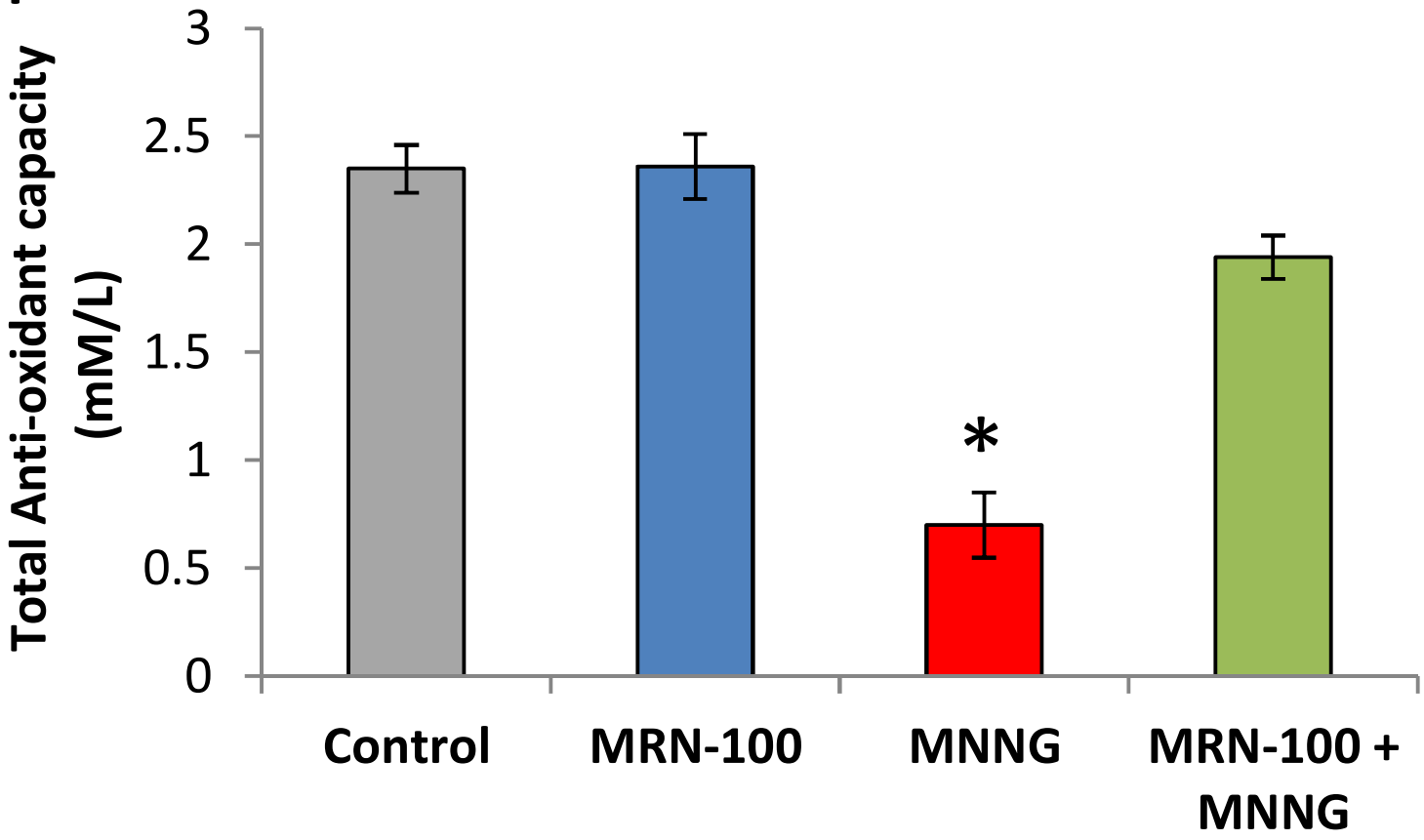
MRN-100 augments antioxidant defense system

4- Total anti-0xidant capacity

MRN-100 + MNNG

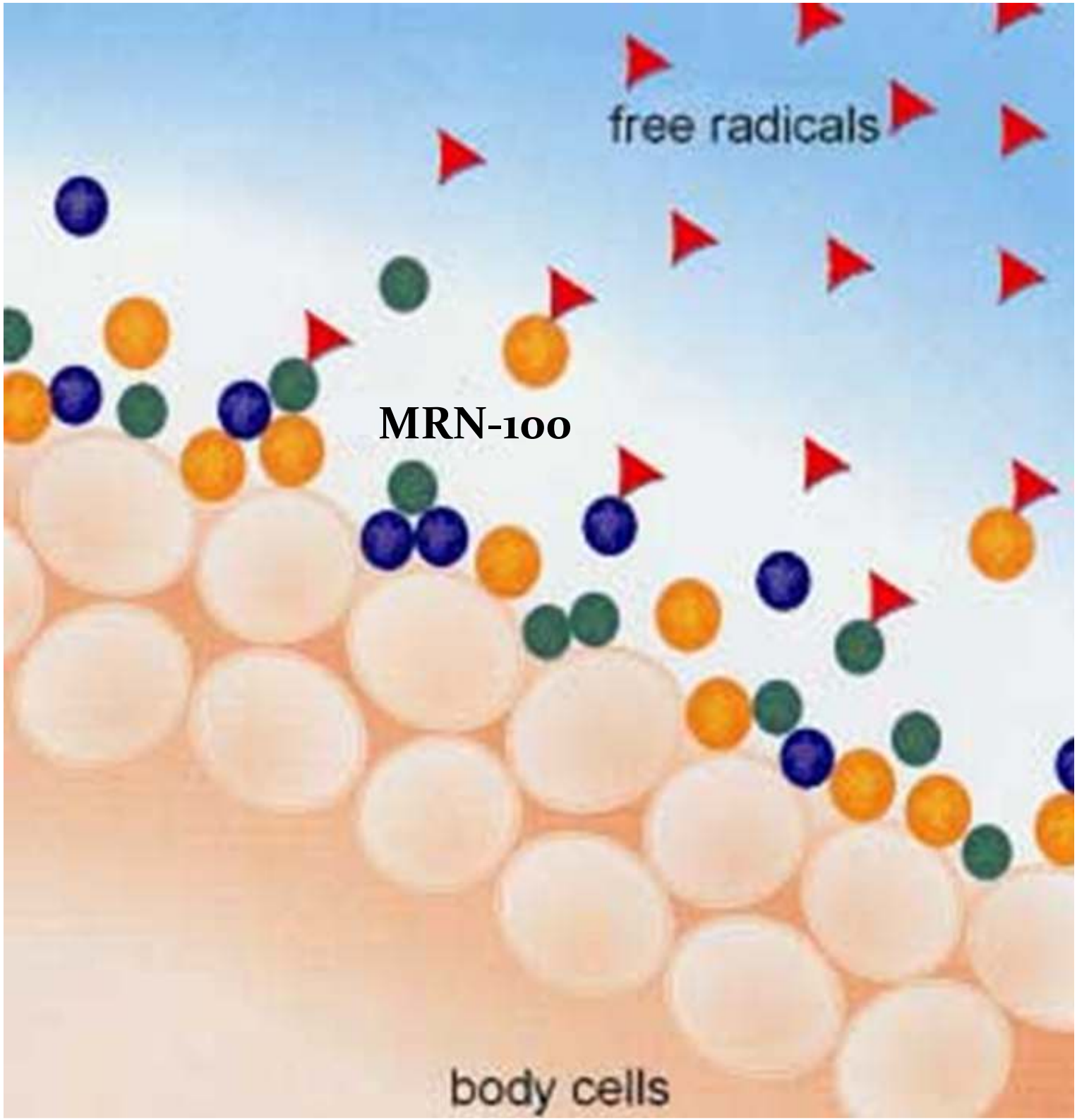
Control MRN-100 MNNG MRN-100 + MNNG

F



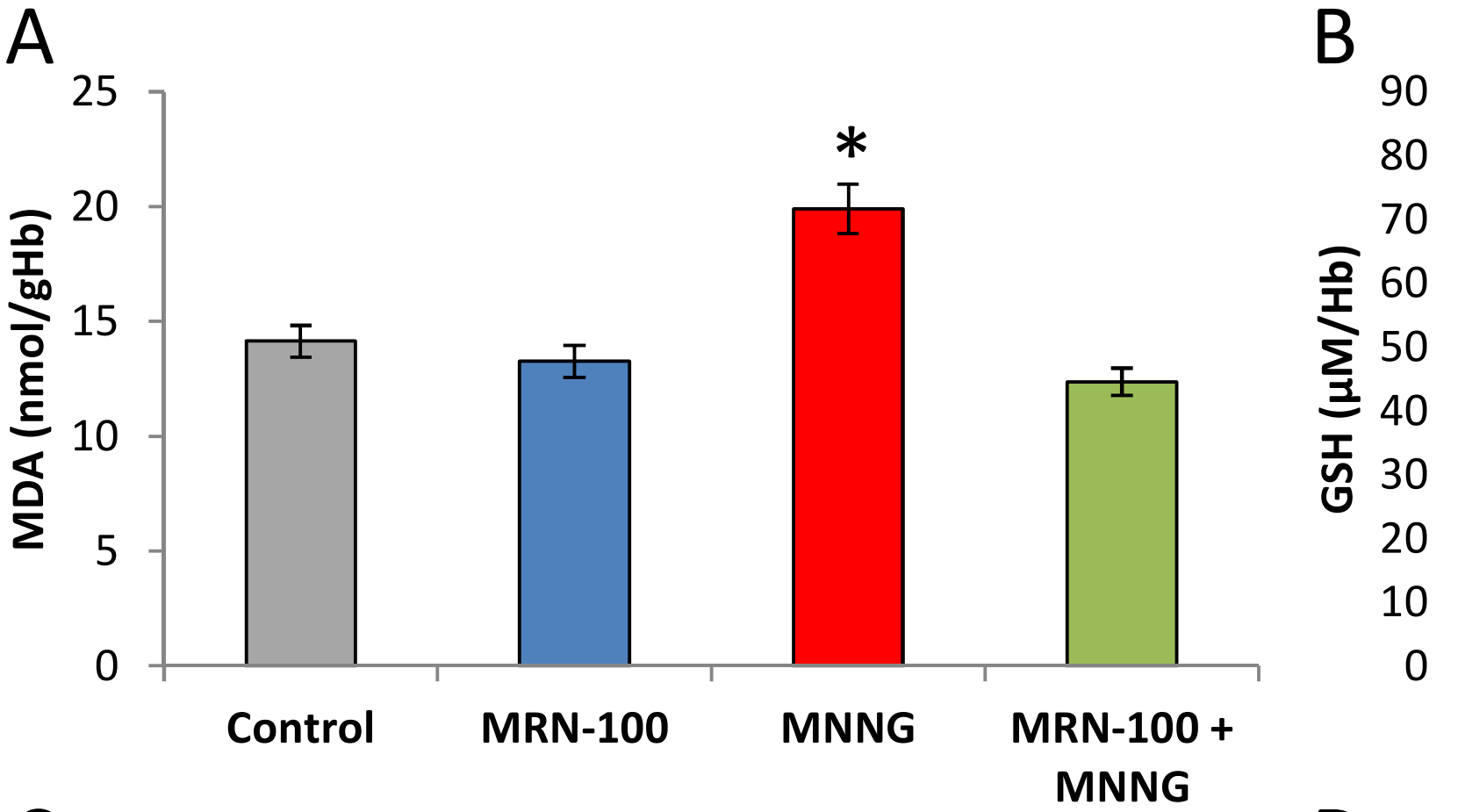
MRN-100 + MNNG

*


free radicals
MRN-100
body cells

MRN-100 augments antioxidant defense system.

3- Modulating lipid peroxidation.(lipid peroxidation biomarker MDA)



Tota

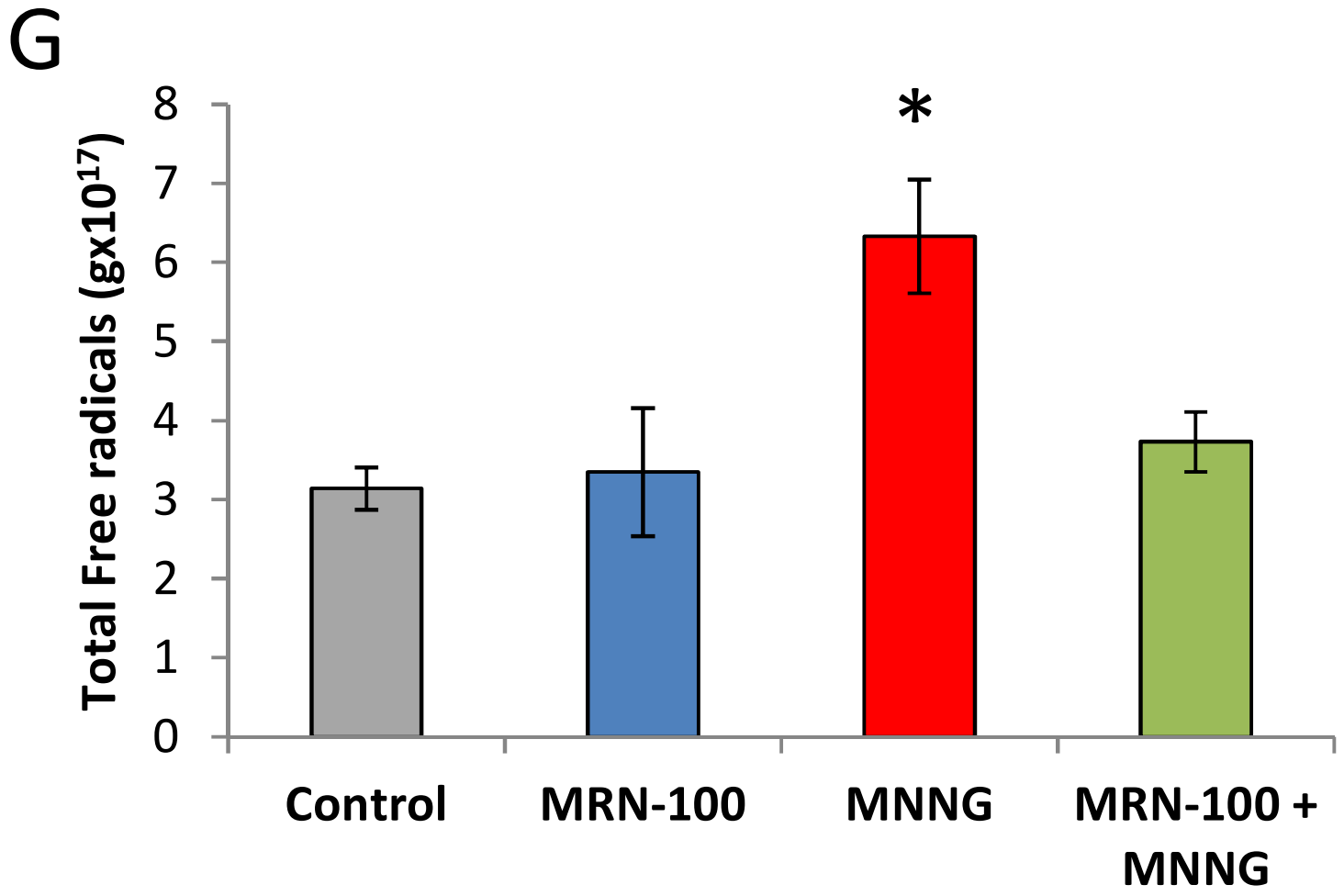
0.5

0

MRN-100 augments antioxidant defense system

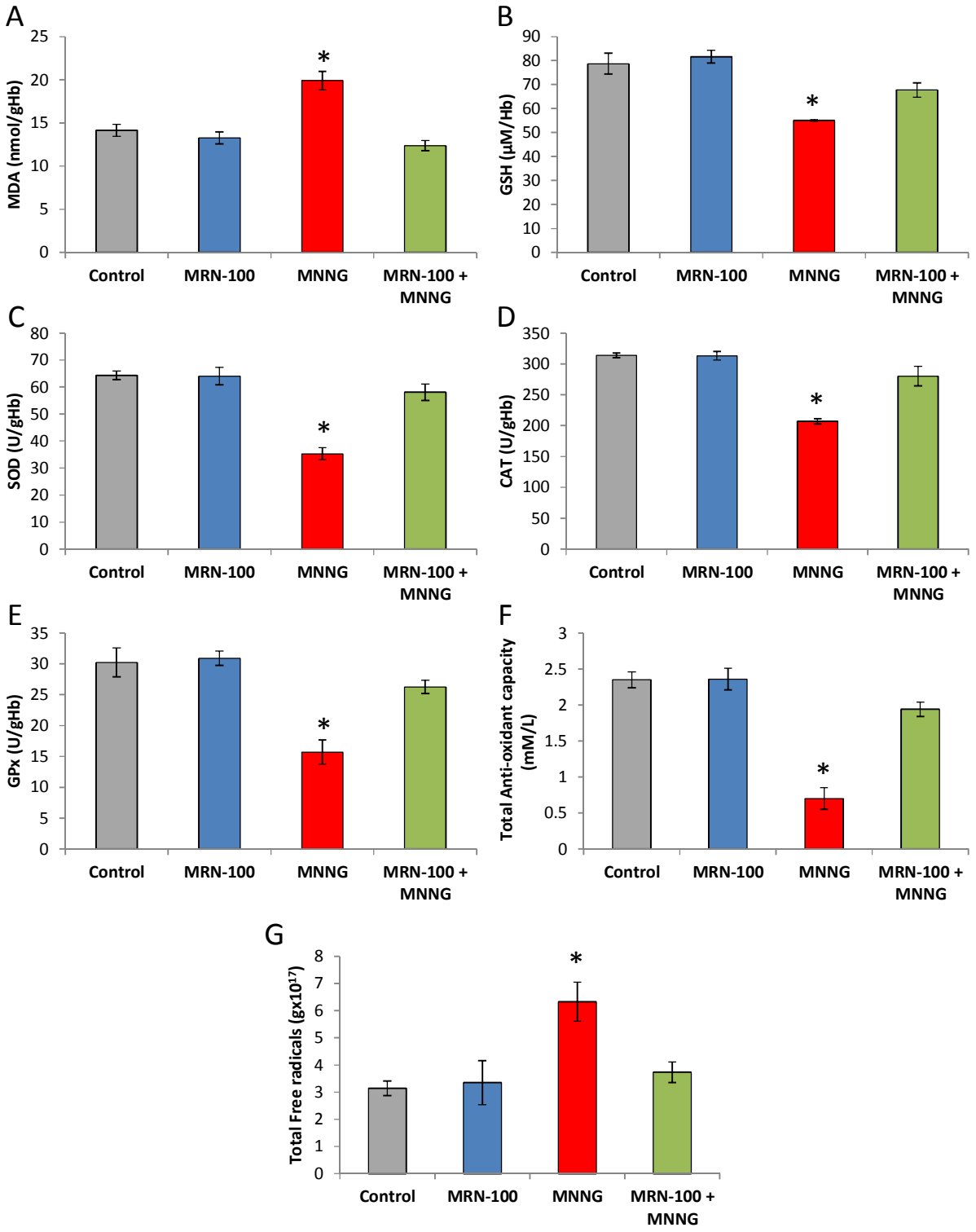
MRN-100 MNNG MRN-100 + MNNG Control MRN-100 MNN

5 Total free radicals



Augmenting antioxidant defense system

- **Free radical scavenger (GSH)**
- **Antioxidant scavenger enzymes; SOD, CAT and GPx**
- **Modulating lipid peroxidation.** (lipid peroxidation biomarker MDA, NO)


A
MDA (nmol/gHb)
25
20
15
10
5
0
*
Control
MRN-100
MNNG
MRN-100 + MNNG
B
GSH (µM/Hb)
90
80
70
60
50
40
30
20
10
0
*
Control
MRN-100
MNNG
MRN-100 + MNNG
C
SOD (U/gHb)
80
70
60
50
40
30
20
10
0
*
Control
MRN-100
MNNG
MRN-100 + MNNG
D
CAT (U/gHb)
350
300
250
200
150
100
50
0
*
Control
MRN-100
MNNG
MRN-100 + MNNG
E
GPx (U/gHb)
35
30
25
20
15
10
5
0
*
Control
MRN-100
MNNG
MRN-100 + MNNG
F
Total Anti-oxidant capacity (mM/L)
3
2.5
2
1.5
1
0.5
0
*
Control
MRN-100
MNNG
MRN-100 + MNNG
G
Total Free radicals (gx10^17)
8
7
6
5
4
3
2
1
0
*
Control
MRN-100
MNNG
MRN-100 + MNNG

第38巻第2号平成24年2月25日発行（毎月1回25日発行）　昭和54年8月27日第3種郵便物認可
ISSN 1347-4340

Medical Science Digest

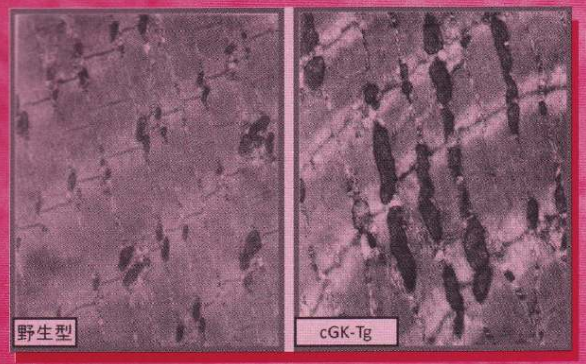
MSD

Vol.38
No.2
2012
通巻491号
2

メディカル・サイエンス・ダイジェスト

特集 生活習慣病とミトコンドリア異常

特集編輯 伊藤　裕
（慶應義塾大学腎臓内分泌代謝内科）

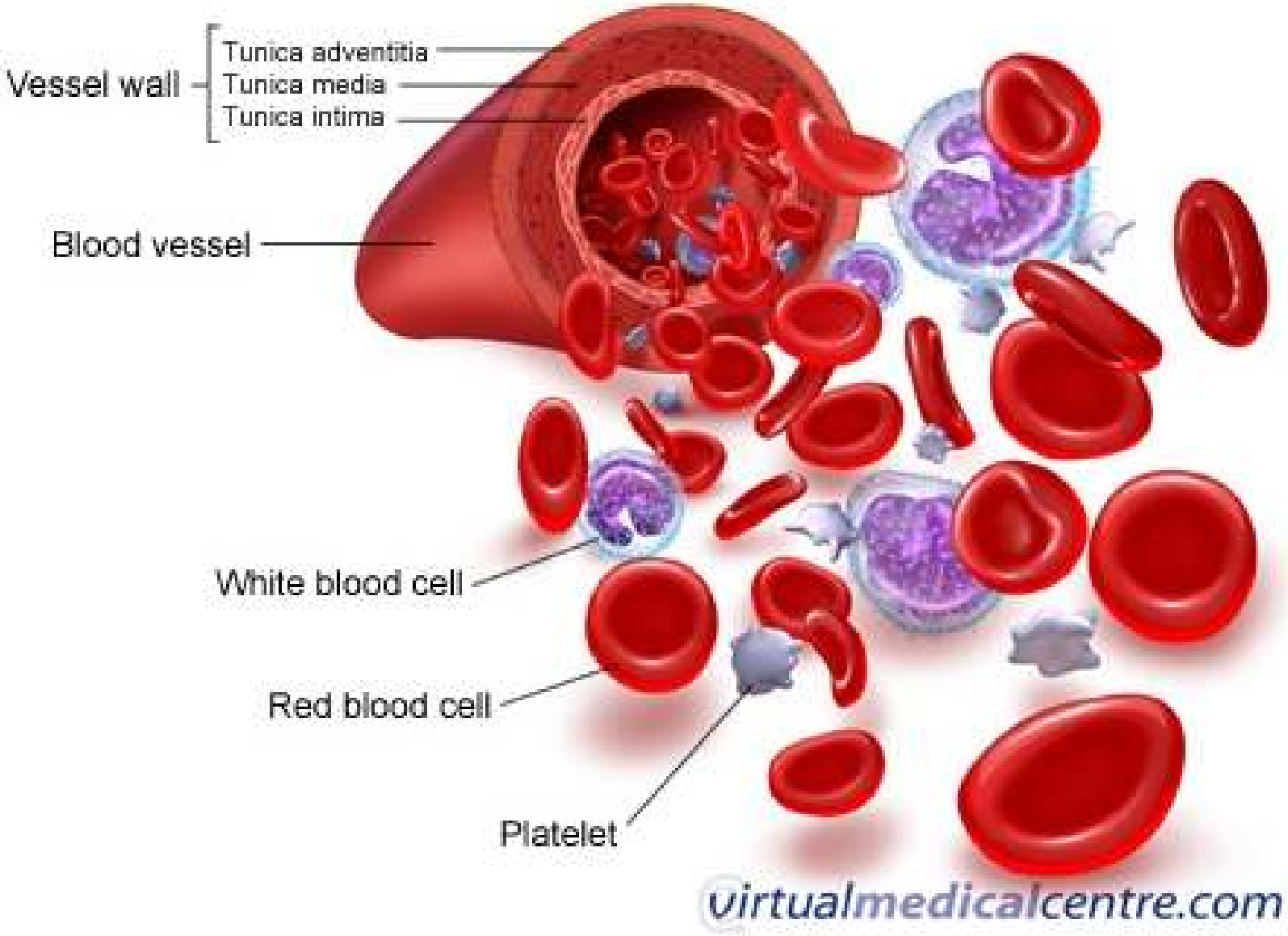


ニューサイエンス社

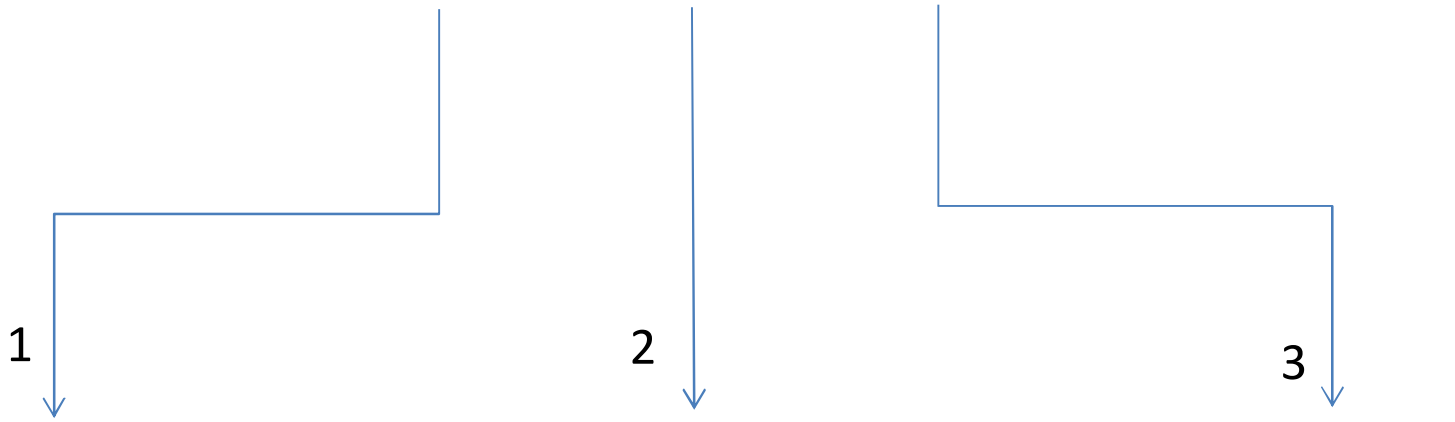
2-

Immune modulation

Blood Constituents



Hematology Parameters



Lymphocytes

Red Blood Cells (RBCs)
Hemoglobin Content

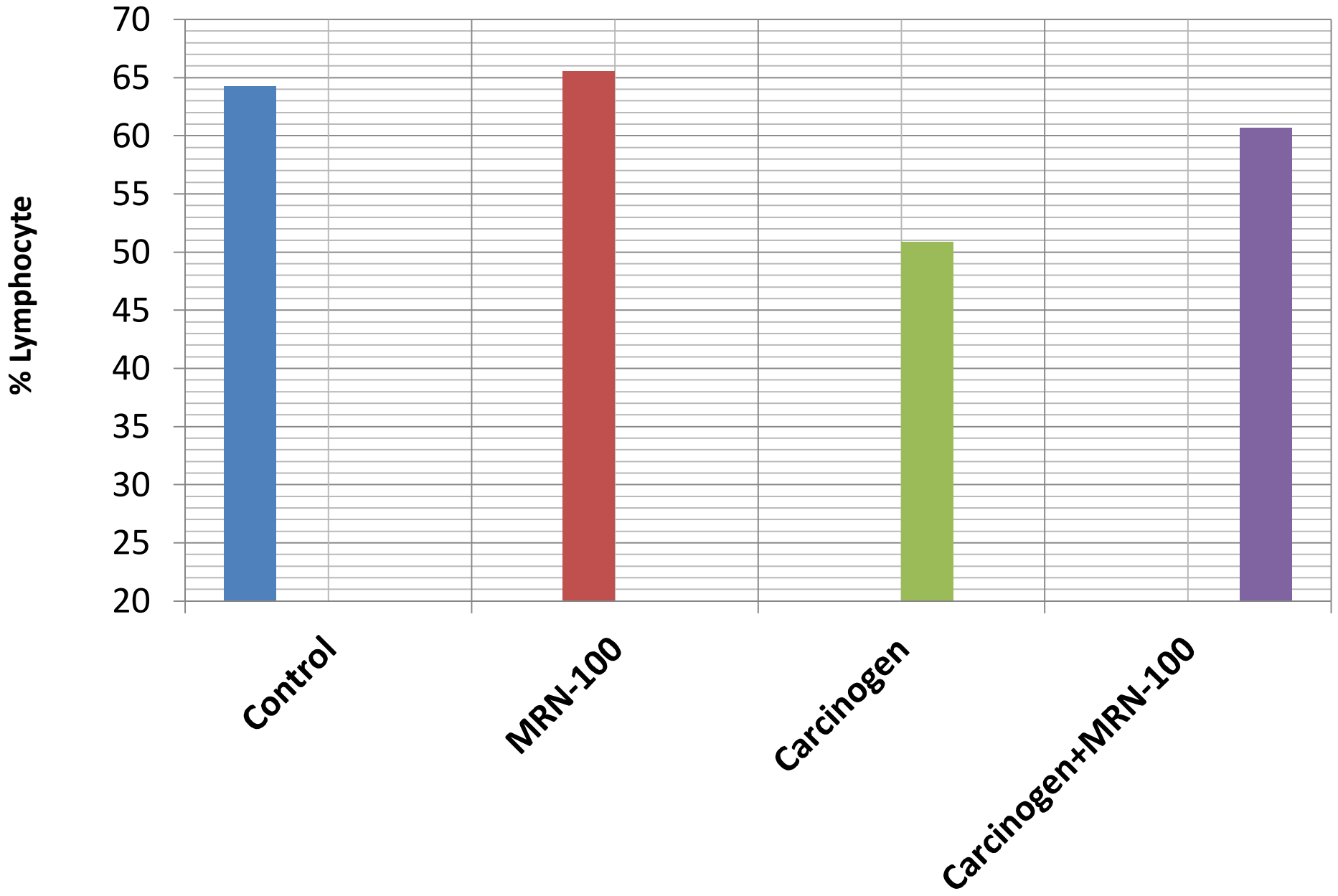
Platelets

Effect of MRN-100 on hematological parameters in gastric cancer

	Group			
	Control	MRN-100	MNNG	MNNG+ MRN-100
RBCs (10^6/cmm)	8.80±0.21	8.94±0.13 (1.53%)	7.08±0.29**,†† (-19.58%)	8.32±0.09##,† (-5.47%)
Hb(g/dl)	13.82±0.33	13.93±0.24 (0.84%)	11.82±0.48**,†† (-14.48%)	13.88±0.17## (0.48%)
Hematocrit (%)	43.02±1.17	43.12±0.59 (0.23%)	38.57±0.60**,†† (-10.34%)	41.38±0.71# (-3.80%)
WBC's (10^3/cmm)	8.78±0.66	8.61±0.46 (-1.97%)	11.44±0.32*,† (30.36%)	8.78±1.12# (0.04%)
Lymphocytes(%)	64.25±2.81	65.62±1.27 (2.13%)	50.93± 4.14**,†† (-20.73%)	60.7±3.33# (-5.53%)
Neutrophils (%)	26.05±1.95	27.03±0.99 (3.77%)	42.58±5.10 **,†† (63.47%)	29.62±1.77## (13.69%)
Monocytes (%)	4.65±0.43	4.63±0. 36 (-0.36%)	4.70±0.21 (1.08%)	4.68±0.78 (0.65%)
Platelets (10^3/cmm)	803.5±29.67	805.5±24.87 (0.25%)	1011.17±66.87**,†† (25.85%)	810.17±61.48## (0.83%)

Data represents the mean±SE of 6 mice/group.
*Significantly different from control group at 0.05 level.
**Significantly different from control at 0.01 level.
†Significantly different from **MRN-100** group at 0.05 level.
†† Significantly different from **MRN-100** group at 0.01 level.
# Significantly different from MNNG group at 0.05 level.
Significantly different from MNNG group at 0.01 level.
(% change of control group).

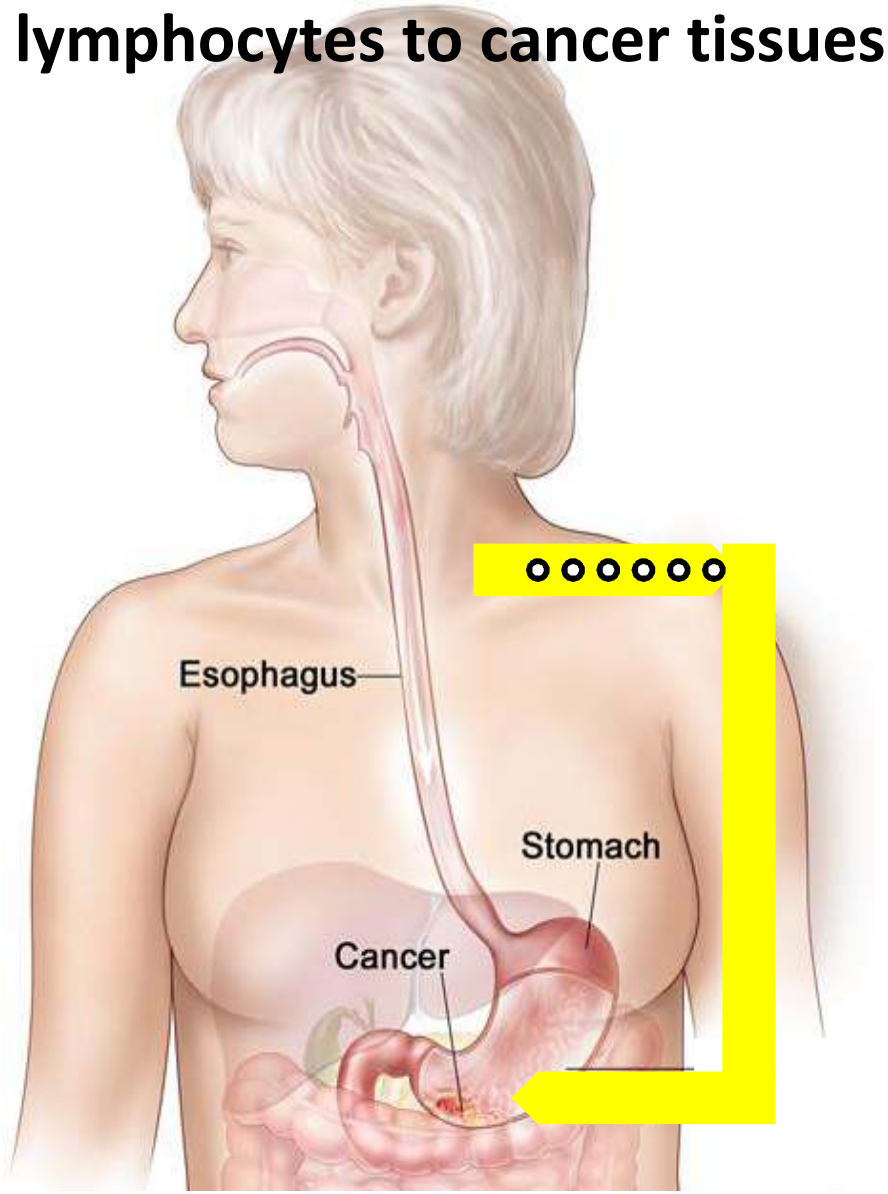
MRN-100 Protects Against Loss of Lymphocytes

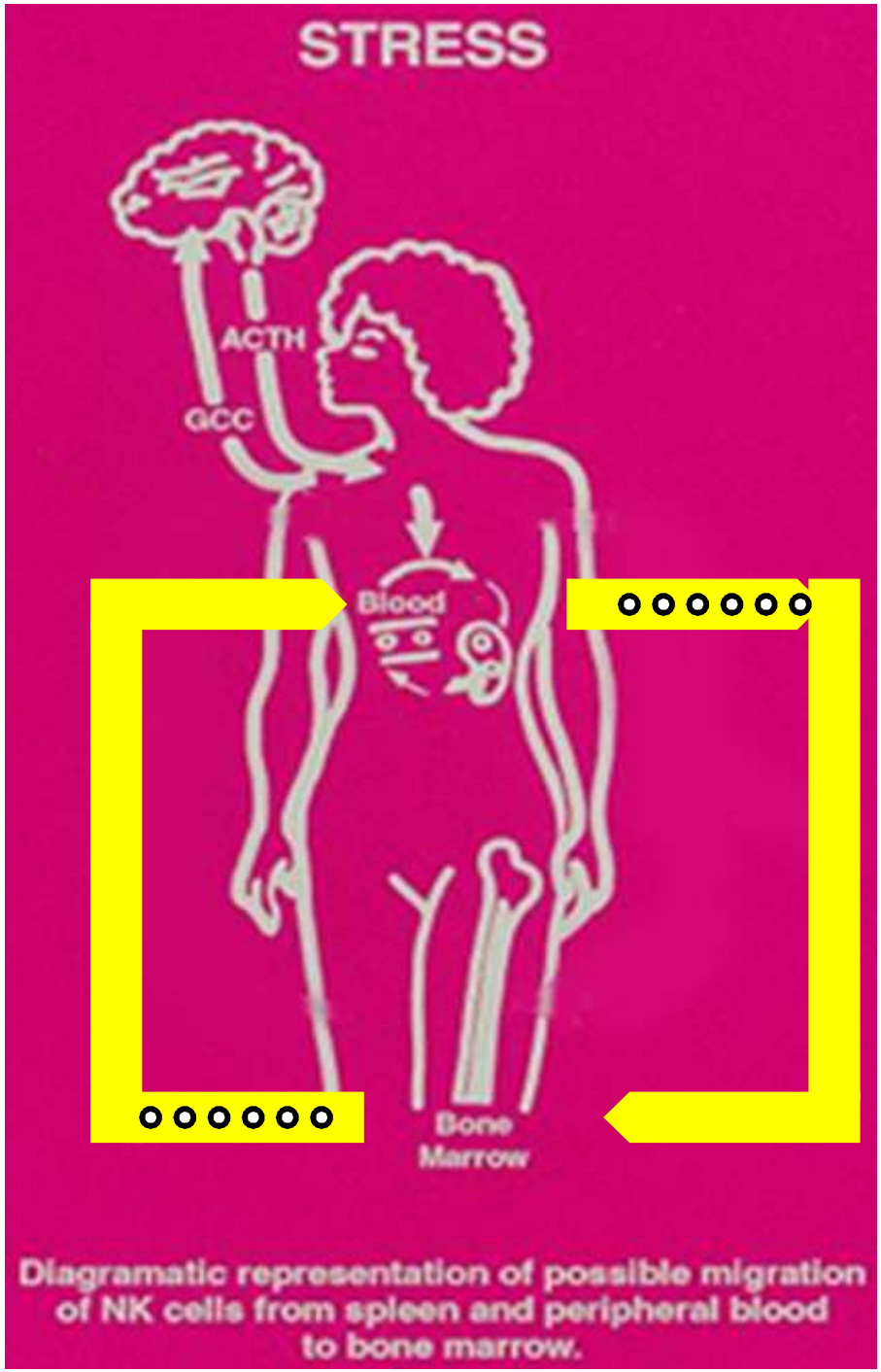


Mechanisms underlying the loss of lymphocytes

1. Migration of lymphocytes to cancer tissues
2. Phagocytosis (eat up) of lymphocytes by tumor cells

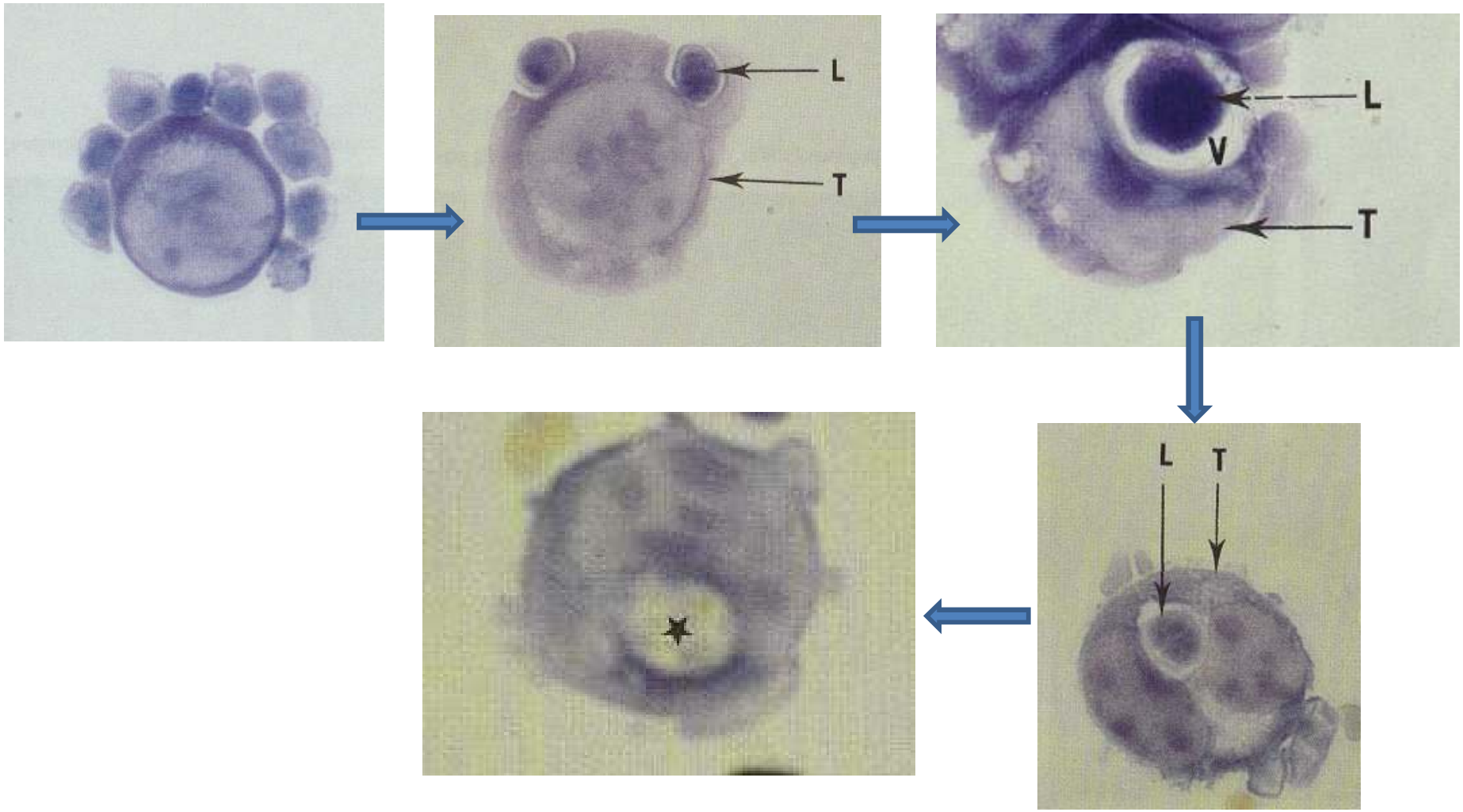
1. Migration of lymphocytes to cancer tissues





Ghoneum M. et al. Immunol. 60:461-65. (1987).

2-Phagocytosis (eat up)of lymphocytes by cancer cells (LAZ-559, B cell lymphoma of human origin).



Ghoneum M, Grewal IS. Hematol Oncol. 1990 ;8(2):71-80.

MRN-100 Enhances Natural Killer Cell Anti-Cancer Activity

Natural Killer (NK) Cells: **The first line of defense against cancer**

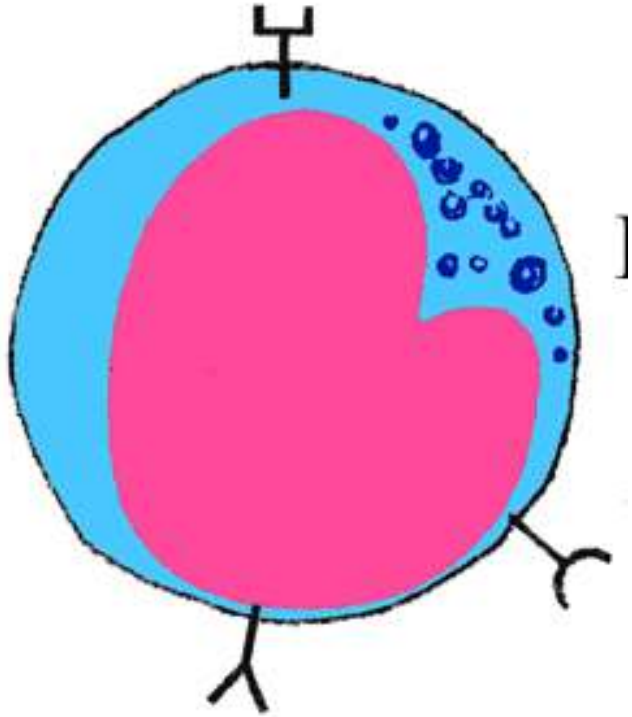
Dissecting the pathway of NK cell killing the cancer cell

1. **NK cell binds to cancer cell**

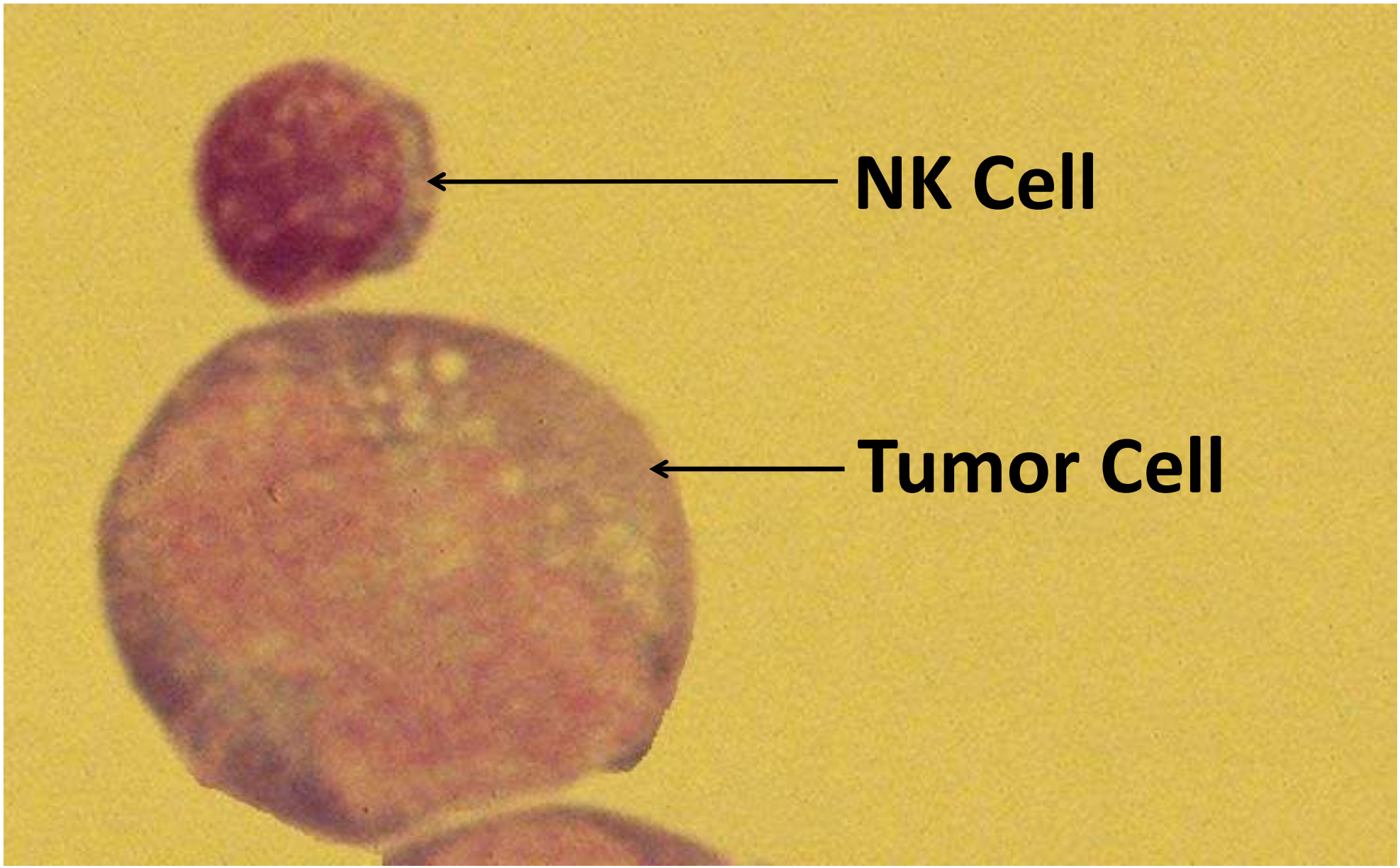
2. **NK cell discharges the granules inside the cancer cell, which causes holes in the cancer cell**

3. **Death of cancer cell**

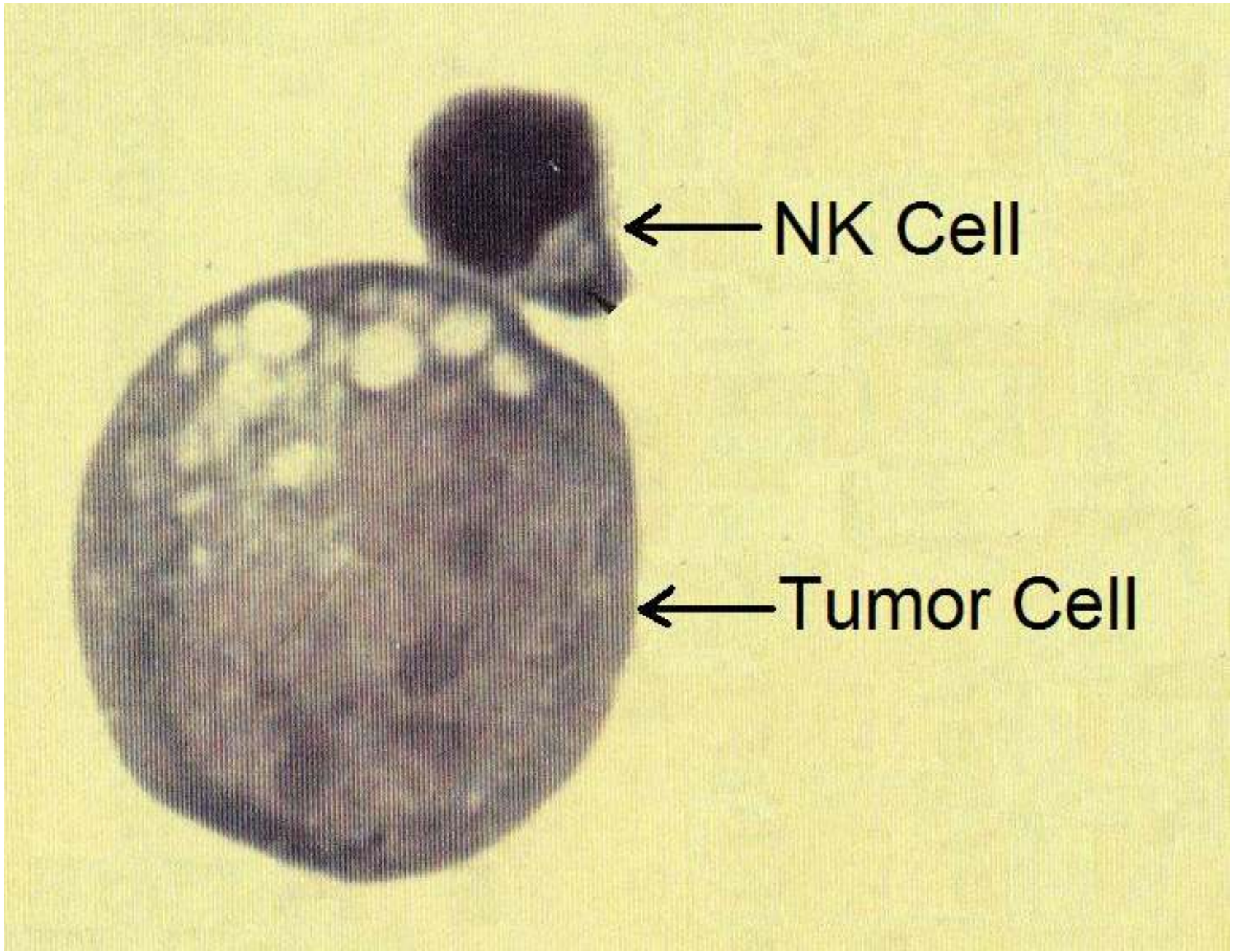
4. **NK cell attacks new cancer cell (recycle)**



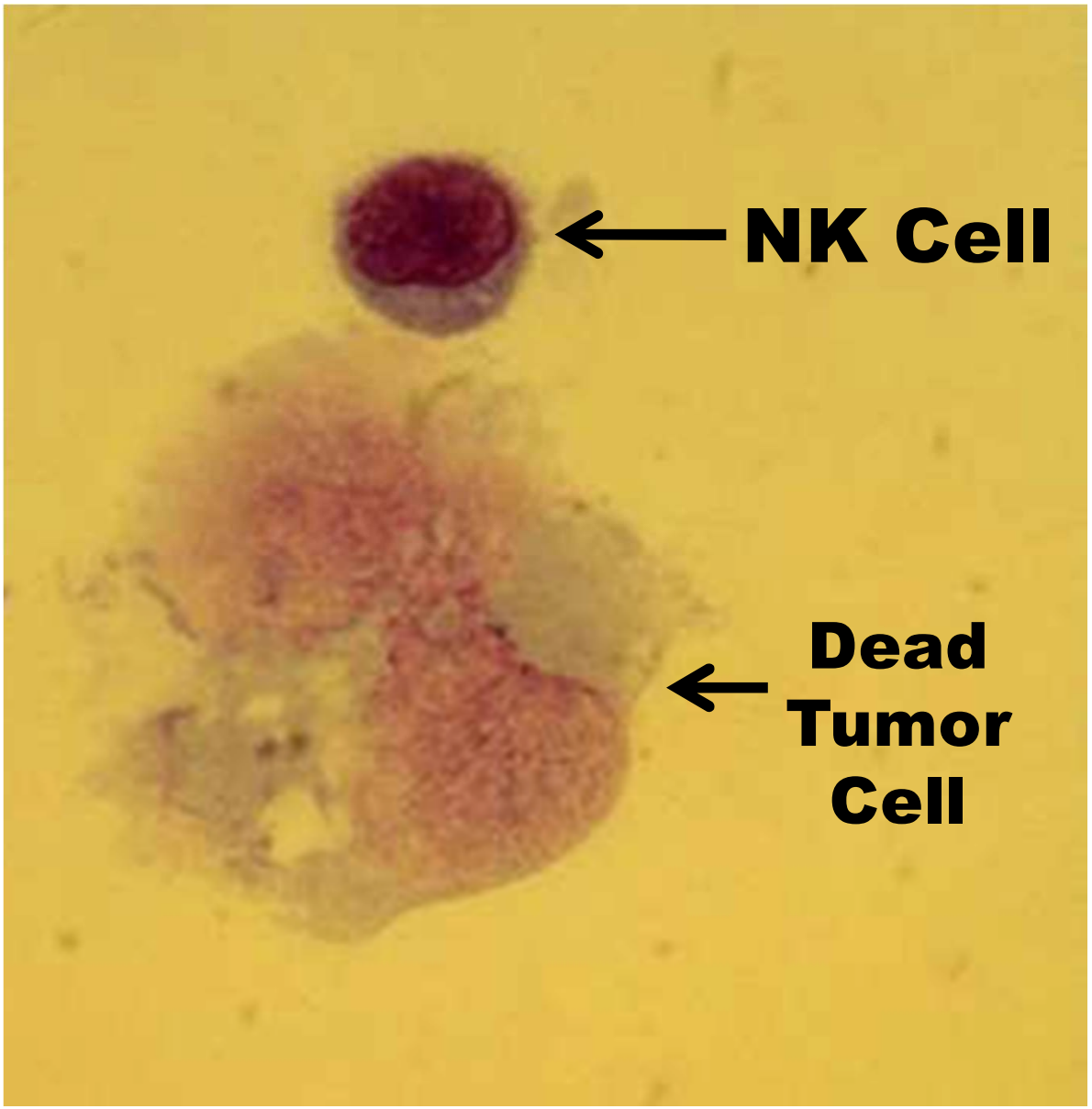
1. NK cell binds to cancer cell



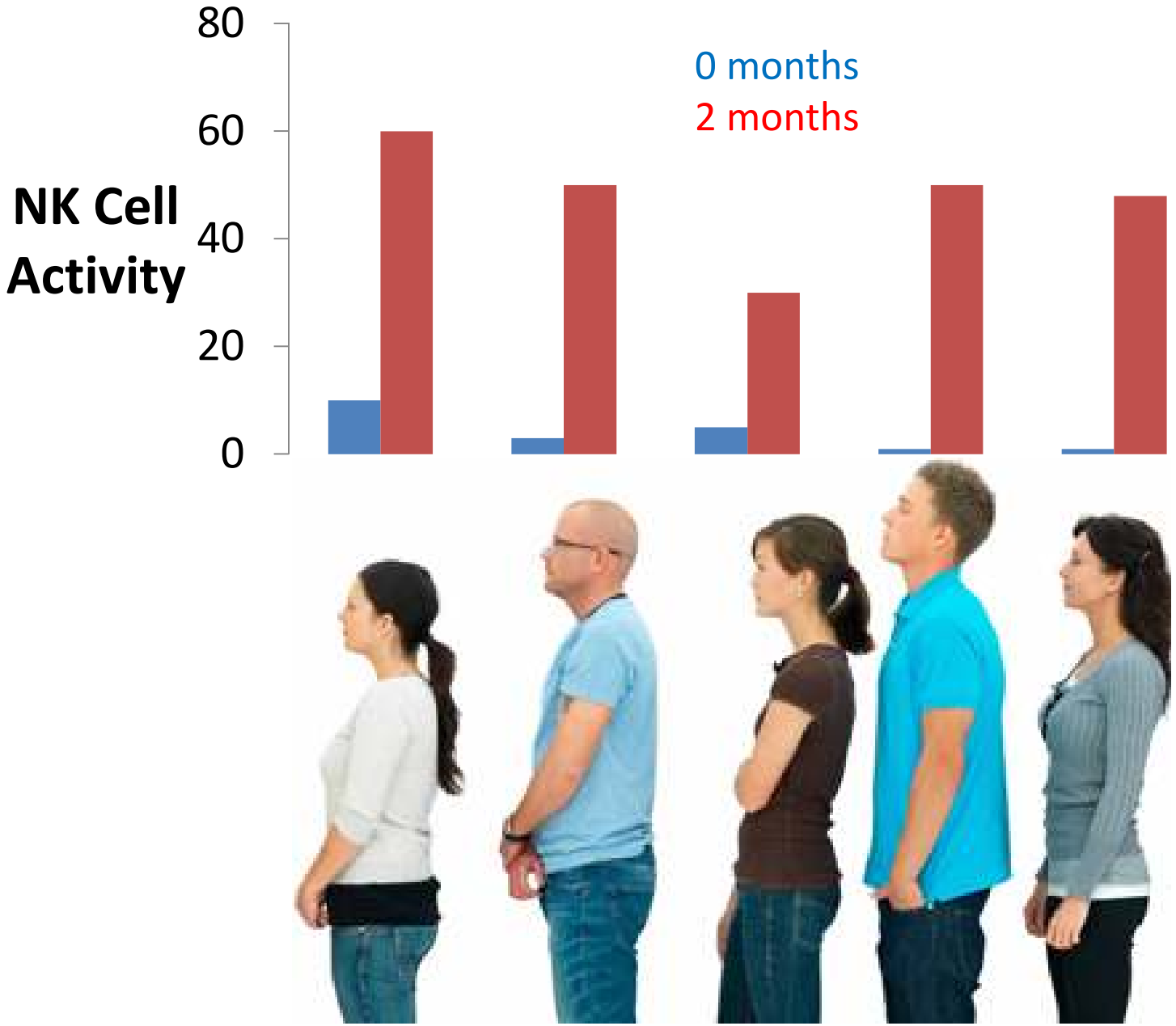
2. NK cell induces holes in cancer cell



3. Cancer cell is dead

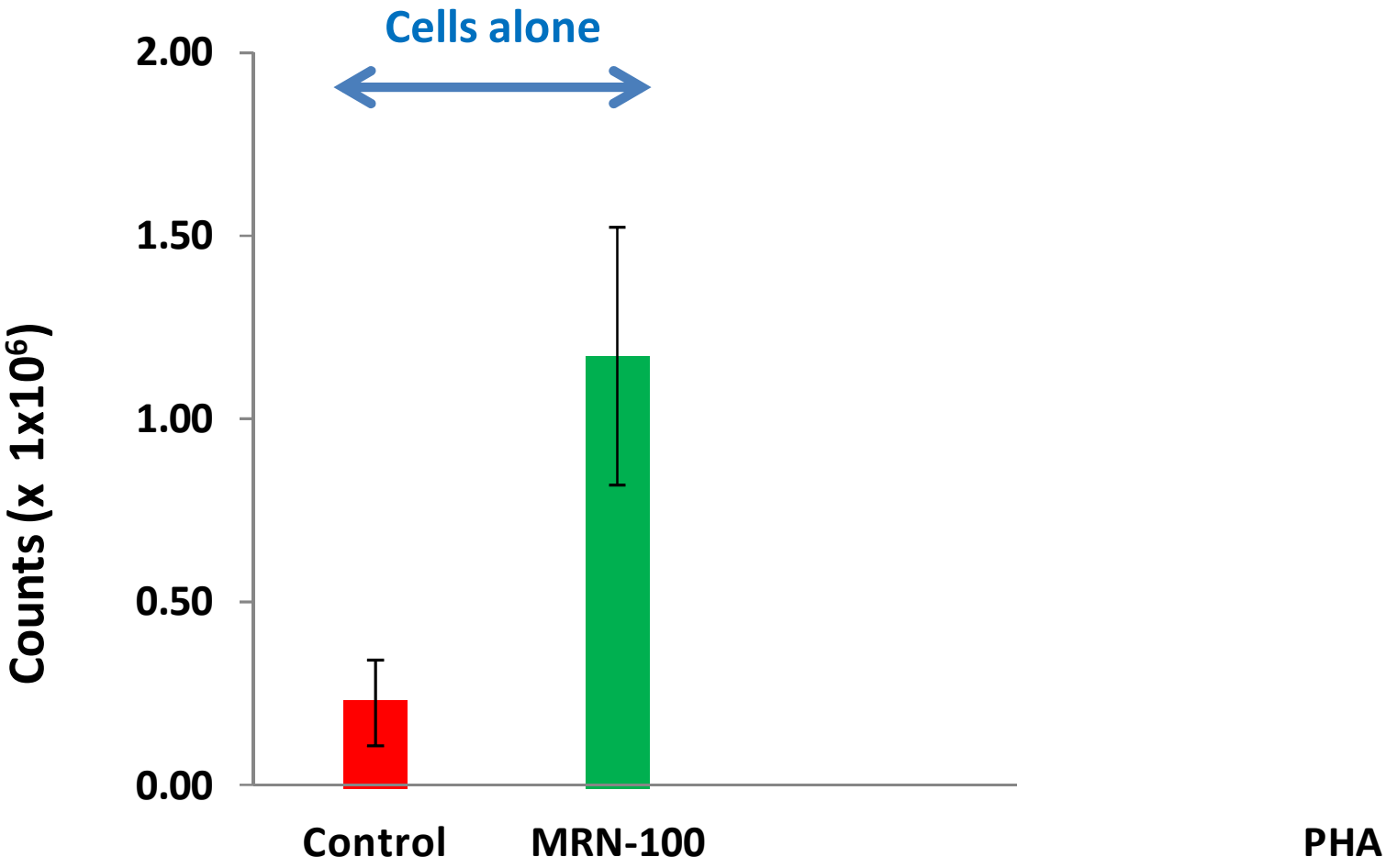


MRN-100 Enhances Human NK Cell Activity




Members of the Society of Natural Immunity
Honolulu, Hawaii, Nov. 10-12 1985

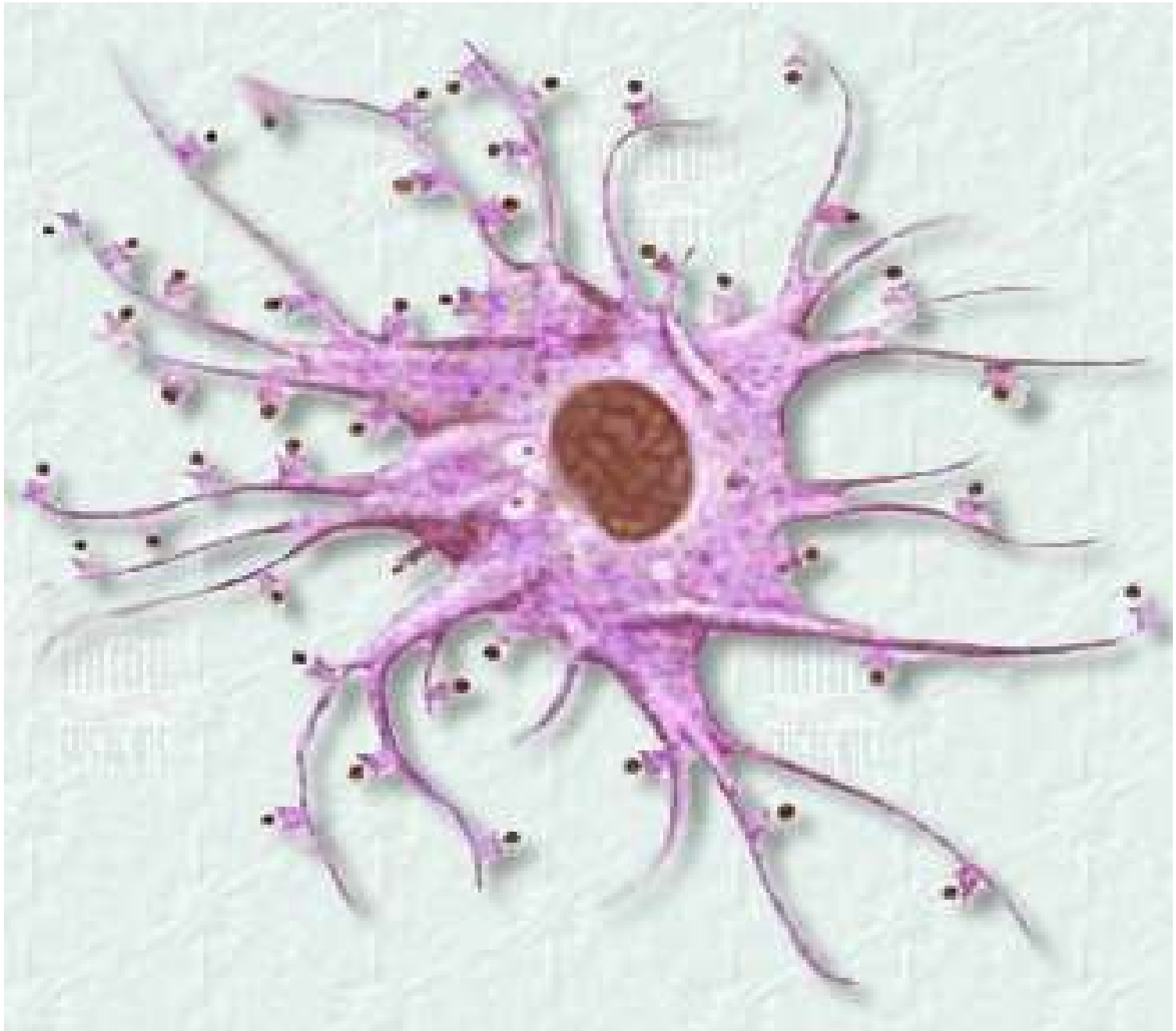
MRN-100 Enhances Human T Cell Proliferation



MRN-100 activates DC

DC

Dendritic cells (DCs)



Dendritic Cell

(The MOST Efficient Antigen Presenting Cells, APC)

Their main function is to process antigen material and present it on the surface to other cells of the immune system, thus functioning as antigen-presenting cells.

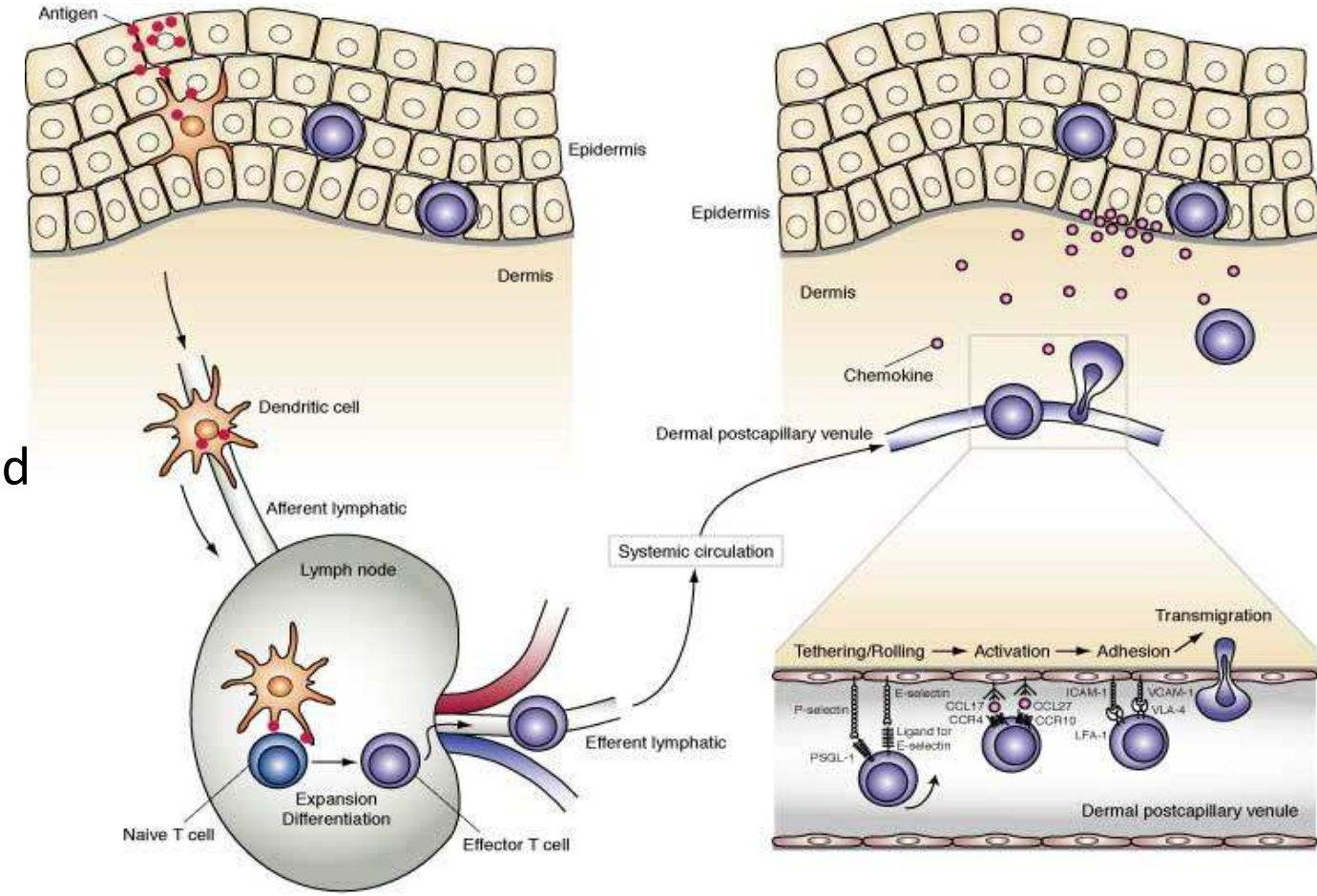
They act as messengers between the innate and adaptive immunity.

DC and T cells migration to and from the skin

1-Germs (antigens) that enter the skin are loaded on DCs, which migrate to draining lymph nodes

2- In the lymph nodes, naive T cells are activated by the germ- loaded DCs and start to multiply

3-These germ- responsive T cells migrate into the injured site



Yamamichi N, Oka M, Inada K, Konno-Shimizu M, Kageyama-Yahara N, Tamai H, Kato J, Fujishiro M, Kodashima S, Niimi K, Ono S, Tsutsumi Y, Ichinose M, Koike K. Biochem Biophys Res Commun. 2012 Jul 20;424(1):124-9.

Department of Gastroenterology, Graduate School of Medicine, The University of Tokyo, 7-3-1 Hongo, Tokyo 113-8655, Japan.

Rebamipide has potential tumor-suppressive effects on gastric tumorigenesis via the recruitment of dendritic cells.

Rebamipide, an amino acid derivative of 2-(1*H*)-quinolinone, is used for mucosal protection, healing of gastroduodenal ulcers.

MRN-100
as a DC Activator
via

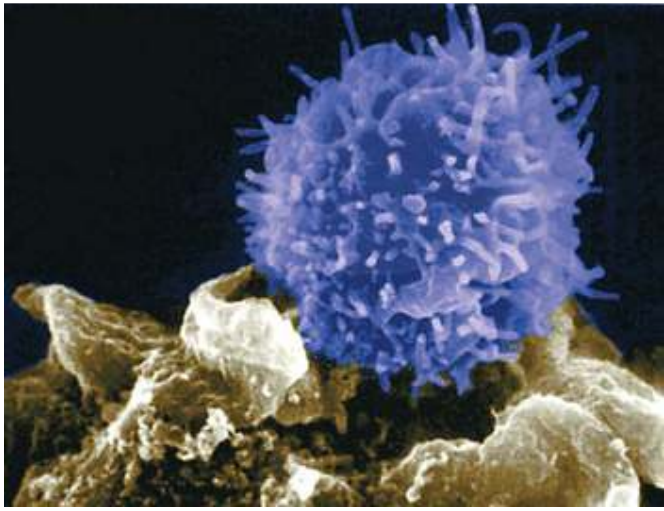
1: Increased Expression of Co-Stimulatory Molecules

2: Increased Cytokine Production

MRN-100
as a DC Activator

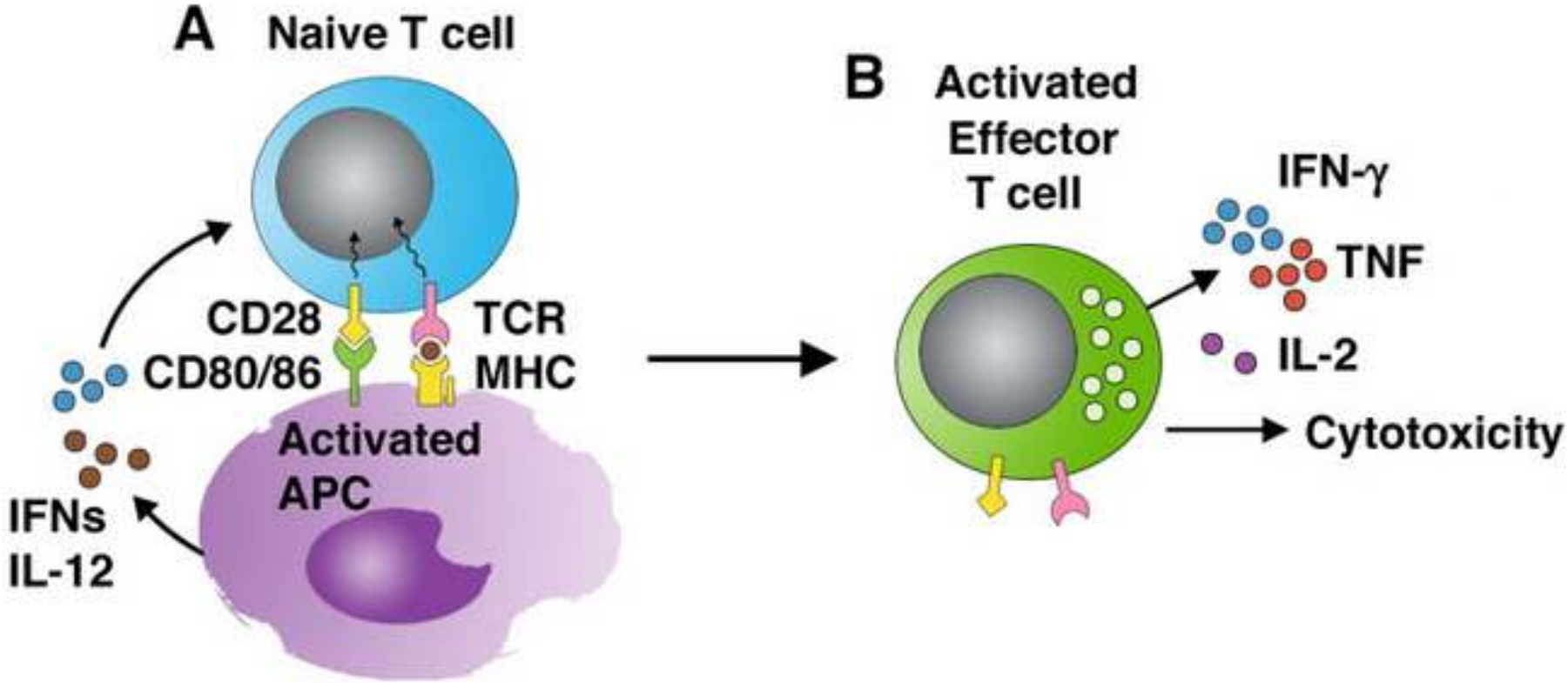
1: Through Increased Expression of Co-Stimulatory Molecules

T Cells



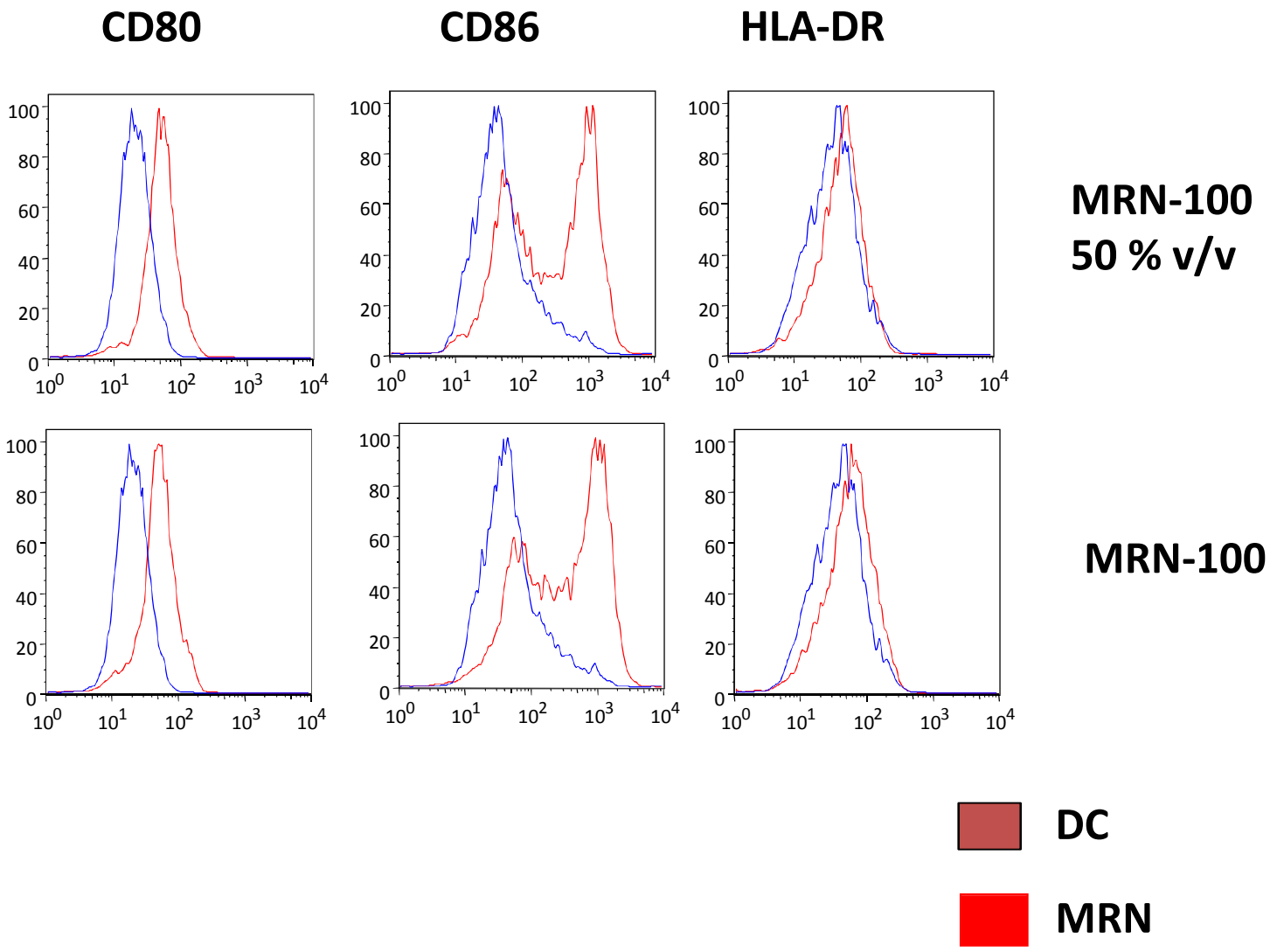
- T cells are white blood cells
  - Involved in cell-mediated immunity
- T cells act as soldiers, seeking out and killing invaders

CD86 Expression

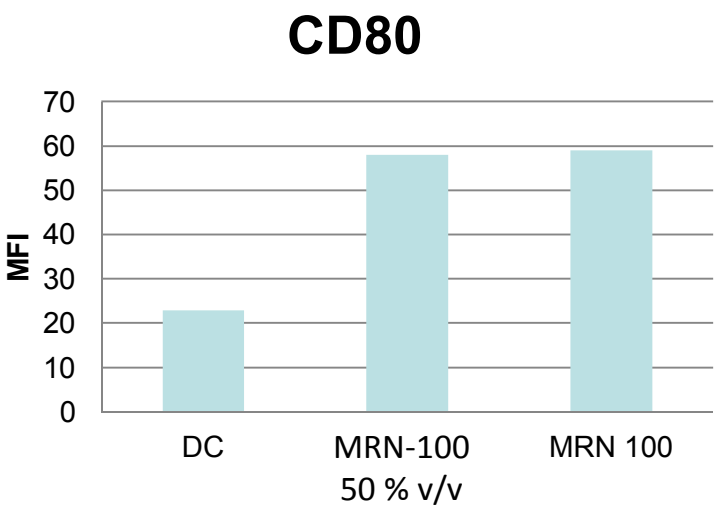


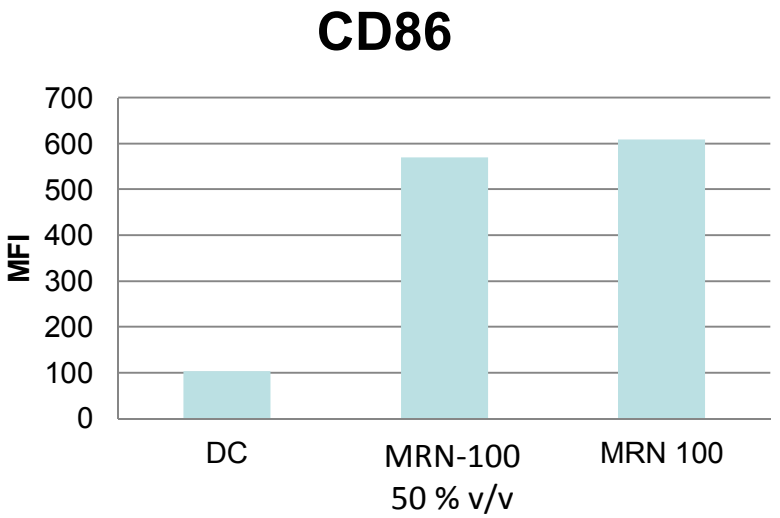
Freeman et al. GEM 203,2223-27 (2006)

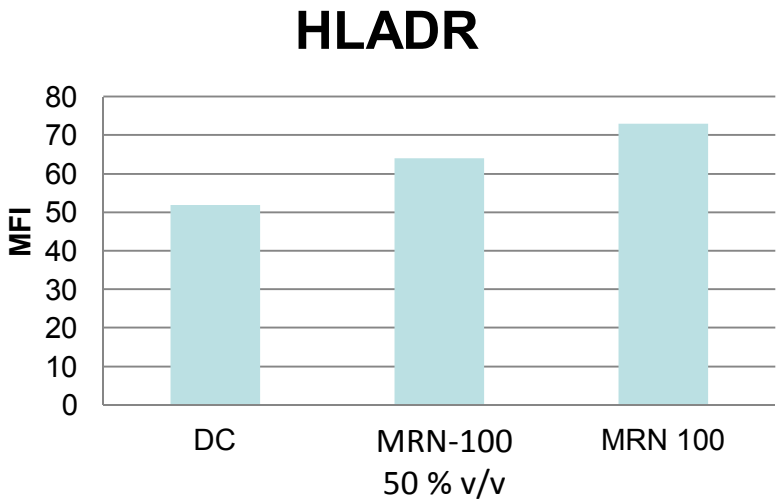
Different Concentrations of MRN-100 Activate Dendritic Cells



MRN activated Dendritic cells upregulate Co-stimulatory markers and HLADR







MRN-100
as a DC Activator

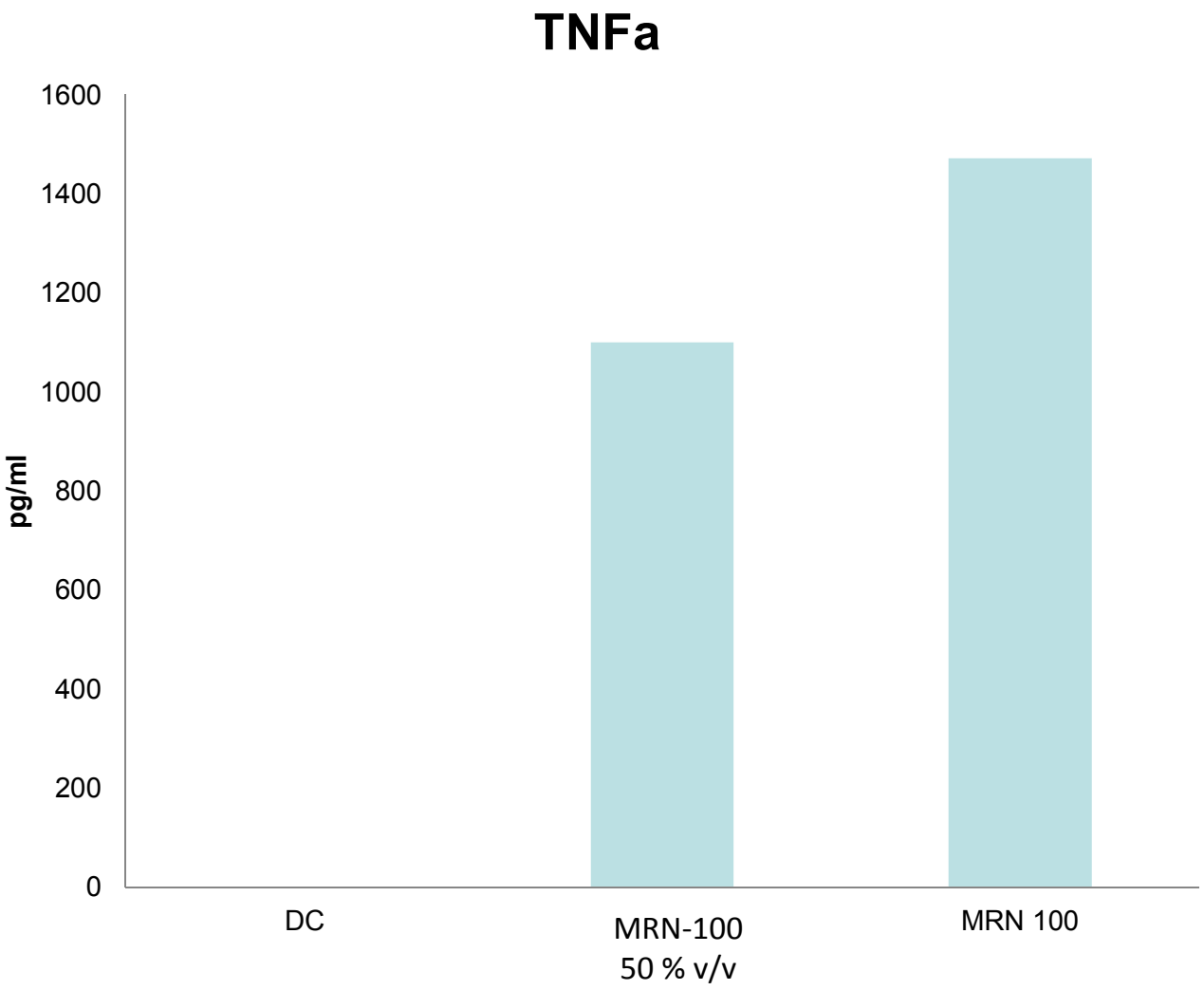
2: Through Secretion of Cytokines

Cytokines: Small proteins which:

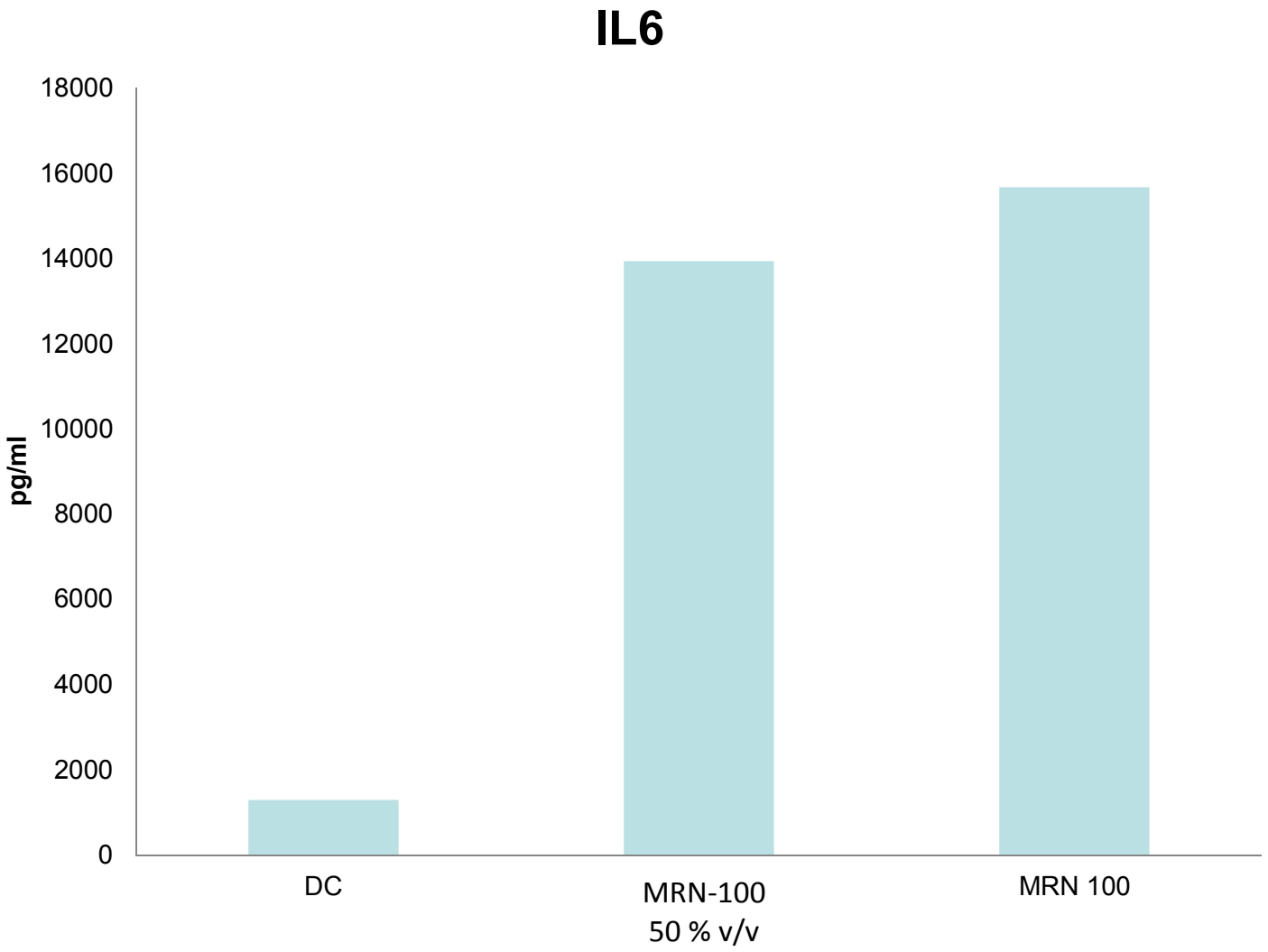
1. Regulate immunity and inflammation

2. Are produced in response to an immune stimulus.

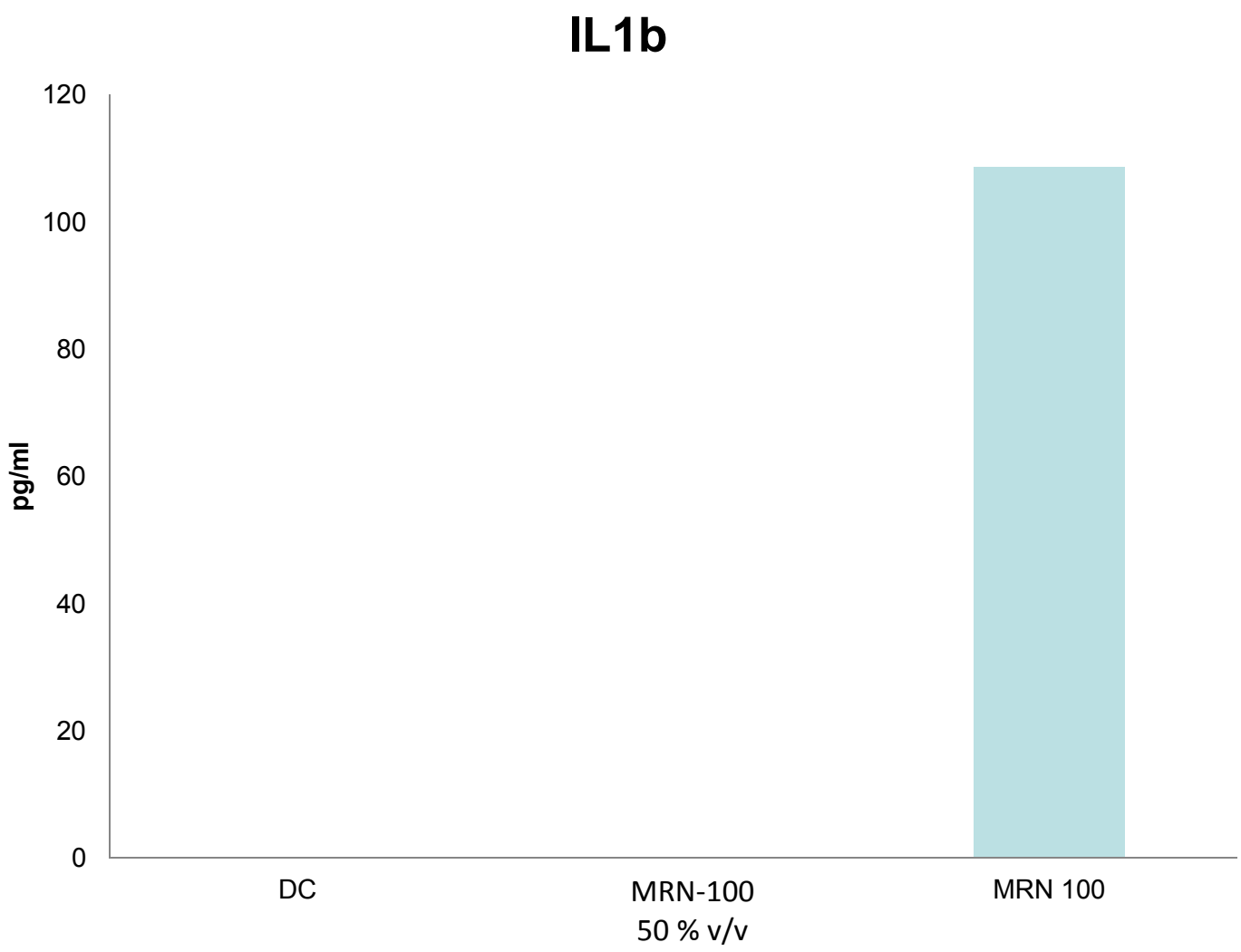
MRN-100 activates DCs secrete Cytokines

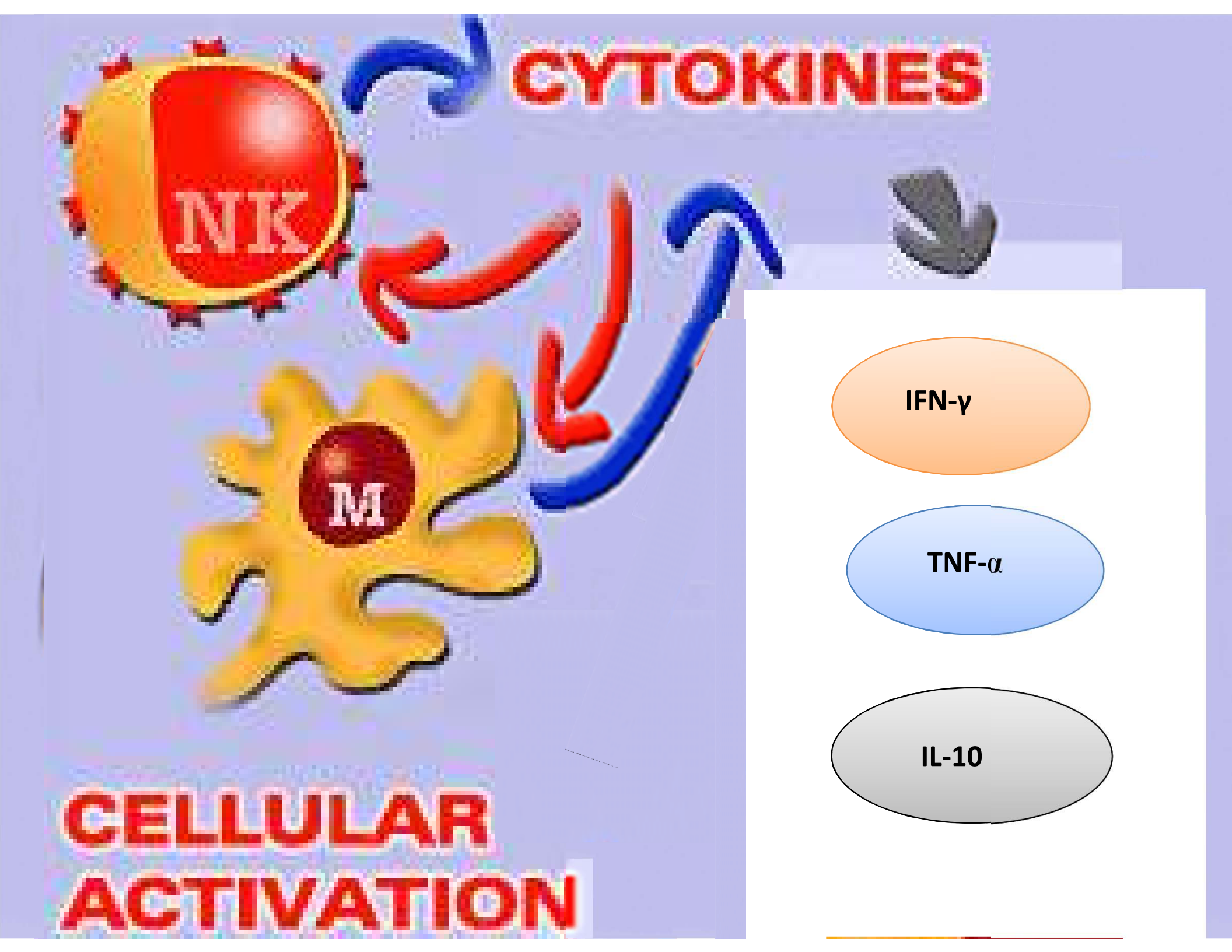


MRN-100 activates DCs secrete Cytokines

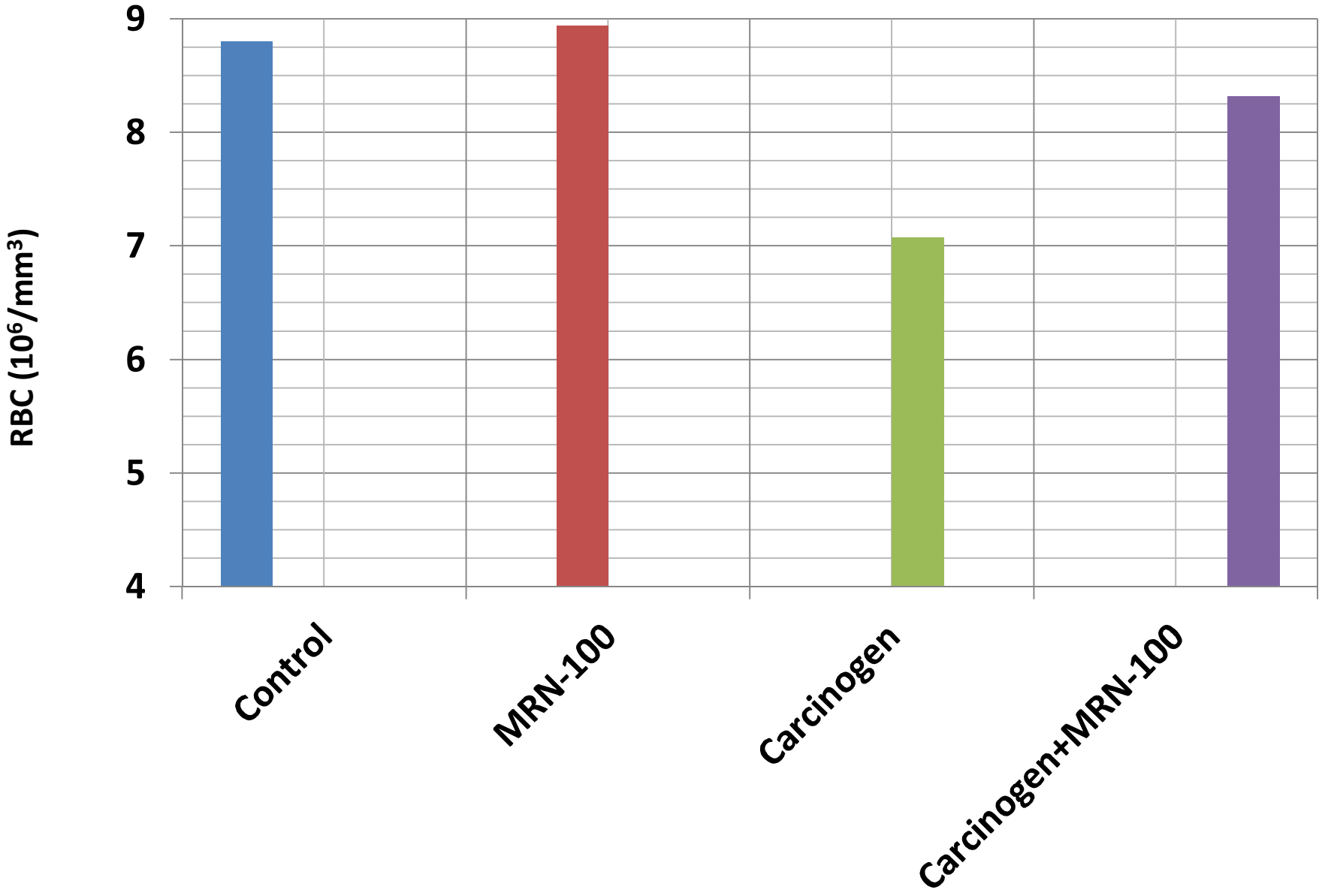


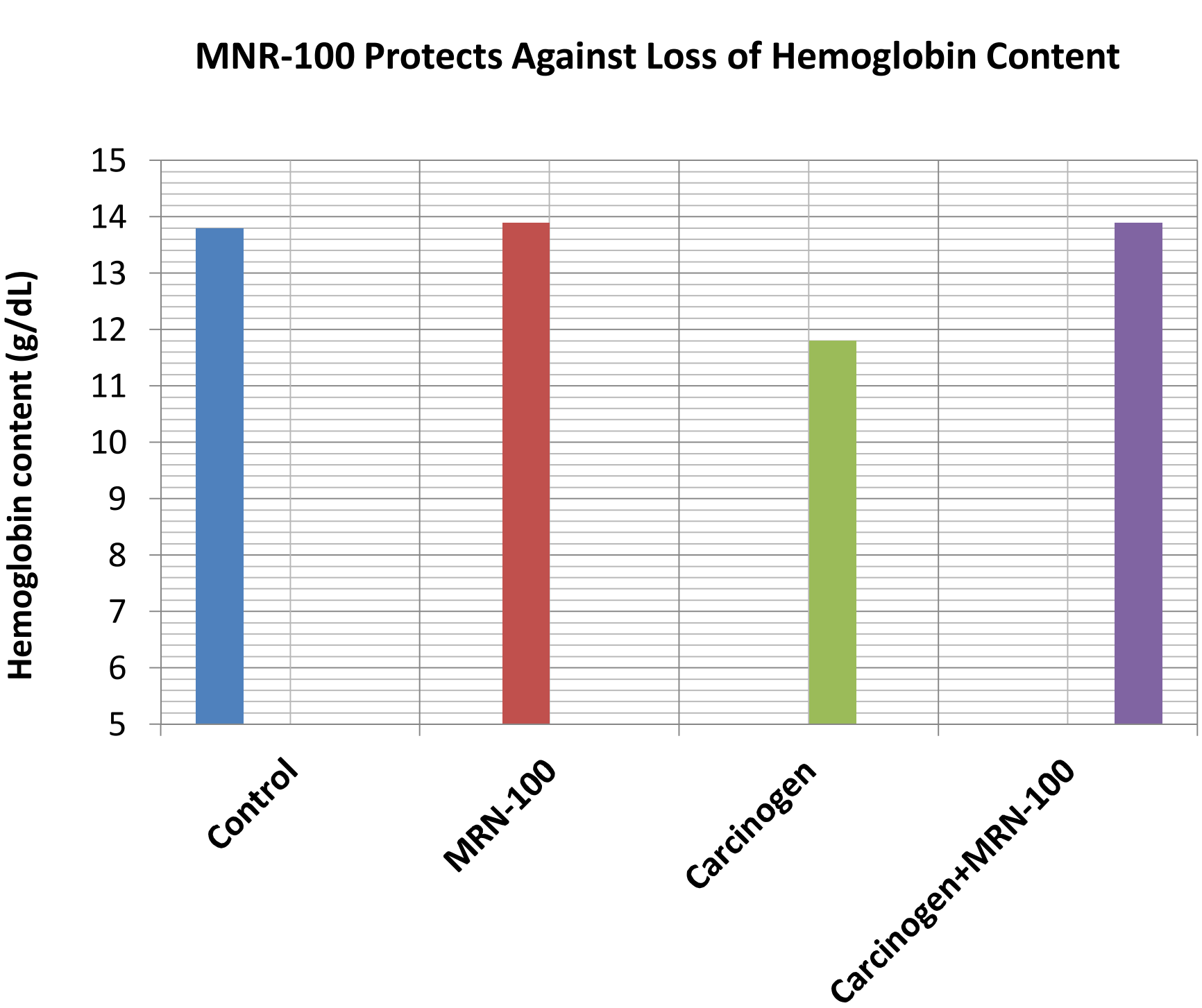
MRN-100 activates DCs secrete Cytokines



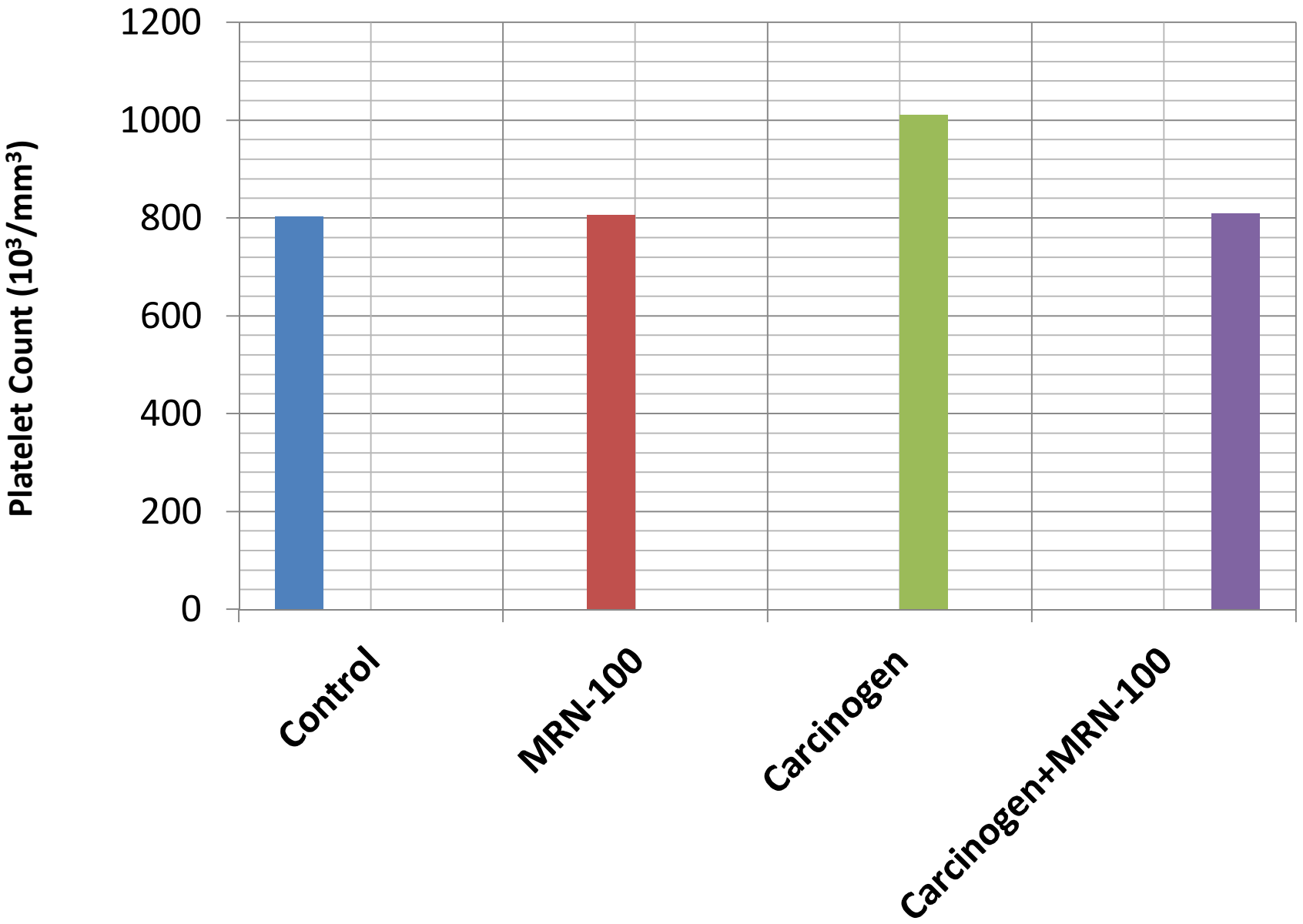

CYTOKINES
NK
M
IFN-γ
TNF-α
IL-10
CELLULAR
ACTIVATION

MNR-100 Protects Against Loss of Red Blood Cells




MNR-100 Protects Against Loss of Hemoglobin Content
Hemoglobin content (g/dL)
15
14
13
12
11
10
9
8
7
6
5
Control
MRN-100
Carcinogen
Carcinogen+MRN-100

MNR-100 Protects Against Loss of Blood Platelets



Conclusions

- Our study suggests MRN-100 may be an effective adjuvant for the treatment of gastric and esophageal cancer.

- The mechanism by which MRN-100 exerts its effect may involve its ability to protect against:
  a. Oxidative stress by carcinogen
  b. Damage of immune system by carcinogen

Publications and Presentations related to MRN-100

- Ghoneum M and Kijima Y. Induction of human natural killer (NK) cell activity by p-water (MRN-100). Ann. Conf. on Clinical Immun. New Orleans, LA May 31-June 3 (1996).
- Ghoneum M, Choong K and Namatalla G. p-water (MRN-100) possesses anti-HIV activity in vitro. Palm Springs symposium on HIV/AIDS foundation of HIV therapy. Palm Springs, CA., Mar. 13-16 (1997).
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- Ghoneum M. NK immunorestoration in cancer patients by MRN-100, an iron based compound derived from bivalent and tervalent ferrate. 4th Int. Symp. on predictive oncology and therapy. Nice, France. Oct. 24-27, 1998.
- Ghoneum M. MRN-100 depletes glutathione level and increases human head and neck carcinoma Calu-27 sensitivity to natural killer cell cytotoxicity. 4th Int. Symp. on predictive oncology and therapy. Nice, France. Oct. 24-27, 1998.
- Tachiki K, Uyemura K, Ghoneum M, Makinodan T. and Yamaguchi, D. Inhibition of tumor cell growth and modulation of cytokine production by the iron based compound MRN-100. American Association for Cancer Research (AACR) Proceedings Cytokines and Cancer: Regulation, Angiogenesis, and Clinical Applications. Vail, Colorado. September 20-24, 2000.
- Badr El-Din NK, Noaman E, Ghoneum M, and Abdel Fattah SM. An Iron-Based Beverage, Hydro-Ferrate Fluid (MRN-100), Protects Against Oxidative Stress in Aging Rats. Abstract In: Annals of Nutrition & Metabolism 55(1)2009. Presented at 19th International Congress of Nutrition. Bangkok, Thailand. October 4-9, 2009.
- Ghoneum M. Elbaghdady H, El-Shebly A and Pan D. Protective effect of HydroFerrate Fluid, MRN-100, on survival and hematopoietic cell recovery in γ-radiated Fish, *Tilapia Nilotica.* Health Physics Society (HPS) 57th Annual Meeting (American Conference of Radiological Safety). 22-26 July, 2012 in Sacramento, CA.
- Ghoneum M, Matsuura M and Gollapudi S. An iron-based beverage, hydro ferrate fluid, MRN-100, alleviates oxidative stress in murine lymphocytes *in vitro*. Nutrition J. 8(1); 18 (2009).
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- Ghoneum M and Badr El-Din N, Mitochondria and Modulating Oxidative Stress: A Role for HydroFerrate Fluid (MRN-100) in Reversing Age-associated Oxidative Stress and Apoptosis. (Review article in Japanese) Medical Science Digest (MSD) Vol. 38, 2 (2012).

MRN-100□□□□□□□□□□□□□□

- Ghoneum M and Kijima Y. Induction of human natural killer (NK) cell activity by p-water (MRN-100). Ann. Conf. on Clinical Immun. New Orleans, LA May 31-June 3 (1996).
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Acknowledgements

- Sastry Gollapudi, Ph.D. UCI, USA
- Nariman Bader El-Din, Ph.D. El Mansoura University, Egypt
- Lucilene Tolentino, MD. CDU, USA
- Lina Wang, MD. USC, USA
- Motohiro Matsuura, Ph.D. Jichi Medical University, Japan


DANGER

Linus Pauling, 2 time Nobel Prize Winner, Vitamin C advocate

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SULLIVAN COUNTY

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House of Representatives
State of Tennessee

NASHVILLE

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SUBCOMMITTEES
DOMESTIC RELATIONS
PUBLIC TRANSPORTATION AND HIGHWAYS

April 22, 2004

Dr. Mamdooh Ghoneum Ph.D
3240 Kelton Ave,
Los Angeles, CA 90034

Dear Dr. Ghoneum:

On behalf of the State of Tennessee, we would like to extend our appreciation for your participation in the Alternative Medicine Seminar.

The information you provided was very beneficial to many Tennesseans with these diseases affecting the immune system.

The research you are conducting in the area of cancer research and immune system disease is valuable to so many people, and we thank you.

The State of Tennessee owes you our gratitude in assisting our citizens with alternative therapies in dealing with the treatment of many severe diseases.

Again, we thank you and look forward to having you back in our state again.

Respectfully yours,

Nathan Vaughn

Nathan Vaughn
2nd District State Representative

Japanese Society of Complimentary and Alternative Medicine.

Japanese Immunology Society

感謝状

Manduok Choneum, Ph. D. 殿

あなたは私共東洋医学免疫研究会の研究に際し終始一貫献身をもって事にあたり多大な成果をあげ当会の業績に寄与してくださいました。本日ここに当会を代表し深く感謝の意を表します。

平成七年十一月二十日

東洋医学免疫研究会
会長 佐藤正

原宿免疫センター
理事長 瀬戸良一


THE FILIPINO-CHINESE MEDICAL SOCIETY, INC.
3RD SCIENTIFIC MEETING AND
2ND ONCOLOGY SYMPOSIUM
"ROLE OF IMMUNOTHERAPY IN CANCER"
SPONSORED BY:
TAN YAN KEE FOUNDATION
JULY 18, 2005

The
FILIPINO-CHINESE MEDICAL SOCIETY, INC.
presents this

PLAQUE OF APPRECIATION

to

MAMDOOH GHONEUM, Ph. D.

In grateful recognition of his invaluable contribution
as GUEST SPEAKER of the
3RD Scientific Meeting and 2ND Oncology Symposium of the
Filipino-Chinese Medical Society, Inc., discussing the topic
"ROLE OF IMMUNOTHERAPHY IN CANCER".

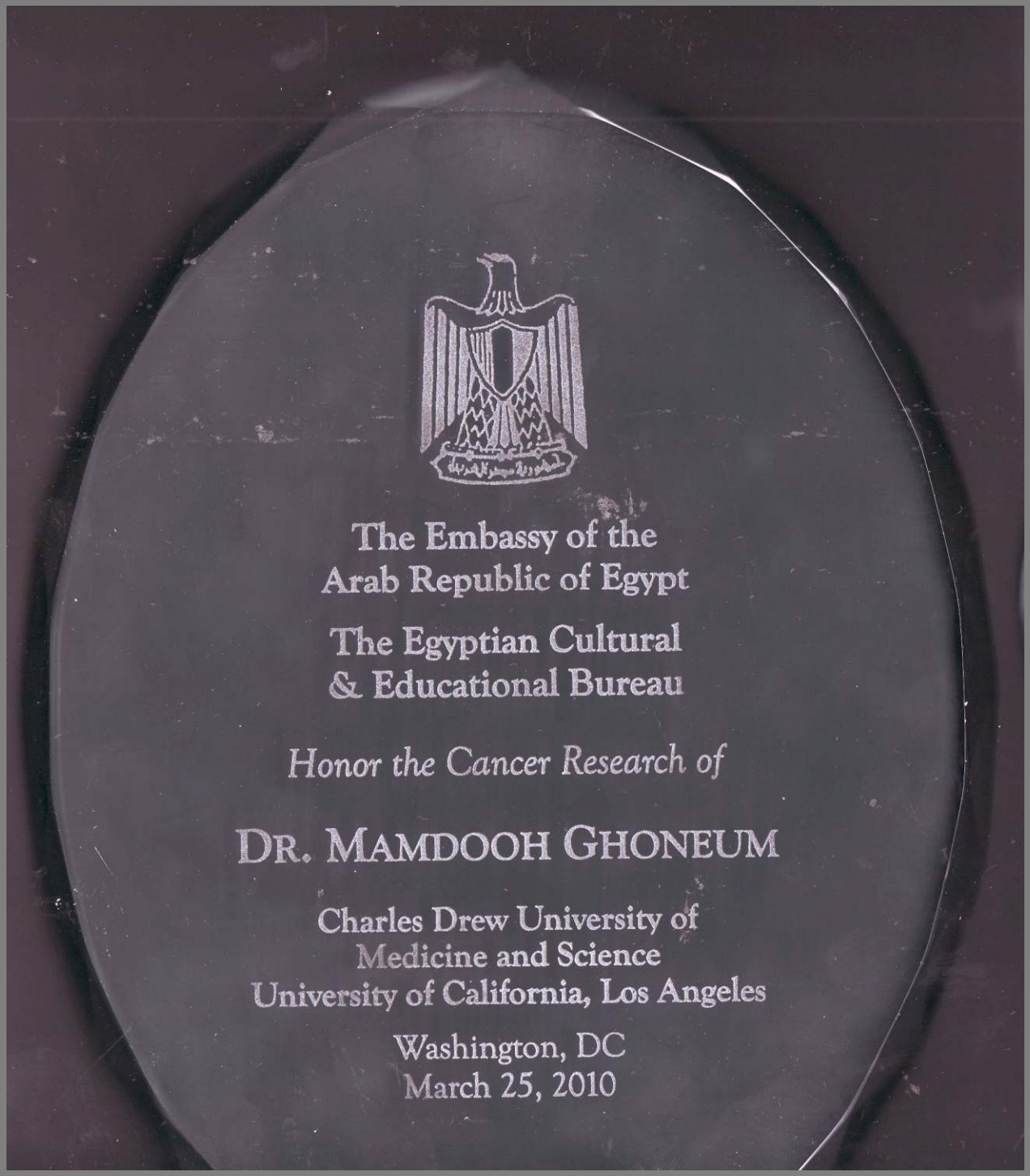
Given at Century Park Hotel this 18th day of July,
year two thousand and five.

CARMENCITA LO, M.D.
President

NELSON LIM, M.D.
Secretary

SUSAN LEE, M.D.
Chairman
Scientific Committee

TERESITA DY UY, M.D.
Chairman
Committee on Honors & Awards


The Embassy of the
Arab Republic of Egypt
The Egyptian Cultural
& Educational Bureau
Honor the Cancer Research of
DR. MAMDOOH GHONEUM
Charles Drew University of
Medicine and Science
University of California, Los Angeles
Washington, DC
March 25, 2010


Wadi Halfa
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القوات المسلحة المصرية