

Approved: March 6, 2000  
Date

## MINUTES OF THE HOUSE COMMITTEE ON HEALTH AND HUMAN SERVICES.

The meeting was called to order by Chairperson Garry Boston at 1:30 p.m. on March 2, 2000 in Room 423-S of the Capitol.

All members were present except: Representative Brenda Landwehr, Excused

Committee staff present: June Evans, Secretary

Conferees appearing before the committee: Mary Beth Gentry, Assistant Dean for External Affairs, KU Medical Center  
Jasjit S. Ahluwalia, M.D., M.P.H., M.S.  
Amy O'Brien-Ladner, M.D.

The Chairperson called the meeting to order and stated the minutes of February 21, 22, and 23 would be approved at the end of the meeting. A presentation on Mini Medical School was presented.

The Chairperson introduced Robert Hemenway, Chancellor, Kansas University, who stated he was a cheerleader for the School of Medicine and the Mini Medical School and introduced Mary Beth Gentry, Dr. Ahluwalia and Dr. Amy O'Brien-Ladner.

Mary Beth Gentry stated the first mini medical school for the public was held this fall in Kansas City. This was a 8 week session course taught by some of the center's top faculty that gave working knowledge of the human body and its ailments without ever having to make an incision or give an injection. The fee was \$75.00. The space was limited to 250 participants and it filled up fast after an article was run in the newspaper. The mini medical school for 2000 will be held in a larger facility that holds 500. It is hoped this program can be expanded throughout Kansas (See Attachment #1).

Jasjit S. Ahluwalia, M.D., M.P.H., M.S., gave a presentation on Tobacco Use: A 21<sup>st</sup> Century Pandemic. Despite a long history of tobacco use in the world, the first half of the 20<sup>th</sup> century will be notable for a tremendous increase in the consumption of tobacco along with tragic increase in the number of people suffering from diseases associated with tobacco. As early as 1954 published reports of health effects of smoking began. Nicotine is a powerful and toxic drug. Lung cancer was considered an extremely rare condition in the beginning of the 20<sup>th</sup> century and was not listed as a cause of death in the vital statistics until 1930. More than 400,000 people die from tobacco related diseases each year and 25% of those deaths are from heart disease. Smoking has many effects on the cardiovascular system. Nicotine causes increased blood pressure and heart rate, resulting in the need for increased oxygen for the heart muscles.

Cessation of smoking decreases the risk of many diseases. Carbon monoxide levels begin to drop almost immediately and within a few weeks cough and sputum production begin to subside. Risk for heart disease decreases sharply in the first year of cessation and after 10 years is the same for non-smokers. The risk of cancers gradually decreases and deterioration due to long disease slows. Smoking remains the number one cause of death in this country (See Attachment #2).

Amy O'Brien-Ladner, M.D., Associate Professor of Medicine, Department of Medicine, Division of Pulmonary/Critical Care, University of Kansas School of Medicine, gave a presentation on Iron Lung: Consequences of Polluted Air. Iron is one of the transition metals located in the periodic table. It is the most abundant transition metal in the body. It is absolutely required for all human cell function but is potentially lethal in excess.

Iron accumulates in lungs with the normal aging process. Cigarette smoking increases the accumulation

CONTINUATION SHEET

MINUTES OF THE HOUSE COMMITTEE ON HEALTH AND HUMAN SERVICES, Room 423-S of the Capitol at 1:30 p.m. on March 2, 2000.

of iron in the lung by a variety of mechanisms, including the delivery of iron particles and ROS in the smoke that is inhaled. Emphysema is the destruction of lung air spaces that are involved in oxygen exchange in emphysema. Studies demonstrate that societies with populations with increase body iron stores are associated with an increased risk of cancer and an increased overall death rate (See Attachment #3)

Representative Geringer moved and Representative Lightner seconded approval of the minutes of February 21, 22 and 23. The motion carried.

The meeting adjourned at 2:25 p.m. and the next meeting will be March 6.

The KU School of Medicine's  
1999 Mini Medical School

On Sept. 14, 1999, the University of Kansas School of Medicine presented its first Mini Medical School to community members seeking a stronger understanding of diseases, diagnoses, preventive measures, and advances in medical research.

Each Tuesday evening for eight weeks, 250 individuals packed the Wahl East auditorium to hear presentations by School of Medicine faculty, either basic scientists or physician scientists. Topics by a total of 16 speakers ranged from tobacco use to the reproductive system and from skin cancer to the development of a vaccine against HIV and AIDS.

Interest in the program was overwhelming with enrollment filling the class by noon on the day the Kansas City Star announced the upcoming program. As a result, 150 people were placed on a waiting list.

Individuals of all professions and ages were attracted to the Mini Medical School. High school and college students, pharmaceutical representatives, bankers, attorneys and homemakers enrolled. The youngest student was 9 years of age and the oldest was 85 years young.

The goal of the program was to help the students, upon completion of the course, to know the basic concepts needed to understand news reports about medical research, know how to improve their health and have an understanding of the ongoing role research plays in medical practice.

Today, more than 45 medical schools nationwide and the National Institutes of Health offer similar education programs. The program has been endorsed by the Association of American Medical Colleges as an important tool in helping the public understand academic medicine's role in the health of the nation.

KU's next Mini Medical School will begin September 5, 2000 in the larger Battenfeld Auditorium and enrollment is expected to increase by at least 100.

Future plans are in the works for an advanced "Post Doctorate" course in spring 2001 for students who have completed the Mini Medical School and desire a more intensive, hands-on experience. In addition, efforts are underway to develop a model of this program that can be delivered to interested individuals throughout Kansas, especially those in rural communities where access to health information is often less available.

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## **KU School of Medicine Mini Medical School- 1999 Program Overview**

We believe a profound crisis is facing our nation's biomedical research community. The public is experiencing a declining confidence in, and understanding of, science. One of the reasons behind this decline in public confidence and understanding is that the members of the scientific community have not been effective at communicating the significance, complexity, excitement and hope embodied in biomedical research. Yet, ironically, the public expresses a genuine interest in science and the medical field in general. That is why we have developed the KU School of Medicine Mini Medical School.

The philosophy behind a Mini Medical School is to encourage this interested, yet relatively uninformed, public and the skeptical, perhaps out-of-touch, scientists to meet together in an intimate setting to help break down the barriers. The public will be able to participate in an engaging, informative, and fun program that not only gives them specific information on medical topics, but also gives them a chance to learn about what scientists do from the scientists themselves. The scientists learn ways of reaching out to the public and learn the importance and value of doing so.

We have established the following goals for our Mini Medical School:

1. Educate the community about clinical and basic biomedical sciences and the latest advances in research and healthcare delivery.
2. Create a partnership among individuals for their personal health and the health of their community
3. Build a positive public awareness for academic medicine's role in the nation's health.

The KU School of Medicine will host an eight-week Mini Medical School, with the last week being a graduation ceremony for the students. Tuition of \$75.00 will be assessed, with limited scholarships available.

## Comments from Mini Medical School Students

### Tobacco Use: A 21<sup>st</sup> Century Pandemic- Jasjit S. Ahluwalia, M.D., M.P.H., M.S.

\*Factually interesting, logically compelling conclusions, stimulating & enthusiastic presentation.

\*Excellent presentation! My mother died of lung cancer 5 yrs ago from smoking 1-3 packs/day for 40 yrs plus. Now I know all the reasons why.

### Iron Lung: Consequences of Polluted Air- Amy O'Brien-Ladner, M.D.

\*An excellent speaker about a very esoteric and really, really, boring topic.

### The Male Reproductive Function: What Makes a Man- George Enders, Ph.D.

\*Dr. Enders presented very interesting information. He needs the entire 2 hours to present it because there was so much to learn.

### Infertility: It's Not Just Sperm and Eggs- Valerie Montgomery Rice, M.D.

\*Dr. Rice was excellent. She brought the info down to an understandable level. Her info was presented well, visually as well as verbally.

### Complementary Medicine: Simple Things To Do In Complicated Times- Jeanne Drisko, M.D.

\*This was excellent! One of the major reasons I took this course is because I wanted to hear Dr. Drisko's lecture. An expanded benefit is that she touched on fibro myalgia and menopause, both of which I suffer greatly with.

### Cancer: What Is It and How Can We Cure It Or Prevent It?- William Jewell, M.D.

\*Last year I lost my father to lung cancer. Dr. Jewell eased my grief with his detailed explanation of the process and additional information.

\*Awesome! Thanks for making some quite complicated subject matter very clear!

### Sedatives and Hypnotics: Benefits and Dangers- Salvatore J. Enna, Ph.D.

\*Dr. Enna's lecture provided useful insights about pharmacological attempts to search for better drugs- more specifically targeted to the task at hand. An implication of his lecture is the continued need for research re: specifically targeted drugs, while reducing or eliminating unwanted side effects.

### What Are Diseases and Why Do We Get Them?- Christopher Crenner, M.D., Ph.D.

\*Really helpful to have a better and clearer sense between illness and disease- very clear explanation. Very practical info. One of the best sessions yet!

\*I am on 15 prescriptions a day. This lecture got my attention. I would like more in depth information on the interactions of my drugs. I plan to write him. Also, I have major disease found X-ray, blood work etc.

### Progress on Development of a Vaccine Against HIV and AIDS- Opendra Narayan, D.V.M., Ph.D.

\*He has a real knack for making something complicated understandable. Excellent presentation.

\*Particularly germane to his lecture was his active research involvement in testing live HIV virus vaccines in monkeys and the possibility of convincing FDA to allow using such vaccines in human experimentation.

\*Dr. Narayan obviously knew what he was speaking about. He did a great job and he presented his knowledge in a way where those who didn't know, understood it. Great Job!

### X-Ray Vision: Looking Inside Your Body- Louis H. Wetzel, M.D.

\*Wow! I want Dr. Wetzel to read and diagnose all of my x-rays! Super presentation!

\*Really enjoyed Dr. Wetzel's presentation. Understandable why he's received the teaching awards- what a gift he has!

\*Superb lecture on x-rays, etc. I understood much better a CT scan I had several years ago after hearing this lecture. Also appreciated the emphasis on using expert radiologists.

**The Kidney: The Body's Filter in Good Times and Bad- Billy G. Hudson, Ph.D.**

\*I have lost over 11 family members (maternal side) of my family to kidney deaths. The last one was my nephew, he was 21 y.o. My only grandson has kidney problems and is 11 y.o. I am blessed to have been privileged to hear Dr. Hudson's lecture. Their deaths make more sense to me now. Linda, the female speaker, increased my faith in a miracle for my grandson.

\*Loved the visuals- I have a B.S. degree in anatomy and never heard an explanation of the kidney filtration system that came close to the wonderful presentation of Dr. Hudson.

\*Dr. Hudson is a good teacher- he shows his students what he's talking about. He conveyed a great deal of info without slides or lecturing. A very understandable talk on a very technical subject (the handout scared me to death!). Thanks, too, to the patients who shared their stories. May God bless them.

\*Dr. Hudson's "toys" made the illustration of molecules, filters, and antibodies so clear. Thanks for bringing in patients. They really helped me understand the importance of supporting medical research.

**Sunlight: The #1 Environmental Carcinogen- J. Michael Casparian, M.D.**

\*Dr. Casparian has encouraged me to have a new respect for my skin. I also have two bi-racial grandchildren (one Jewish/Black and the other Caucasian/Black), and I will advise their parents to take this information into consideration, by consulting their doctors.

\*Gruesome slides are needed to hammer home a point. We've had 3 people quit smoking in the Mini Medical School. I bet we have a greater number of "fake" smokers cease this habit. Good talk.

**Age and Our Memory: When Is It Normal To Forget?- Charles DeCarli, M.D.**

\*Wow. Fascinating material. The topic was new to me (always good) and Dr. DeCarli managed to provide analogies and descriptions so that I could grasp them.

\*Alzheimer's disease is fascinating to me as I recently had an uncle diagnosed with it and now my father worries that he "is getting" it.

**Heartburn: Frequently Not an Innocent Problem- Norton Greenberger, M.D.**

\*This was a fabulous learning experience. When I visit my family doctor, I'll make sure to tell him about my night coughing and frequent loss of voice. Now! I am concerned! It is starting to get worse. I can't eat after 7pm.

**Why Your Headaches Make Your Head Ache- Kenneth Michael Welch, M.D.**

\*Very interesting presentation. Helped to generate a greater respect and concern for those who suffer from migraine headaches. Thanks.

\*Thank you, thank you, thank you for explaining my "ophthalmic" migraines. Tis a comfort to know the physiology and mechanism of them. Brilliant lecture- pardon the pun!

\*I appreciate the practical information as to how to prevent the onset of migraine headaches. For me:....a headache develops which stretches into nausea..., 60 minutes later I vomit, and there is immediate relief and headache is gone totally. What is the mechanism at work here?

**General Mini Medical School Comments**

\*This Mini Medical School was simply fantastic! Would love to come every evening for talks like these. Hopefully you can offer more lectures like these in the future!!!

\*This was a great experience and I do hope that some continuation program will be available to those of us who would like to do some more learning.

\*It was a fabulous experience- all eight weeks! What about graduate school?

\*Because of this course, I might take some courses and possibly pursue a career in medicine (have any job openings?)- it really was fulfilling intellectually for me but also gave me a GIANT appreciation for what doctors do!! I have never been over to KU for medical reasons but you must have the happiest doctors. In town!

# Med school classes sans needle, scalpel

## KU center offers sessions for public starting Sept. 14

By ALAN BAVLEY  
The Kansas City Star

Have you thought about going to medical school, but you can't stand the sight of blood?

The University of Kansas Medical Center has a deal for you: an eight-session course taught by some of the center's top faculty that will give you a working knowledge of the human body and its ailments without ever having to make an incision or give an injection:

It's called Mini Medical School, and it is a form of education that a growing number of medical schools are offering successfully.

Wherever they're offered, mini medical schools attract sellout crowds of people eager for a quick immersion into the scientific discoveries affecting their health care.

"People are hungry for this information," said Mary Beth Gentry, assistant dean of the KU School of Medicine. "A lot of people don't understand what academic medicine is all about. This way, we can put a human face on it."

"Another reason for the school is to encourage support for the medical center's research," said Jasjit Ahluwalia, a faculty member and organizer of the Mini Medical School.

"We have to have the public behind us (to foster research) because it's the public's money," Ahluwalia said.

KU's Mini Medical School will be held Tuesday nights at 7, beginning Sept. 14. Tuition is \$75. It will be held in the Wahl East Auditorium on the medical center campus.

Each lecture will be followed by an extended question-and-answer period.

"This is going to be the essence of medical school," Gentry said. "It is going to combine the science and the treatment of disease. It won't be dumbed down."

The first mini medical school was held in 1989 at the University of Colorado as a gesture of community outreach.

John Cohen, a professor of immunology who organized it, said he expected the mini medical school to have the same kind of limited popularity a bird-watching course might attract. Perhaps 20 persons would sign up, he thought.

After a newspaper ran an article about it, 1,200 people called to en-

roll.

"We were swamped. We had to find a big hall," Cohen said. Colorado has continued to hold its mini medical school every year since.

"It's remained one of the hotter tickets in town. We've never been able to get rid of our waiting list," Cohen said.

After Colorado's success, more than 70 medical schools, health departments and other institutions have held mini medical schools. About 55 schools offer them.

"I'm not going to rest until every medical school is doing one," said Bruce Fuchs, director of the National Institutes of Health's Office of Science Education and an advocate for the mini medical school movement.

Fuchs started mini medical schools at the Medical College of Virginia and more recently at the National Institutes of Health. He is writing a how-to manual for medical schools that want to start one.

"The idea we want to get across to people attending mini medical schools is that you're going to learn serious information and you're going to have more fun than you imagine," Fuchs said.

"We try to send people away with a sense of what's possible, what they can learn if they put their mind to it."

Fuchs said the people who enroll in mini medical schools ranged from truck drivers to clergy to homemakers to college professors. Some are students considering a medical career.

More often they are people trying to learn how to make good medical decisions for themselves and their families.

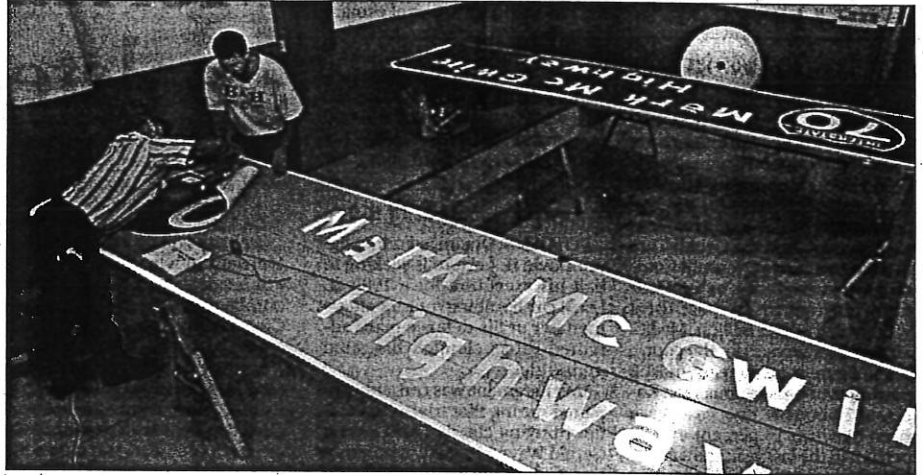
"People are feeling pressure to become more knowledgeable about health care," Fuchs said. "They're being asked by their doctors to be more of a participant in their health care, rather than receiving it passively."

That intense interest shows up frequently during one of the most popular parts of mini medical schools, the question-and-answer sessions that follow the lectures.

"It's amazing," Cohen said. "That often goes on until the janitor turns out the lights."

To enroll in Mini Medical School, call KU Medical Center at (913) 588-1227. A limited number of scholarships are available through the medical center.

To reach Alan Bavley, medical writer, call (816) 234-4858 or send e-mail to [abavley@kcstar.com](mailto:abavley@kcstar.com)



KELLEY McCALL/The Associated Press

Missouri Department of Transportation employees Tony Nichols (left) and Darren Kempker assembled a Mark McGwire highway sign Monday in Jefferson City. The signs will mark a stretch of Interstate 70 in the St. Louis area named for McGwire in commemoration of his home run record.

# CMSU's new president outlines philosophy, plans

By LYNN FRANEY  
The Kansas City Star

WARRENSBURG — In his first speech at Central Missouri State University, new President Bobby Patton got professors and administrators to roar with laughter — about the stuffiness of the over-processed world of academia.

Patton said a friend who heard he was heading to a university with a mule as its mascot told him that mule skinner's belief: "If the mule you're riding on dies, get off."

Well, people in academia probably would resist such simple advice, Patton surmised.

Instead, they might "buy a bigger whip." "Say things like, 'That's the way we've always ridden that mule.'" Or, "Arrange to visit other sites where they ride dead mules more efficiently."

Patton's audience of about a thousand people laughed loud and long and applauded most of his "Top Ten" academic dead-mule response list.

However, amid the fun, Patton also outlined some serious recommendations for helping maintain the 10,000-student university's strengths and adding new ones.

He said he believes in sharing leadership, authority and responsibility, and that a university should be an amalgam of all the people who work and study there, rather than a hierarchical place run in a pyramid.

"I want to stress the importance of each person in this au-

dience....You all do your jobs better than I could do them, because that is your expertise," he said.

Patton, who succeeds Ed Elliott, previously was vice president for academic affairs at Wichita State University, a dean at California State University at Los Angeles, and the head of the communication and theater department at the University of Kansas.

Patton said he plans to form nine task forces to analyze how the university is doing now and ways it can improve future performance in teaching, research and service.

The groups will meet this fall.

and give him their suggestions on matters such as campus communication, diversity, scholarships, and faculty and staff development by the end of the semester.

Elliott, CMSU president for 14 years, resigned in July, a year after he had signed a new three-year contract that would have ended in 2001. Elliott will get a year's paid leave of absence. After his sabbatical ends, Elliott will become a consultant for the university's Board of Governors, earning the same as a top-paid professor.

To reach Lynn Franey, higher education reporter, call (816) 234-4927 or send e-mail to [lfraney@kcstar.com](mailto:lfraney@kcstar.com)

## DEATHS AND FUN

### DEATHS

- Adams, Delorous S.
- Anderson, Elizabeth M.
- Atchley, Marguerite
- Bertier, Mary J.
- Birch, Ila
- Buehrer, Gary
- Bugh, John W.
- Cameron, Gladys A.
- Carter, Jeffery A., II
- Carter, Leitha Ann (Proctor)
- Cheney, Eugene
- Montgomery
- Clater, Sarah D.
- Colley, Roxanne S.
- Counce, James Phillip
- Davidson, Joseph Earl
- Dooley, Bette Ann McClure

Cemetery, Shawnee, KS. Friends may call 6-8 p.m. Wednesday at the chapel. Memorial contributions may be made to the Bonner Springs United Methodist Church.

Mrs. Anderson was born August 4, 1916, in Johnson County, KS. She was a member of the Bonner Springs United Methodist Church. She is survived by her husband, Charles Anderson, of the home; one son, John Anderson, Kansas City, KS; one daughter, Kathleen McMillan, Menomonee Falls, WI; and two grandchildren. (Arrangements: Alden-Harrington Funeral Home, Bonner Springs, KS)

### MARGUERITE ATCHLEY

Marguerite Atchley, 88, Blue Springs, MO, died August 21, 1999, at St. Mary's Manor. Funeral services will be 11 a.m. Tuesday, August 24, at Shell Colonial Chapel; burial in St. Mary's Cemetery. Friends may call 10-11 a.m. Tuesday at the chapel. Memorial contributions may be made to [Carroll@kcstar.com](mailto:Carroll@kcstar.com)

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# The University of Kansas Medical School

M i n i M e d i c a l S c h o o l

Jasjit S. Ahluwalia, M.D., M.P.H., M.S.  
Vice-Chair, Director of Research and  
Associate Professor of Preventive Medicine,  
and Associate Professor of Internal Medicine  
University of Kansas School of Medicine



Dr. Ahluwalia received his B.A. degree at New York University where he was a University Scholar for four years. He then completed a combined four year M.D./M.P.H. program at the Tulane University Schools of Medicine and Public Health in 1987. At the University of North Carolina at Chapel Hill, he completed a three year Internal Medicine residency. He then spent two years at the Harvard Medical School General Internal Medicine fellowship program studying clinical epidemiology and completing a M.S. degree in Health Policy from the Harvard School of Public Health.

From September 1992 to June 1997, Dr. Ahluwalia was an Assistant Professor of Medicine at Emory University School of Medicine, with a joint appointment in the School of Public Health as an Assistant Professor of Health Policy. At Emory, he was a practicing Internist, taught medical and public health students, and conducted clinical research.

In July, 1997, he joined the faculty at the University of Kansas School of Medicine as Vice-Chair, Director of Research, and Associate Professor of Preventive Medicine and Internal Medicine. Dr. Ahluwalia has received more than \$3.0

million in funding over the past 5 years. He currently holds a \$1.5 million grant from the National Cancer

Institute titled, "Does Bupropion Help African American Smokers Quit." He has also received \$240,000 for the four year Robert Wood Johnson Foundation Generalist Physician Faculty Scholars program.

He has been active in a number of national organizations, including the Society of General Internal Medicine, The Society for Nicotine and Research, and the American College of Preventive Medicine. He has served on planning committees for national meetings, served on organizational panels, and has been a reviewer for the National Institutes of Health. He speaks extensively on a number of topics to regional and national medical audiences, as well as nonmedical audiences. Until 2003, Dr. Ahluwalia will serve on the National Advisory Committee of the Robert Wood Johnson Foundation's new initiative on Addressing Tobacco in Managed Care.

## Tobacco Use: A 21st Century Pandemic

### I Objectives

At the end of this session the learner will be able to:

- 1) Trace the history of tobacco use in the U.S.
- 2) Describe the health effects of smoking
- 3) Understand the physical changes that occur as a result of smoking
- 4) List methods used to help smokers quit

### II Background

#### History of Tobacco

Despite a long history of tobacco use in the world, the first half of the 20th century will be notable for a tremendous

increase in the consumption of tobacco along with tragic increase in the number of people suffering from diseases associated with tobacco. Mayan stone carvings suggest that tobacco was used as early as 900 AD. Early methods of use included puffing, chewing and snorting tobacco. It was not until the early 1800's that tobacco was produced in a form that could be inhaled. Lighter strains of tobacco were developed and flue curing was discovered which produced a tobacco that was milder and less irritating to the throat. It was at this time that shredded tobacco began to be rolled by hand in paper and smoked by inhaling - the first cigarettes.

The production of cigarettes soared when, in 1881, James Bonsack of Virginia designed a machine that could produce 70,000 cigarettes a day. Production in the U.S. continued to

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increase and reached 10 billion cigarettes during 1913. World War I helped spread the use of cigarettes by the inclusion of cigarettes in soldiers' rations. This practice was continued during WWII and in 1949 approximately 393 billion cigarettes were produced.

Filters were first introduced in 1930. When the health risks of smoking began to be recognized in the 1950's, production of filter cigarettes increased with unfounded claims of safety. By 1960, approximately 50% of all cigarettes produced had filters. In 1964, the first low tar, low nicotine cig-

arette was produced, just shortly before the Surgeon General's first report on the health effects of smoking. Today the dominance of cigarettes as the primary method of tobacco use in the U.S. continues. According to the U.S. Department of Agriculture, the United States alone produces approximately 689 billion cigarettes annually with the production capacity of over one trillion annually. In addition, recent years have seen increases in the production and use of cigars and smokeless tobacco.

**Types of Tobacco Commonly Used Today**

	CIGARETTES	PIPES/CIGARS	SMOKELESS TOBACCO
Consumption/Production	Comprise 95% of all tobacco products	Cigars – 4.6 billion produced in 1996, highest level of production since 1980	Usage increasing, especially among teenage males - 15.8% in 1997
Method of nicotine delivery	inhaled smoke, nicotine absorbed in alveoli (lungs)	puffed, nicotine absorbed through buccal mucosa (lining of the mouth)	placed between cheek and gum, nicotine absorbed through buccal mucosa
Characteristics	<ul style="list-style-type: none"> <li>- Shredded tobacco wrapped in paper</li> <li>- With or without filters</li> <li>- 20 in pack</li> </ul>	Pipes <ul style="list-style-type: none"> <li>- Loose, shredded tobacco</li> </ul> Cigars <ul style="list-style-type: none"> <li>- Rolled tobacco leaves or shredded tobacco wrapped in tobacco leaf</li> <li>- One large cigar can equal one pack cigarettes</li> </ul>	Moist snuff <ul style="list-style-type: none"> <li>- Powdered tobacco</li> </ul> Chewing tobacco <ul style="list-style-type: none"> <li>- Leaf tobacco in pouch</li> <li>- Plug tobacco in brick form</li> </ul>

**Prevalence**

Since 1965, the prevalence of adult smoking steadily declined to 25% in 1990 and has remained steady since then. Although men have consistently had higher rates of smoking than women, the

decline in smoking from 1965 to 1995 was greater for men than women, from 52% to 27% for men vs. 34% to 23% for women.

Percent of adults who were current smokers in 1995 – United States

Total population	25%
Gender	
Male	27%
Female	23%
Ethnicity/Race	
White	25%
Black	26%
Hispanic	18%
Education	
≤High School	30%
≥ College degree	14%

Source: National Health Interview Survey: 1995.

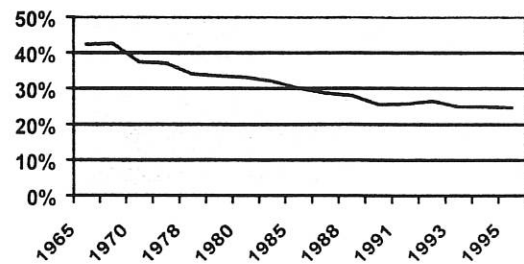
There are some differences in smoking rates among various ethnic populations. Although whites and African Americans have similar overall smoking rates, African Americans average fewer cigarettes per day and fewer quit. Hispanics have a lower overall smoking rate than African Americans or whites. The most dramatic differences in smoking rates are seen across educational levels, with the percent of smokers increasing as level of education decreases.

Initiation of smoking most often occurs in the teenage years and prevention of initiation could have a dramatic impact on smoking rates. The rate of adolescent smoking declined during the 1970's and 1980's but began to increase again in the 1990's. In 1997, among persons 12-19 years of age, 42.7% reported using tobacco products during the previous 30 days, 32% more than in 1991 (MMWR, 1998). This may explain why smoking rates have not continued to decline but rather have remained stable for the overall population.

### Policy

As early as 1954 published reports of health effects of smoking began to appear. In 1964 the first Surgeon General's report was released; it concluded that smoking is a cause of lung cancer and chronic bronchitis. During the next 30 years there has been increasing activity to reduce the prevalence of tobacco use. Many of the policies, such as package labeling, put the onus on the consumer to voluntarily reduce consumption of tobacco. Few have had a major impact on the tobacco industry itself.

**Prevalence of Smoking in the U.S.: Adults 1965-1995**



#### Years of Tobacco Policies

- 54   ▪ First Surgeon General's report
- 56   ▪ Warning labels
- 71   ▪ Cigarette ads on the radio and television banned
- 73   ▪ Airlines urged to offer no smoking sections on commercial flights
- 75   ▪ Military discontinues cigarettes in rations
- 82   ▪ Congress doubles federal cigarette excise tax
- 87   ▪ Department of Health and Human Services bans smoking at its facilities
- 88   ▪ Smoking banned on domestic flights of less than two hours
- 90   ▪ In-flight smoking ban extended to 6 hour domestic flights
- 92   ▪ EPA issues preliminary report on the dangers of secondhand smoke
- 92   ▪ Legislation requires states to adopt and enforce restrictions on tobacco sales to minors
- 92   ▪ EPA strengthens its preliminary report and classifies secondhand smoke as a carcinogen
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During the past 30 years Congress has considered over 1,000 tobacco control bills while at the same time accepting campaign money from the tobacco industry lobby. It is not surprising that few bills have passed. The Federal Trade Commission

has failed to take significant action regarding advertising by tobacco companies, and more recently Congress refused to grant the Federal Drug Administration jurisdiction over nicotine as a drug.

### III Smoking or Health

#### Tobacco Components

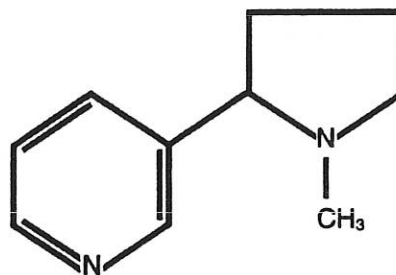
Tobacco smoke is made up of over 4,000 compounds including nicotine, tar, carbon monoxide and irritants. About

45 of these chemicals are known carcinogens, tumor accelerators or co-carcinogens. Nicotine is a powerful and toxic drug. It is an alkaloid that is easily dissolved in water or liquid, and absorbed into the body across membranes in the lungs or mouth, depending on the type of tobacco used. Cigarettes con-

tain about 8 mg of nicotine with 1-2 mg per cigarette delivered to the smoker. This is true of all brands except ultra-low nicotine cigarettes, which are heavily ventilated. The large number of minute air holes in these cigarettes increases the air and reduces the smoke that is inhaled. Nicotine and carbon monoxide are the primary causative agents in cardiovascular diseases while tar contributes to cancers and lung disease.

Nicotine levels vary greatly in smokeless tobacco (spit, chew etc.) depending on the brand. Smokeless tobacco contains many of the same compounds, but since the tobacco is not burned some are not released. Health effects of smokeless

tobacco include bad breath, gum disease and abrasion of the teeth. Carcinogens contained in smokeless tobacco present the most significant health risk causing various forms of oral cancer.



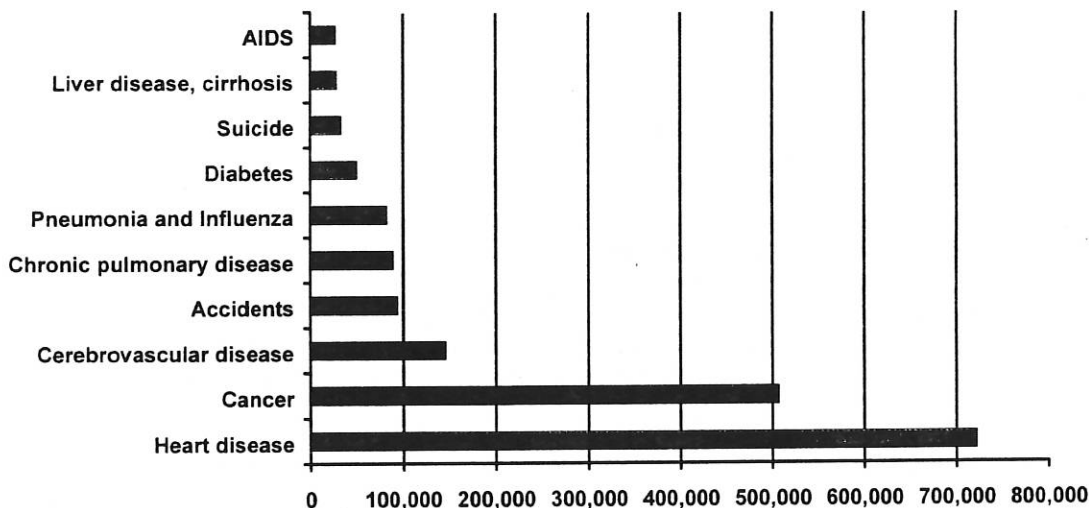
Structural formula of nicotine

### Health Risks

Lung cancer was considered an extremely rare condition in the beginning of the 20th century and was not listed as a cause of death in the vital statistics of the United States until 1930. However, just since 1964 there have been more than 2 million deaths from lung cancer in the United States (CDC's TIPS).

Among women, lung cancer has surpassed breast cancer as the leading cause of cancer death. In addition to lung and other cancers, smoking contributes to cardiovascular disease and respiratory disease, resulting in more than 400,000 deaths annually.

The 10 Leading Medical Causes of Death



Source: National Center for Health Statistics; 1990

### Respiratory System

Inhaling cigarette smoke into the lungs is a very effective way to deliver nicotine to the body. The nicotine is absorbed into the blood stream through the alveoli, small air sacs deep in the lungs. The tar that is present in cigarettes gets deposited in the alveoli and is a concentration of many of the chemicals that are present in cigarette smoke.

In healthy lungs there is an efficient system for dealing

with foreign substances and irritants. Lungs produce mucus as a way of trapping material, and tiny hair like structures called cilia are in constant motion to move the mucus out of the lungs. Consistent smoking results in several noticeable changes in this system. An increased production of mucus along with dysfunction of the cilia lining the lungs results in a decreased ability to clear the lungs. This produces an

increased, often chronic, cough. It is the tar that is present in cigarette smoke that is responsible for the development of lung cancer, emphysema and chronic bronchitis. Approximately

90% of all lung cancer and 85% of all chronic obstructive pulmonary disease (COPD), which includes emphysema and chronic bronchitis, is directly attributable to smoking.

### Cardiovascular system

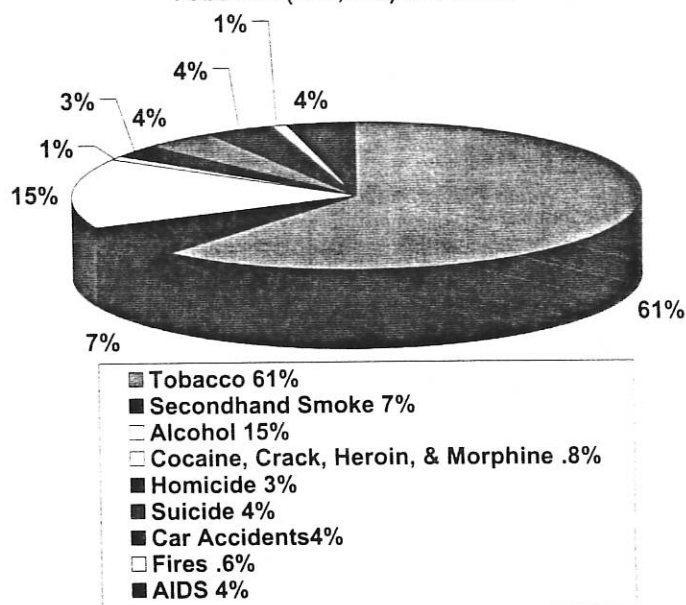
More than 400,000 people die from tobacco related diseases each year and 25% of those deaths are from heart disease. Smoking has many effects on the cardiovascular system. Nicotine causes increased blood pressure and heart rate, resulting in the need for increased oxygen for the heart muscles. Although smoking is not considered a causative factor in chronic hypertension, it greatly increases the risk of heart disease. The carbon monoxide that is present in cigarette smoke replaces oxygen in the blood requiring increased blood flow to

supply the body with needed oxygen, another stressor for the heart. Smoking increases levels of LDL cholesterol (bad cholesterol) and decreases levels of HDL cholesterol (good cholesterol), thereby increasing the risk of atherosclerosis, the narrowing of arteries. In addition, the blood of smokers has a higher viscosity, which leads to a greater risk of developing blood clots. These effects result in increased risk for many cardiovascular diseases and conditions such as chronic heart disease, heart attacks, stroke, and reduced circulation to extremities.

### Central Nervous System

The persistent nature of smoking is due in part to the addictive properties of nicotine and its effects on the central nervous system. Smoking a cigarette delivers nicotine to the brain very quickly, within 7-10 seconds, and affects mood and cognitive functions. The effects on mood can vary greatly from mild euphoria and stimulation to feelings of relaxation and stress relief. Smokers also report increased attention and ability to concentrate. These effects appear to be controlled by altering the number and frequency of cigarettes smoked as well as the length and depth of inhalations. The addictive properties are evident in the need for consistent dosing, development of tolerance to nicotine and the presence of withdrawal symptoms when the smoker is abstinent. Most smokers state they would like to quit, yet few succeed, and the relapse rate is high.

Leading Causes of Preventable Death:  
Tobacco (434,000) vs. Other



Source: U.S. Centers for Disease Control: 1993

### Benefits of quitting

Cessation of smoking decreases the risk of many diseases. Carbon monoxide levels begin to drop almost immediately and within a few weeks cough and sputum production begin to subside. Risk for heart disease decreases sharply in the first year

of cessation and after 10 years is the same for non-smokers. The risk of cancers gradually decreases and deterioration due to lung disease slows.

### IV Treatment strategies

Over the past 30 years there have many methods promoted as effective in assisting with smoking cessation. Included among early methods were techniques such as the use of mild electric shock and other aversion techniques. Acupuncture and hypnosis may be helpful for some individuals but the few studies conducted suggest these methods are no more effective than placebo.

Annually, approximately 4% of smokers quit, most with little or no assistance. There are, however, a variety of options available to smokers to assist with cessation, both behavioral and pharmacological. Behavioral options range from educational pamphlets, self-help books and internet programs to telephone support and to more intensive methods such as group or individual treatment.

**Behavioral Treatment Options**

Description & Examples	Pros & Cons
<p><b>Group Programs</b>                      Freedom From Smoking (American Lung Association)                      Fresh Start (American Cancer Society)                      Smokeless                      Smoke Stoppers</p> <p>Also offered by many hospitals, medical facilities and by voluntary agencies.</p>	<p><b>Pros</b></p> <ul style="list-style-type: none"> <li>• Supportive, encouraging environment</li> <li>• Includes help with changing smoking behaviors</li> </ul> <p><b>Cons</b></p> <ul style="list-style-type: none"> <li>• Meeting schedule may not be flexible enough for some</li> <li>• A group may not be available when you need it</li> <li>• Cost may be a barrier</li> </ul>
<p><b>Individual Counseling From Healthcare Provider</b></p> <p>Health care providers may offer individual assistance with smoking cessation. This should include information on skills and relapse prevention</p>	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Flexible</li> <li>• Personalized to your needs</li> <li>• Help with changing smoking behaviors</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• No opportunity for peer support, sharing</li> <li>• Usually requires an appointment</li> <li>• Cost may be a barrier</li> </ul>
<p><b>Books, Manuals, Audiotapes, Videotapes, and Internet Resources</b></p> <p>May be a starting point for additional help. These should be educational, informative and discuss the key parts of a comprehensive plan for quitting.</p>	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Flexible and private</li> <li>• Suits people who enjoy working on their own</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Success depends on continued use</li> <li>• May not cover all necessary skills</li> </ul>
<p><b>Telephone Counseling</b></p> <p>Many health providers and worksites offer telephone counseling to provide assistance in developing and following through with a plan for quitting.</p>	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Flexible and private</li> <li>• Suits people who enjoy working on their own</li> <li>• Provides personal support</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Phone counselor may vary</li> <li>• Coordination of calls may be erratic</li> </ul>

Pharmacological methods include nicotine replacement, in a variety of forms, and bupropion, as currently approved and effective methods. Nicotine replacement therapy aids with cessation by replacing the nicotine the person has been receiving from tobacco products and therefore helps control withdrawal symp-

toms. Bupropion however affects different areas of the brain. While the exact mechanism is not clear it has been shown to be effective. Combining behavioral and pharmacological methods increases effectiveness of either method used alone

### Pharmacological Aids to Cessation

Description & Examples	Pros & Cons
<p><b>Non-nicotine medication</b> Bupropion sustained release (Zyban) (prescription required)</p> <p>Begin therapy at least one week prior to quit date. Only non-nicotine medication considered effective for smoking cessation.</p>	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Easy to use</li> <li>• Pill form</li> <li>• Few side effects</li> <li>• Can be used in combination with nicotine patches</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Should not be used by patients with eating disorders, seizure disorders or those taking certain other medications</li> <li>• May cause insomnia and dry mouth</li> <li>• Must be taken on a regular schedule</li> </ul>
<p><b>Nicotine Inhaler</b> Nicotrol ® Inhaler (prescription required)</p> <p>Mouthpiece containing a replaceable cartridge delivers nicotine when puffed on, not actually inhaled. The inhaler delivers nicotine into the mouth, not the lung, and enters the body much more slowly than the nicotine in cigarettes.</p>	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Flexible dosing</li> <li>• Most similar to hand-to-mouth behavior of smoking</li> <li>• Few side effects</li> <li>• Faster delivery of nicotine than the patches</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Requires frequent use during the day to obtain adequate nicotine levels</li> <li>• May cause mouth or throat irritation</li> </ul>
<p><b>Nicotine Nasal Spray</b> Nicotrol ® NS (prescription required)</p> <p>Delivers nicotine through the lining of the nose when squirted directly into each nostril.</p>	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Flexible dosing</li> <li>• Can be used in response to stress or urges to smoke</li> <li>• Fastest delivery of nicotine among currently available products</li> <li>• Reduces cravings within minutes</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Nose and eye irritation is common, but usually disappears within one week</li> <li>• Requires frequent use during the day to obtain adequate nicotine levels</li> </ul>
<p><b>Nicotine Patch</b> NicoDerm ®CQ (over-the-counter) Nicotrol ® (over-the-counter) Habitrol ® (prescription required) ProStep ® (prescription required)</p> <p>Patches deliver nicotine through the skin in different strengths, over different lengths of time.</p>	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Easy to use</li> <li>• Only needs to be applied once a day</li> <li>• Some available without a prescription</li> <li>• Few side effects</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Less flexible dosing</li> <li>• Slow onset of delivery</li> <li>• Mild skin rashes and irritation</li> </ul>
<p><b>Nicotine Polacrilex (nicotine gum)</b> Nicorette ® (over-the-counter)</p> <p>This gum-like substance contains nicotine which is released after brief chewing. "Gum" is then parked between cheek and gum. The nicotine is absorbed through the lining of the mouth.</p>	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Convenient</li> <li>• Flexible dosing</li> <li>• Faster delivery of nicotine than the patches</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• May cause problems for people with dental problems and those with temporomandibular joint (TMJ) syndrome</li> <li>• Acidic food or drink decreases absorption of nicotine</li> <li>• Frequent use during the day required to obtain adequate nicotine levels</li> </ul>

### Conclusion

We have traced the history of tobacco and described the epidemiology and prevalence of smoking. We have covered the health effects of smoking and the benefits for quitting. Most importantly, we have learned methods on how to help smokers quit both through behavioral interventions designed to address the psychological addiction and the habitual aspects of smoking. In addition, we have covered the pharmacotherapy available to help smokers quit smoking.

Cigarette smoking remains the number one cause of death in this country. It leads to one out of three deaths in the United States. While infectious diseases are conquered by treatments and vaccines, cigarette smoking will unfortunately play an increasing role in death and disability in developing countries. It will take a multi-pronged, interdisciplinary approach to curb the rising deaths from tobacco. Ultimately, the manufacturer of tobacco, the tobacco industry, should be held liable.

**Acknowledgement:** Credit must be given to Denise Jolicouer, MPH one of my best graduate students, and now colleague.

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# The University of Kansas Medical School

M i n i M e d i c a l S c h o o l

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Department of Medicine  
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Dr. O'Brien-Ladner attended the University of Kansas as a Kansas Scholar and received her B.S. degree in Physical Therapy where she was the Ruth G. Monteith award recipient for the outstanding student in her class. She, then completed her MD degree at the University of Kansas School of Medicine, graduating as a member of Alpha Omega Alpha in 1984. She continued at the University of Kansas with a three year Internal Medicine residency and an additional year as chief resident spent under the guidance of Chairman, Dr. Norton Greenberger. She then entered into the Pulmonary/Critical Care fellowship program and completed in 1991. During her final year of fellowship, she spent a year in the laboratory with Dr. Lewis Wesselius studying the effects of oxidant stress on macrophage function and received the Young Investigator Award from the American College of Chest Physicians.

Dr. O'Brien-Ladner joined the faculty in July 1991 is currently an Associate Professor of Medicine at the University of Kansas School of Medicine. She is a past winner of the Student Voice Award for teaching. Her research has been funded by the American Lung Association, American Heart Association and is currently funded by the National Institutes of Health. Dr. O'Brien-Ladner's current research investigates the dysfunction of the alveolar macrophage secondary to oxidant stress and iron in smoking-related lung disease. She is board certified in Internal Medicine, Pulmonary Medicine and Critical Care Medicine and is the Director of the Medical Intensive Care Unit at KU Medical Center.

## "IRON LUNG: Consequences of Polluted Air"

### OBJECTIVES

At the end of this session, the student will be able to:

- Understand the basic roles of iron in health and disease
- Explain the concept of oxidant stress and the role iron plays
- Describe the lung disease processes in which iron may contribute
- Understand the basics of macrophage function
- Define DNA, RNA and "gene transcription"

### I. Introduction: Iron

Iron is one of the transition metals located in the Periodic Table. It is the most abundant transition metal in the body (approx. 4.5 grams). It is absolutely required for all human cell function but is potentially lethal in excess. The treatment of human disease with iron is said to date back to 2735 B.C. in China and 1500 B.C. in Europe, probably to the detriment of those individuals treated. The importance of iron in the health of humans was recognized in the 18th century when iron was

described as an important constituent of blood. Nobel laureate, Christian deDuve, hypothesizes that iron was essential for the origin of life on earth in his book, Blue-print for a Cell. The importance of iron in cell function is related, at least in part, to its association with the production of reactive oxygen species (ROS) or free radicals. ROS species are charged, unstable compounds capable of activating, injuring or even killing cells. In order to generate ROS, it is important to understand the concept of *catalytic iron* or that *that is immediately available for chemical or biologic reactions*. The majority of iron is stored bound to proteins in cells throughout the body leaving it unable to participate in the generation of ROS.

The generation of reactive oxygen species is demonstrated by the Fenton reaction (Fig. 1). Iron mixes with hydrogen peroxide (or just oxygen) and forms the potent hydroxyl radical, the most potent of ROS.

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Fig. 1 FENTON REACTION

ROS are pivotal in the maintenance and activation of all cells within the human body. In excess, however, iron catalyzed ROS can induce oxidant stress. Oxidant stress occurs when the bodies protective mechanisms, antioxidants, are overcome by the amount of ROS and result in injury to cells and tissue. Every cell has an elaborate, inducible protective mechanism against oxidant stress. Primarily, biologic systems handle iron by careful storage to avoid excess generation of ROS. However, the human being does not have a mechanism to rid the body of excess iron. Thus, if increased amounts of iron are ingested and inhaled, the body must handle this excess load internally. And, when protective mechanisms become overwhelmed, iron can be directly injurious to humans, such that it destroys cell structures and leads to cell mutations and/or cell death. There is building evidence, however, that

iron may have a more subtle effect on cell function prior to overt injury. Iron may actually control, at least in part, the stability of DNA and transcription of RNA. DNA is that substance within the cell that contains the "potential" pool of genes that controls transformation of a cell into a cancer fighting or infection-fighting cell. The RNA is that substance, derived from DNA, that serves as the "message" to the cell that functions should be activated or altered. The signals to the cell by RNA, through transcription, is required for activation of human defense mechanisms against a variety of insults, including cancer and infection. Our lab is investigating the effect of excess iron on the cells' capacity to activate itself and surrounding cells to recognize and fight cancer and infection within the lung.

## II. Iron and the Lung

Iron accumulates in lungs with the normal aging process. Furthermore, occupational exposure, for example in steelworkers, and cigarette smoke and urban air pollution escalate the accumulation of iron within lung. This is a particular problem in the lung because the lungs are the only organ (except the skin) to be exposed to high concentrations of oxygen. This can be dangerous because oxygen facilitates the generation of ROS when iron is in excess.

Cigarette smoking increases the accumulation of iron in the lung by a variety of mechanisms, including the delivery of iron particles and ROS in the smoke that is inhaled. Notably, our research group has observed an increase in lung iron in smokers that demonstrates regional variation in accumulation of iron. Upper lobes, the segments of lung at the top of the

chest, accumulate more iron than those in the lower lobes. Interestingly, the diseases related to smoking, primarily emphysema and cancer, both have a predilection for the upper lung region. It is not clear that there is a cause-and-effect relationship between iron and smoking-related disease. However, this has to be considered, because iron exerts influences over a number of mechanisms that can lead to both emphysema and cancer.

Emphysema is the destruction of lung air spaces that are involved in oxygen exchange in emphysema. The walls of these delicate structures are destroyed and form large hyper-expanded bullae similar to the expansion and trapping of air within a balloon (Fig. 2). Bullae serve no functional purpose and displace functional lung.

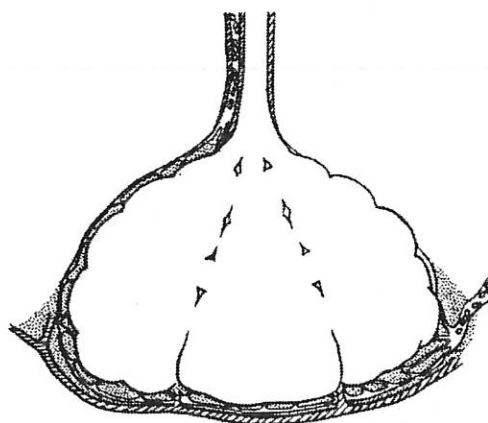
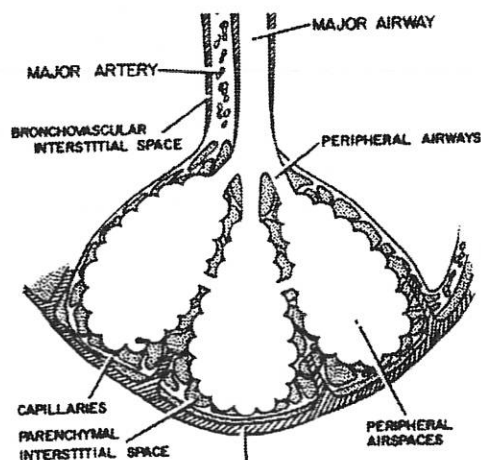


Fig. 2

The destruction of alveoli (air spaces) in the lung

Emphysema leads to chronic disability in the 5th and 6th decades of life and certainly smoking is the primary cause of this disorder. An imbalance between the oxidants and antioxi-

dants have been proposed as the cause of emphysema and our data supporting greater iron concentrations in the very areas involved in the disease suggests possible correlation.

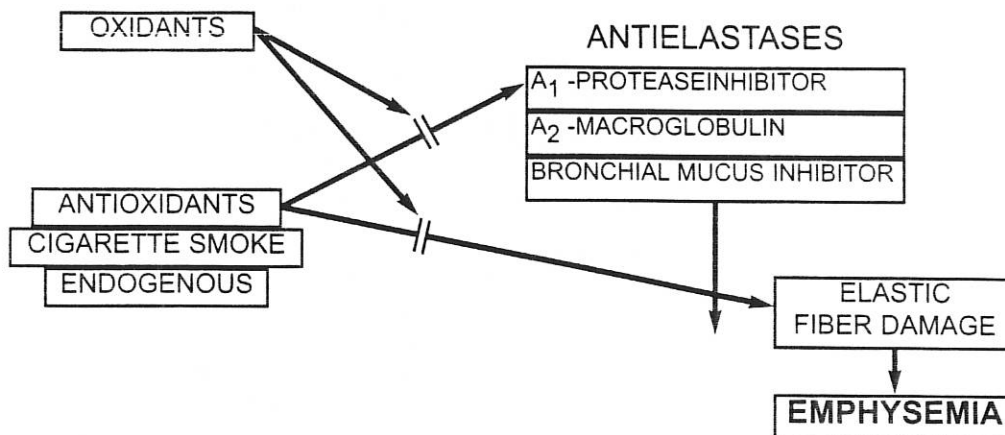


Fig. 3 Oxidants and Emphysema

Regarding the association of cancer and iron, studies demonstrate that societies with populations with increase body iron stores are associated with an increased risk of cancer and an increased overall death rate. Two lines of evidence provide a rationale for these phenomenon. First, iron catalyzes the production through oxidant species which is a chronic stress on

the cells that leads to mutation (DNA damage) and subsequently to cancer. Secondly, iron can increase the chances for some cancer cells to survive by increasing the antioxidant capacity of cells. Interestingly, cancers involving not only the lung are associated with increased iron levels but also the liver and colon.

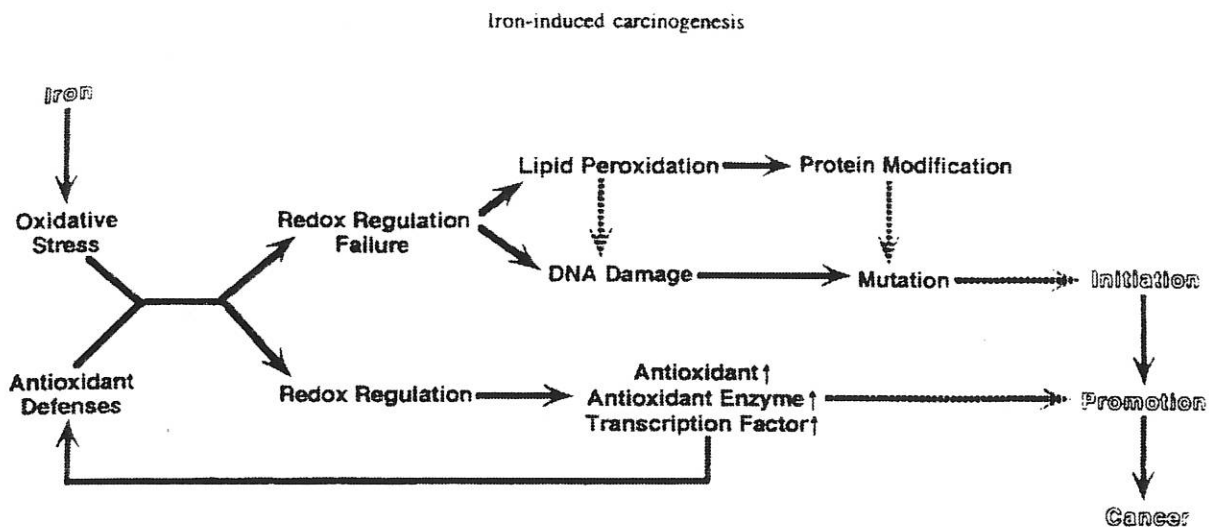


Fig. 4 Iron and Cancer

Smoking is an ideal model in which to investigate the effects of iron overload. Smoking-related disease is a major health care burden, yet, the mechanisms by which smoking causes disease within the human lungs are not entirely clear. As one possibility, it is known that smoking causes many alterations in the functions of resident macrophages, cells that are the "housekeepers" of the lung air spaces. The macrophage actually ingests debris from the air inhaled (Fig. 5), including iron delivered by smoking. The macrophage is responsible for surveillance throughout

the lung which results in early recognition of the early stages of lung cancer or infection. This surveillance is important because the inherent defense mechanisms against these processes are very good if problems are "caught in time". Our lab investigates the role that increased iron has on altering the ability of this macrophage to activate defense mechanisms that protect the lung should malignant or infectious agents present themselves. Our data suggests that iron lowers the ability of the macrophage to remain alert and activate in the time of greatest need.

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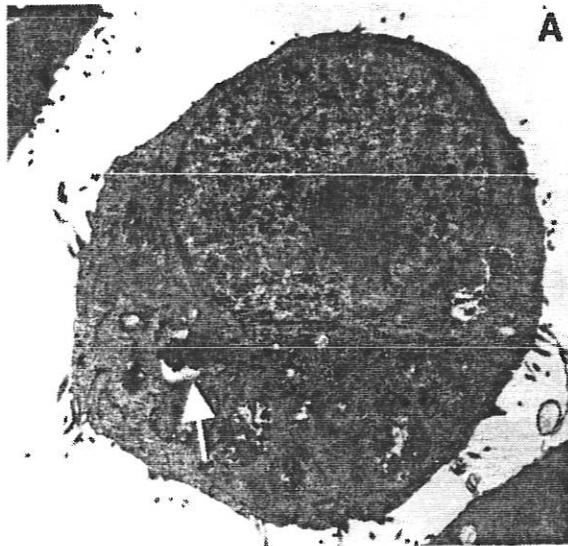


Fig. 5 **MACROPHAGE WITH IRON INCLUSIONS (SEE ARROW)**

### III. Damage Control

Treatment for iron-overload is at an investigational level, except in extreme cases of hereditary disorders or ingestion that are clearly "poisoning" the body. The current treatments available include 1) phlebotomy, the removal of blood from the body. The majority of the iron within the body is contained in blood, or 2) iron chelation where iron is bound to a substance that is circulated throughout the body and then eliminated. Both treatment options are sub-optimal. In regards to smok-

ing-related iron, at this time, smoking cessation is our only option. However, it is not clear that iron accumulated with smoking will, in fact, be redistributed or eliminated by the body. Cancer risk from smoking continues long after smoking stops, whereas, the risk of emphysema ceases with smoking cessation. We are planning an investigation where we determine the affect of smoking cessation on the increased iron burden of the lung. At an investigational level, trials of antioxidant therapy and iron chelation are treatments in experimental stages.