Prognosis for Healthcare: The Future of Medicine

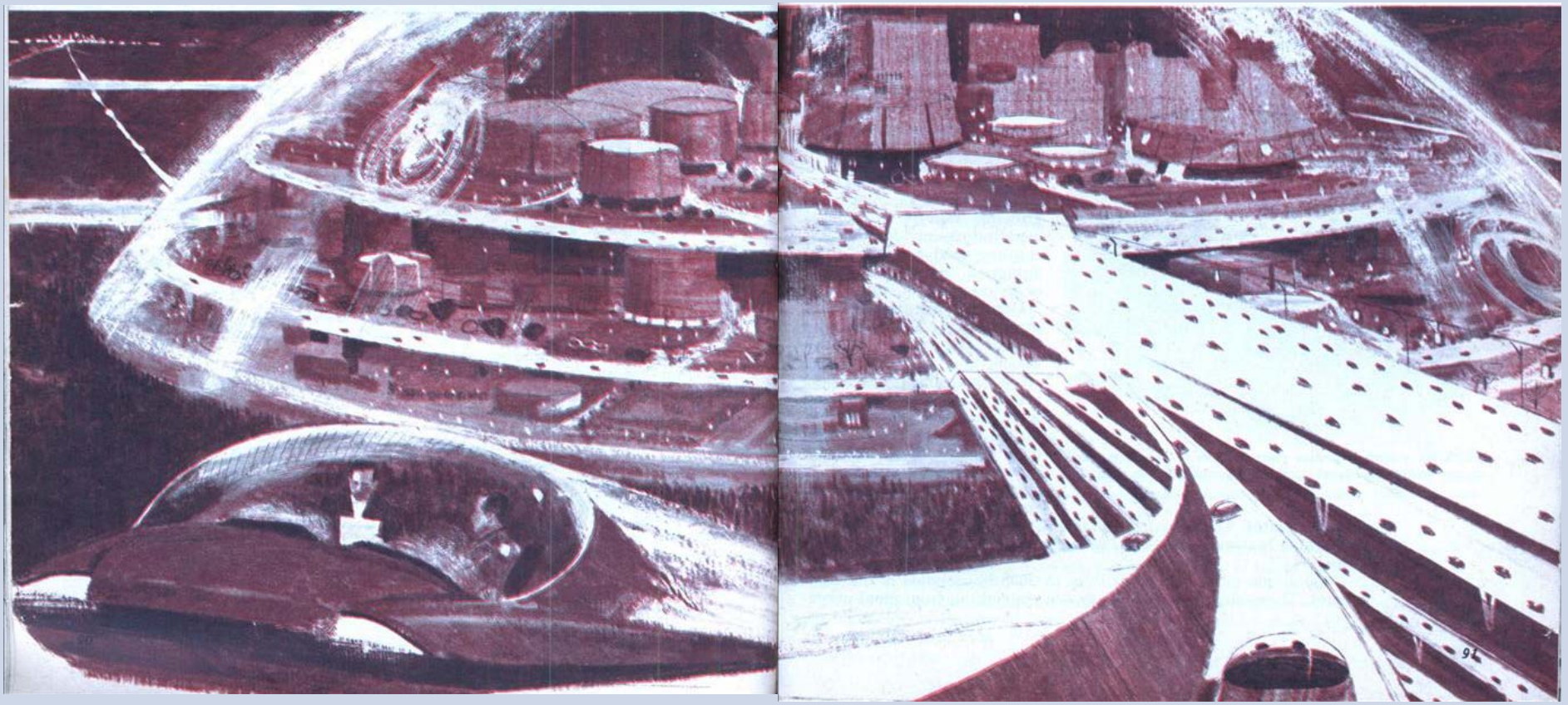
Bruce M. Cohen, M.D., Ph.D.

Director, Frazier Research Institute, McLean Hospital
President and Psychiatrist in Chief Emeritus, McLean Hospital
Robertson-Steele Professor of Psychiatry, Harvard Medical School

40 Years in the Future

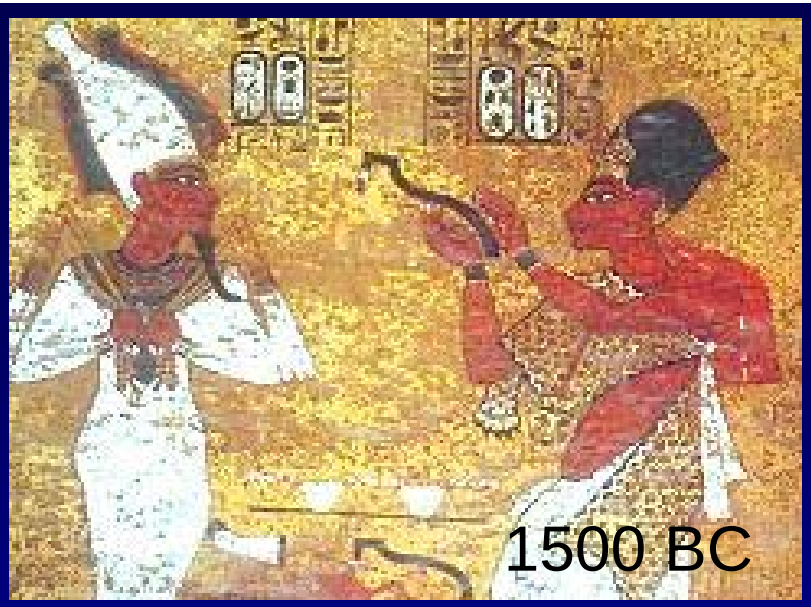
By James R. Berry

Mechanix Illustrated
Nov, 1968



Vehicular travel between the domed, evenly climatized cities of 2008 is controlled by the national traffic computer, which guarantees perfect safety even at speeds of 250mph.

Lessons From The Past


1500 BC


1940s


2009-----You Are Here


Stardate 4351.7

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Looking Forward

What Changes Can We Expect in Medicine?

Drivers of Change in Medicine

Disease and the Spread of Disease
Science and Technology
Clinician Training and Roles
Institutions and Care Settings

All interacting and all influenced by wealth and its distribution

What Changes in Illness Can We Expect?

Disease Changes in Our Future

New infectious diseases crop up now and then throughout history

New toxic diseases can arise due to new manufacturing or environmental changes

Climate change and increased travel can lead to the spread of existing diseases to new populations

Also

The population is aging, and with that will come:

Increased prevalence of some illnesses-

Diabetes, Cardiovascular Diseases, Dementias, Cancers, Arthritis…

With increased costs

Can we take advantage of new advances in science and technology to discover better treatments for medical illnesses?

Some Technologies for the Early 21st Century that Could Change the Future of Healthcare

Advanced Genetics/Genomics

Molecular, Cell and Systems Biology

Truly New Drugs

New Vaccines

Tissue Repair/Stem Cells

Improved Prosthetics

Better Tissue Imaging

Computing/Information Technology

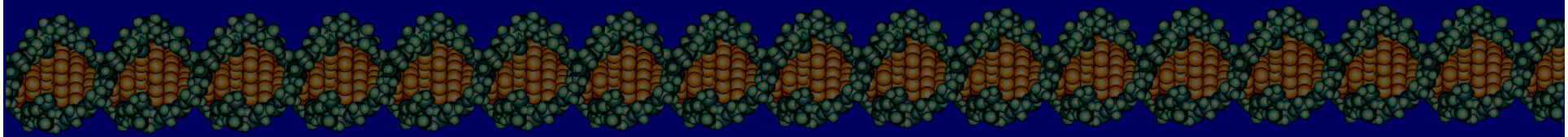
Mechanical/Nano Technology

Two Examples:

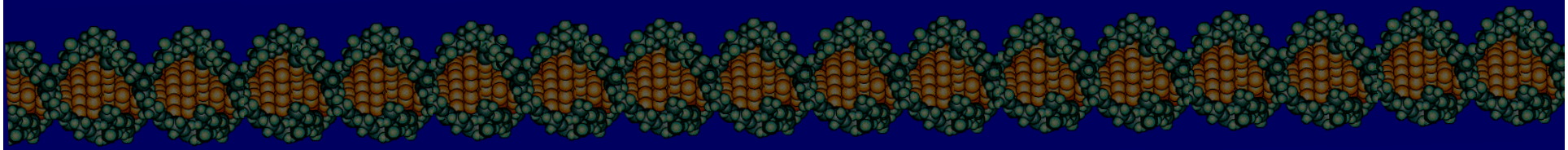
Genetics and Stem Cells

The Potential Contribution of Genetics

The risk of illness, the course of illness, and response to treatment are all substantially determined by inherited factors.

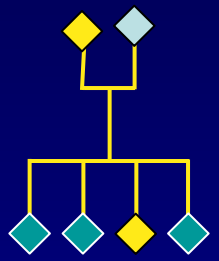


With the sequencing of the human genome and the increasing power of genetic analysis, the pace of discovery of risk genes for human illness has accelerated.



Once genes related to risk of illness are determined, they can be used

To help identify and study individuals at risk



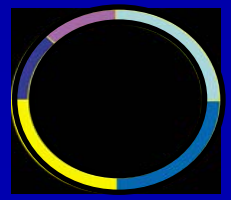
To classify those who are ill according to different subtypes of illness

To study the function of genes related to illness in

Biochemical preparations, Cell culture, Animal models, and Human subjects

To define the mechanisms by which the gene predisposes to illness and, thereby, find targets for treatment

Including medication or changing the genes, themselves



Beyond Treatment: Can We Achieve Prevention, Replacement and Repair?

Some Developing Technologies For Gene, Cell, Tissue and Organ Repair

Gene Alteration

Nanomedicine

Organelle Replacement / Repair

Cell Replacement / Repair

Organ Replacement or Remodeling

Cell Replacement

Replacing Lost Cells

The body has limited capacity
to repair itself by growing new cells:

The skin, the liver, bone and blood cells and blood vessels grow

Brain, muscles, lungs, kidneys, etc. do not

We Can Provide New Cells to the Brain and Other Organs

These cells may directly replace lost cells

or

They may provide factors to limit or reverse cell loss

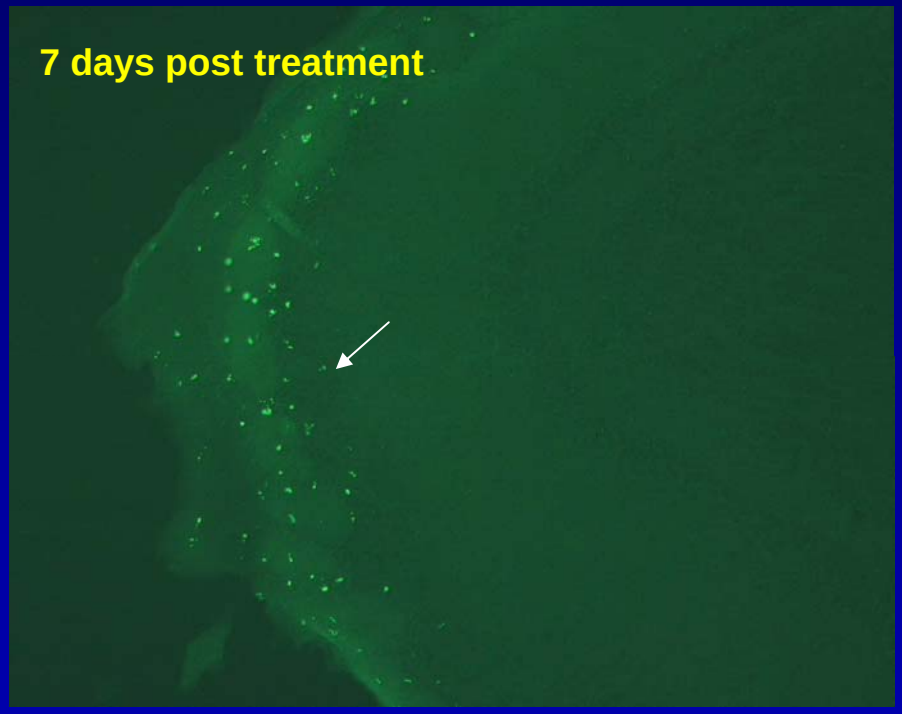
Stem Cells

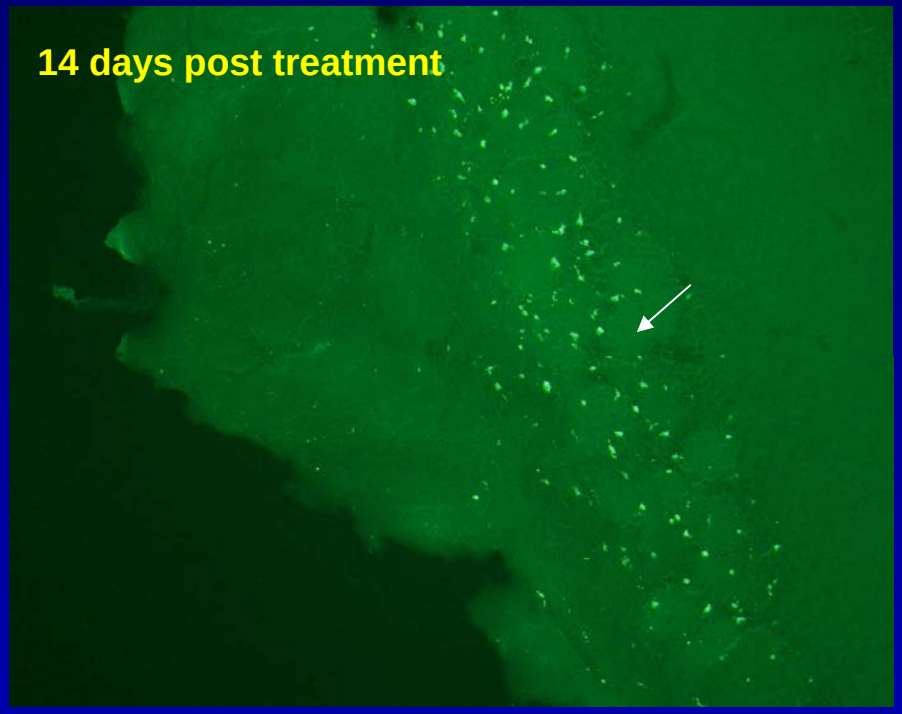
Stem cells can grow to become all or most of the specialized cells of the body

There are several sources of stem cells for use in tissue repair

This includes stem cells obtained from each individual's own body

Stem Cells, Given Intranasally, Can Enter the Brain





Cataldo and Cohen, 2008

Some Current Hot Topics in Developing Medical Technology

Personalized medicine, based on individual genetics

Tissue Repair by stem cells or nano-devices

Better aging

Prevention of illness

All are possible with enough time, effort and funding

Areas for Likely Near-term Medical Success in Applying New Technologies

Treatments targeted at genetic differences of individual cancers

Stem cells to treat Type I (early onset, insulin dependent) diabetes mellitus

-survey of one physician scientist

Issues in Developing and Applying New Medical Technologies

Testing Efficacy and Safety of New Devices and Treatments-What degree of certainty and speed to require for approval (FDA)

Access to New Technology-How to assure availability without overuse

Electronic Medical Records-How to assure accuracy and privacy

Affordability-Who pays for development and use

Is This the Key to the Future?

Costs of Healthcare

Annual US healthcare costs:
$2.2 T, $7421/person, 16.2% GDP
(22% higher on average than other developed countries)

Over half is spent for care in the last six months of life

27% is spent on 1% of the population, much of it for emergency room care

75% of yearly increases is for new medications and technologies

30% is for unnecessary tests and procedures, in part related to malpractice concerns

-American College of Physicians, 2009 White Paper

Paying for Healthcare

Healthcare Payments USA: 2009

Currently, a mixture of private, public and personal payments:

Private Health Insurance: 42%
Public Payment*
Federal: 34%
State: 13%
Out of Pocket: 12%

*(Includes Medicare: 19%
And Medicaid: 15%)

Uninsured: 20% under age 65

-Department of Health and Human Services, USA

USA vs. Other Developed Countries

Hospital costs are 4X higher

Physician and Nurse salaries are 30-100% higher

Drug costs are 3X higher
(Brand names cost more, generics less than elsewhere)

Administrative and regulatory costs are 6X higher
(Private plan administrative costs are 2X those of Medicaid and 4X those of Medicare)

-American College of Physicians, 2009 White Paper

Health Insurance Issues

US health insurance is built of ad hoc pieces:

Private, largely through groups at work,

and

Public, through
Medicare for older or disabled adults or
Medicaid for the poor

There are many other models for coverage, but in the current debate, they are receiving little temperate discussion.

More Payment Issues

Should we have health coverage for all (beyond the ER)?

Who should decide what is covered and for how much?

Should payment be by service, person, group, illness episode, outcome?

What deductibles or co-payments are reasonable?

What maximums or catastrophic coverage are reasonable?

(And yes, you will pay for it, but you are already)

The Future for Caregivers

Caregivers: Roles and Issues

Are current numbers, roles and responsibilities of doctors, nurses and technicians the right ones?

Shouldn't everyone have a primary generalist? (Specialists make 50-200% more than generalists)

Is there a way for doctors to spend adequate time with patients?

How broadly should doctors be trained? Should they know nutrition, exercise, holistic or alternative medicine?

Settings of Care

Partners HealthCare: a system of care including two academic medical centers, community hospitals and health centers, a physician network, specialty hospitals, and other health services.

Massachusetts General Hospital

Brigham and Women's/ Faulkner Hospital

North Shore Medical Center:
Salem and Union Hospital

Newton-Wellesley Hospital

McLean Hospital

Spaulding Rehabilitation Hospital; Partners Home Care

Settings of Care: Issues and Opportunities

"Providing the right care in the right place at the right time"

What mix and location of hospitals, clinics and doctors offices is best? (Convenience and special services must both be addressed. Currently, ERs are overused and routine and preventive care are overlooked.)

What roles for email, websites and telemedicine?

Can we arrange better chronic care (home and clinic) and better end of life care (home and hospice)?

Who will decide the location and types of care?

Quality of care

Quality of Care: Issues and Opportunities

Over 100,000 in USA die each year from medical errors-IOM

The USA ranks #1 in effectiveness of care, but low on patient safety, patient centeredness and access to care-ACP

Most research on the effectiveness of treatment is funded by those with a product to sell: A drug, device, service or model of care

Consumer assessments and input are minimal

Consumer knowledge of options is poor

What Can You Do?

What You Can Do: Globally

Most of the debate and decision making will be driven by private/vested interests-Get involved

Inform yourself-Write and support politicians whose positions make sense to you

Support research on illness, treatment and quality of care

What You Can Do: Locally

Support education on health, illness, and healthcare in the schools and community

Support healthy environments in the schools and workplaces

Illness is Personal: Risk can be Changed

45% of adults *have* one or more chronic medical illness; one third will develop type II diabetes

64% of the US population is overweight, 2-3 X the rate of other countries

Smoking leads to 462,000 unnecessary deaths and $180 B in additional health costs per year

What You Can Do: Personally

The risk of death or disability from many medical illnesses, including:

cardiovascular diseases, diabetes, lung diseases, cancer and infectious disorders

can be reduced by:

Good diet,
Regular sleep and exercise,
Occasional medical check-ups,
And following through with treatment

Thanks for caring and getting involved