The Future of Medicine

is How

Jakub Tolar, MD, PhD
Dean, Medical School
Vice President for Clinical Affairs

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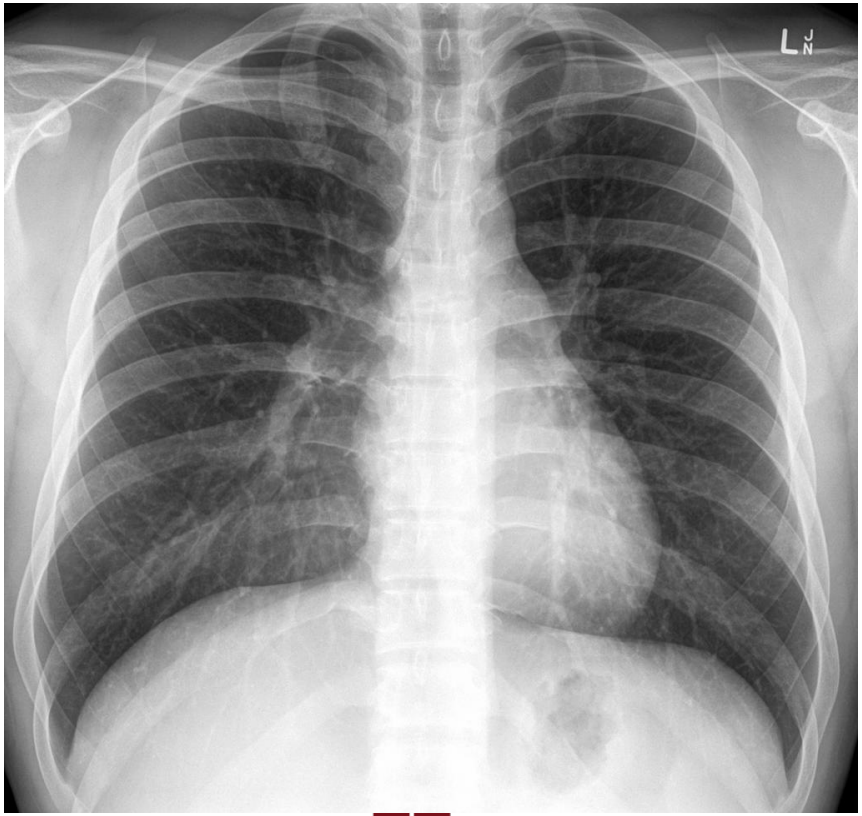
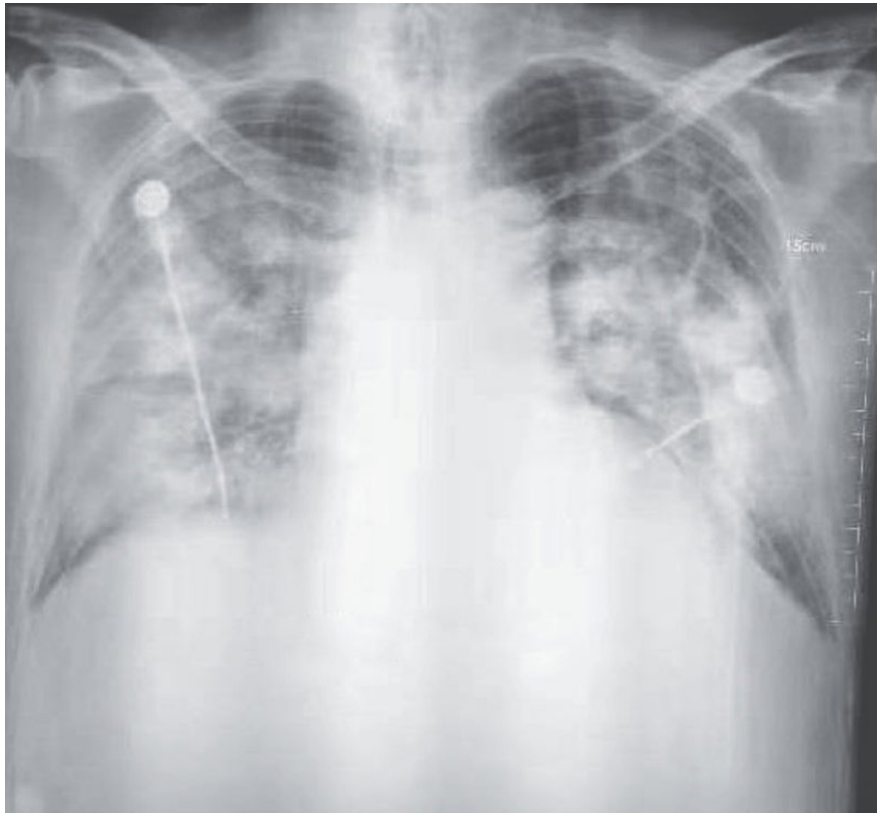
How it started





Single-cohort Hospital
Only COVID-19 hospital in Minnesota

NATIONAL LEADER IN LEARNING HOW TO CARE FOR COVID-19 PATIENTS

74% survival rate in ICU

400+ patients

3 of 600 healthcare workers tested positive

Minnesota COVID-19 Testing Partnership

Responding for the health of Minnesota.

April 22, 2020

Governor Tim Walz

MINNESOTA

UNIVERSITY OF MINNESOTA

MAYO CLINIC

- Equipment from across campus used to set up diagnostic testing lab
- Accredited within 10 days
- Self-sufficient, using our own materials and reagents

June 29, 2020

Reached "Moonshot goal" *capacity of 20,000 COVID-19 tests per day*

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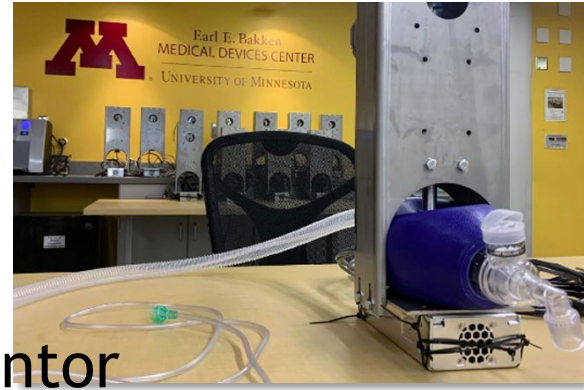
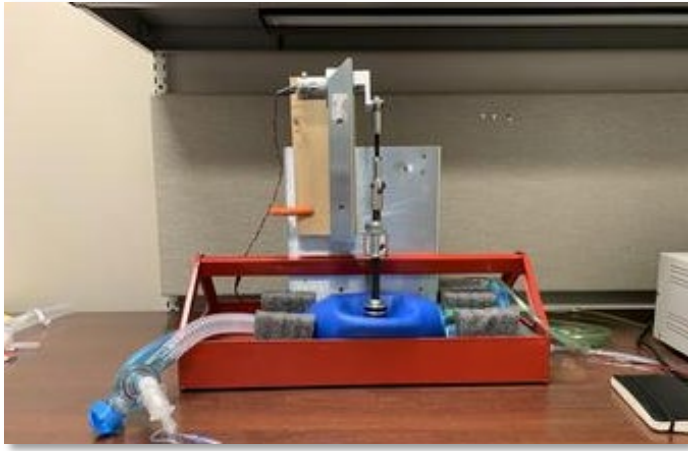
Necessity … invention

Respiratory Safety Shield and System

Masks & PPE

Coventor






Need 300
Volunteers!
Please visit:
MNCovidsitters.org

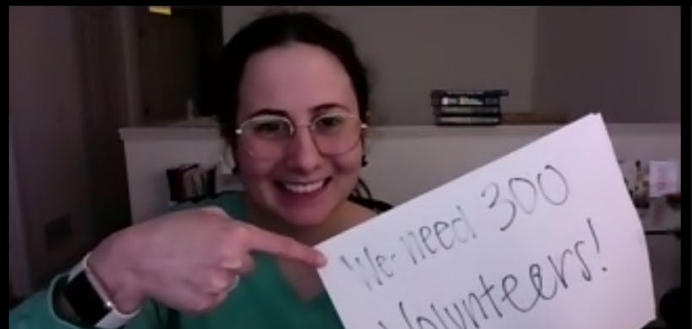

please visit
mncovidsitters


WE NEED 300
VOLUNTEERS!


We Need
-300-
more volunteers!
Visit mncovidsitters.org


WE NEED
300 VOLUNTEERS
PLEASE VISIT US @
MNCOVIDSITTERS.ORG


We need 300
volunteers!


We need 300
volunteers!


WE NEED
300
VOLUNTEERS
!!!!

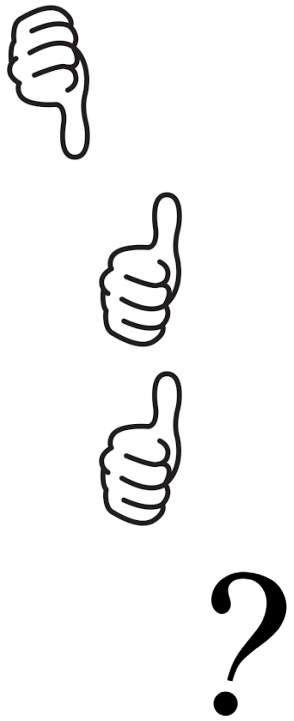
Clinical trials to inform care

HYDROXYCHLOROQUINE

REMEDESIVIR

METFORMIN

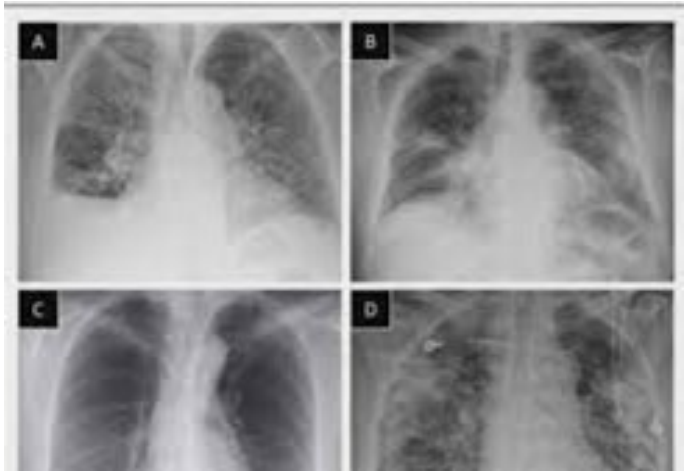
IVERMECTIN



Lessons for clinical care

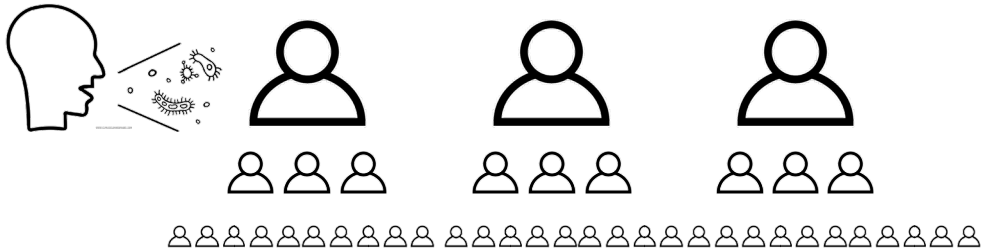
- Virtual visits here to stay
- Interprofessional teams are critical
- Access to care needs improvement statewide

Health Disparities: X-ray Algorithm

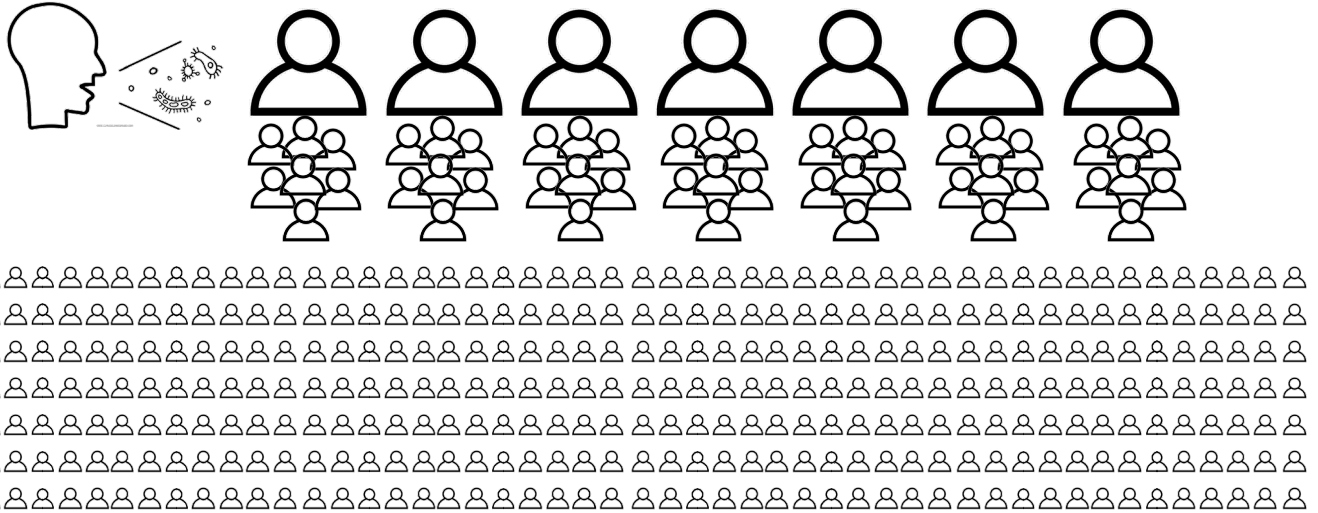


AI system bests radiologists in spotting COVID-19 in lungs

Alpha variant 1:3



Delta variant 1:7



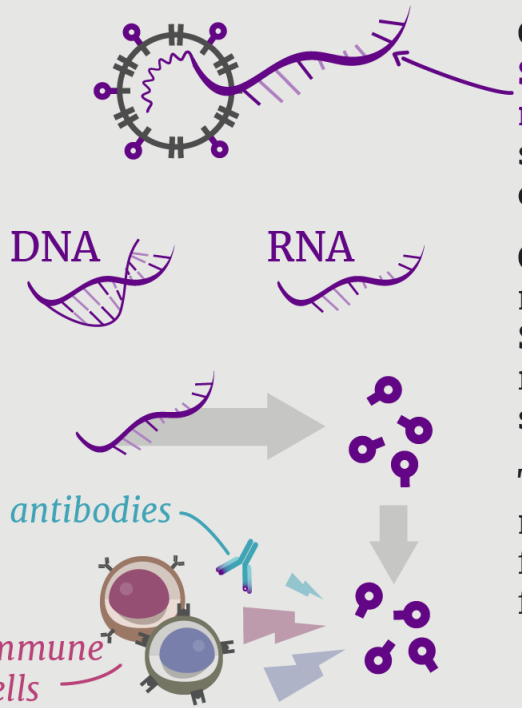
RNA vaccines – 2 doses
Pfizer
Moderna

Viral vector vaccine – 1 dose
Janssen
(Johnson & Johnson)

Types of SARS-CoV-2 vaccines for COVID-19

Genetic vaccines
(nucleic acid vaccines)

British Society for immunology
www.immunology.org



Contain a segment of **SARS-CoV-2 virus genetic material** that codes for a specific protein. Can be DNA or RNA.

Our cells use the genetic material to make the SARS-CoV-2 protein, which is recognised by the immune system to trigger a response.

This response builds immune memory, so your body can fight off SARS-CoV-2 in future.

Considerations

Low cost and fast to develop.

May need to be stored at specific low temperatures.

Approved in the UK for COVID-19

Pfizer/BioNTech & Moderna

In clinical trials for COVID-19

CureVac, Inovio Pharmaceuticals

Types of SARS-CoV-2 vaccines for COVID-19

Viral vector vaccines

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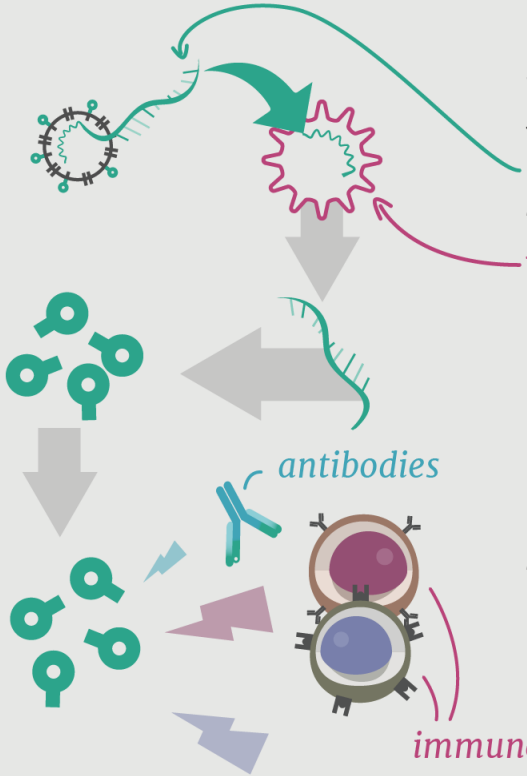


Use an unrelated harmless virus, modified to deliver **SARS-CoV-2 genetic material**. The delivery virus is known as a **viral vector**.

Our cells use the genetic material to make a specific SARS-CoV-2 protein, which is recognised by the immune system to trigger a response.

This response builds immune memory, so your body can fight off SARS-CoV-2 in future.

Considerations

Generate strong immune response.

May need to be stored at specific low temperatures.

Examples in human use for other diseases

Ebola vaccine

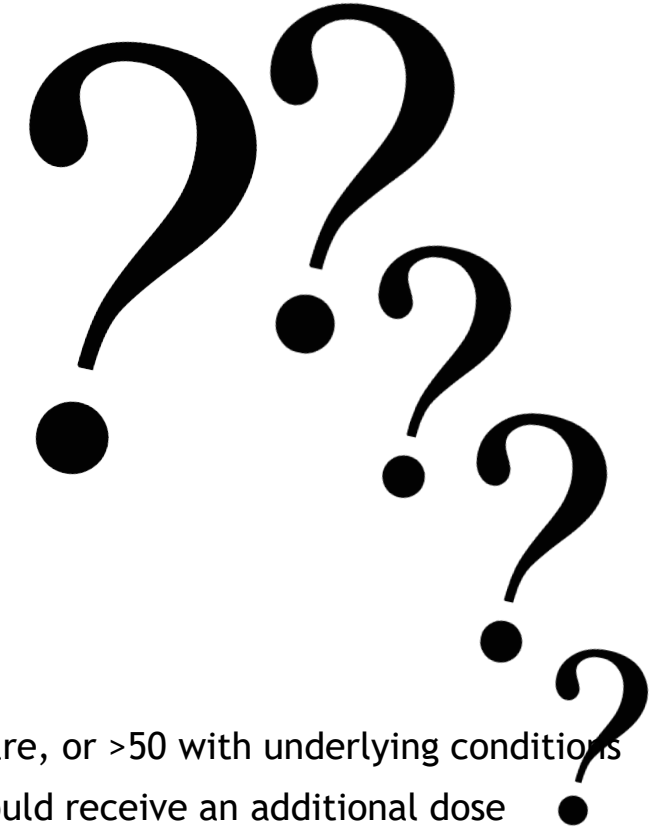
Approved in the UK for COVID-19

AstraZeneca/Oxford

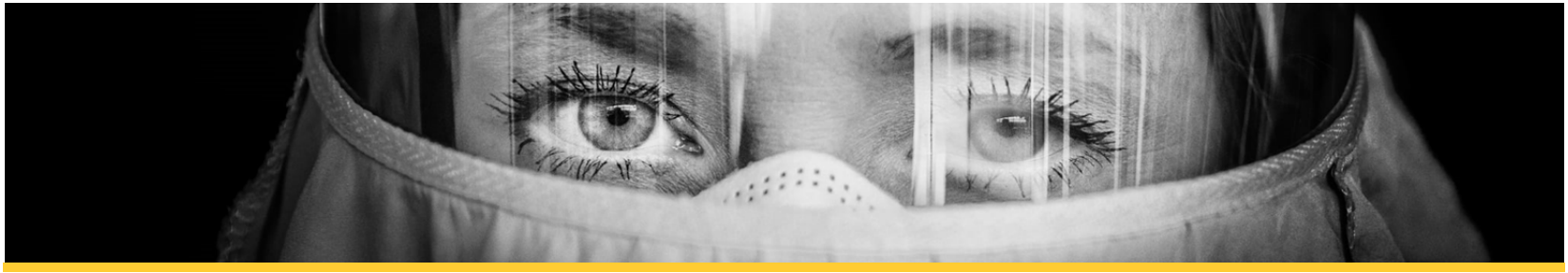
Approved elsewhere in the world for COVID-19

Jannsen, CanSino, Gamaleya

How it’s going



- CDC says Pfizer boosters for people >65, in long-term care, or >50 with underlying conditions
- CDC says people with compromised immune systems should receive an additional dose (Pfizer or Moderna)



We Teach

Training 70% of state's physician workforce

We Explore

Translating world class basic science into improved clinical care

We Heal

Providing compassionate care and cutting edge therapies

We Serve

Developing and delivering solutions for the state's health care problems

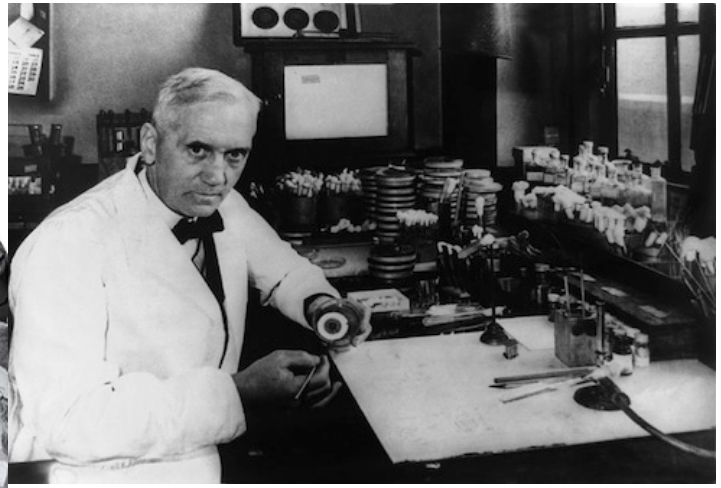
The most exciting phrase to hear in science, the one that heralds new discoveries, is not “Eureka” (I found it) but “that's funny...” —Isaac Asimov (1920–1992)

Post-it Notes

One guy makes weak adhesive by mistake. Another guy doesn’t want his page markers to fall out of hymnal

Velcro

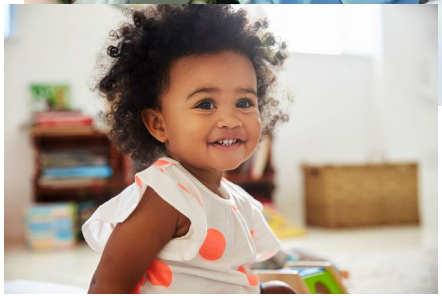
Electrical engineer walks dog



Penicillin

Scientist goes on vacation rather than washing dishes

How it started



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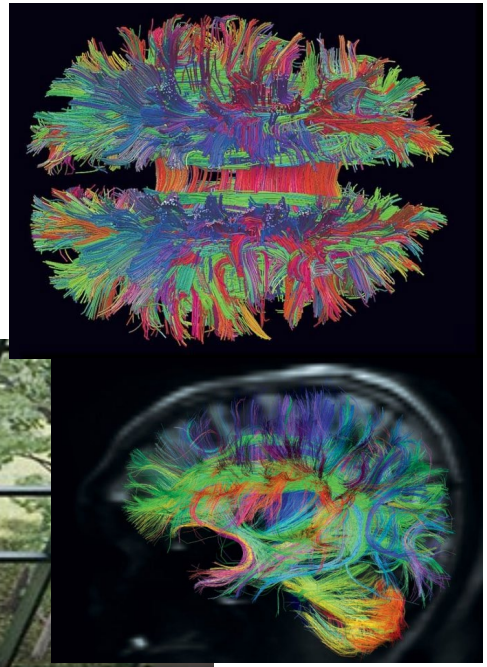
Masonic Institute for the Developing Brain (MIDB)

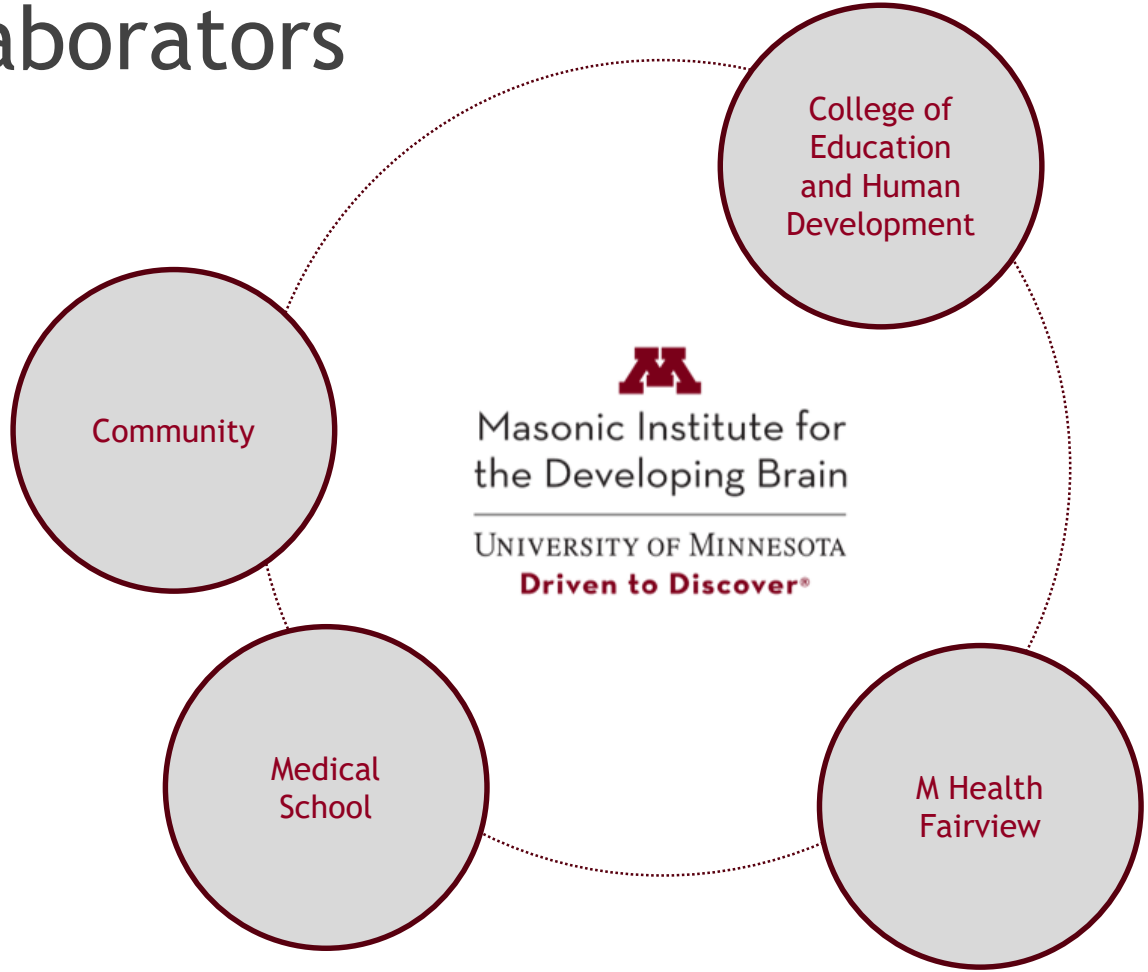
Dr. Michael Georgieff

Dr. Anita Randolph

Dr. Damien Fair



Collaborators



Masonic Institute for the Developing Brain

Advancing brain health from the earliest stages of development across the lifespan, supporting each person's journey as a valued community member

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How it’s going

- Facility opens on East River Road fall 2021
- Develop comprehensive research portfolio
- Engage with community partners

Developing connections between serving community, performing clinical research, providing care, and developing policy


Yes, Paul,
I really am a
scientist.

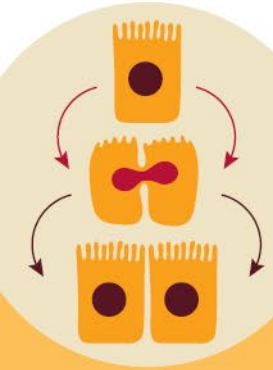
How it started

Dr. Laura Niedernhofer Dr. Paul Robbins Dr. James Pacala

Minnesota Northstar Geriatrics
Workforce Enhancement Program

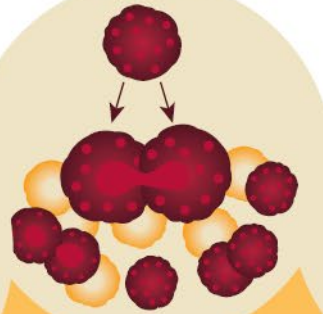
Medical Discovery Team on the Biology of Aging

Science of Aging



1

Our body is made up of trillions of cells. There are many different kinds of cells, each type with a specific function. Healthy cells can **REPRODUCE** themselves, creating replacements for when the original cell dies.

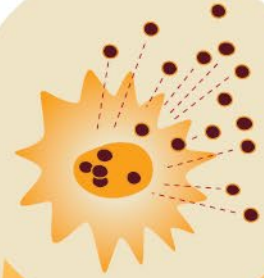


2

Often, cells are damaged. If the **DAMAGE** is catastrophic, the body usually kills these cells because left unchecked, the damaged cell can reproduce incorrectly, causing cancer.

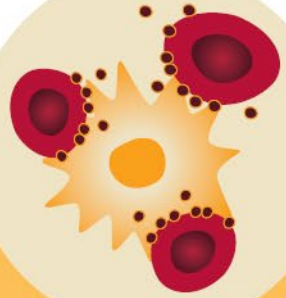
3

If the damaged cell doesn't die, the body has another **SYSTEM** to stop that cell from reproducing. The cell becomes "senescent."



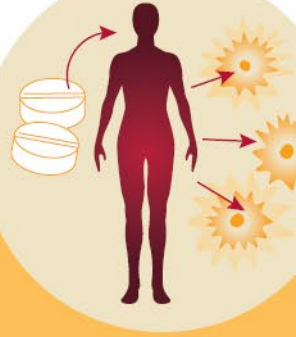
4

These **SENESCENT CELLS**, although they no longer serve their function in the body, still produce and release chemicals that can affect the body.



5

These chemicals cause a constant low level of **INFLAMMATION**, which in turn impact the body's ability to repair and fight off infection.



6

"Senolytics" are **MEDICATIONS** that can clear these cells from the body, reducing inflammation and its complications.

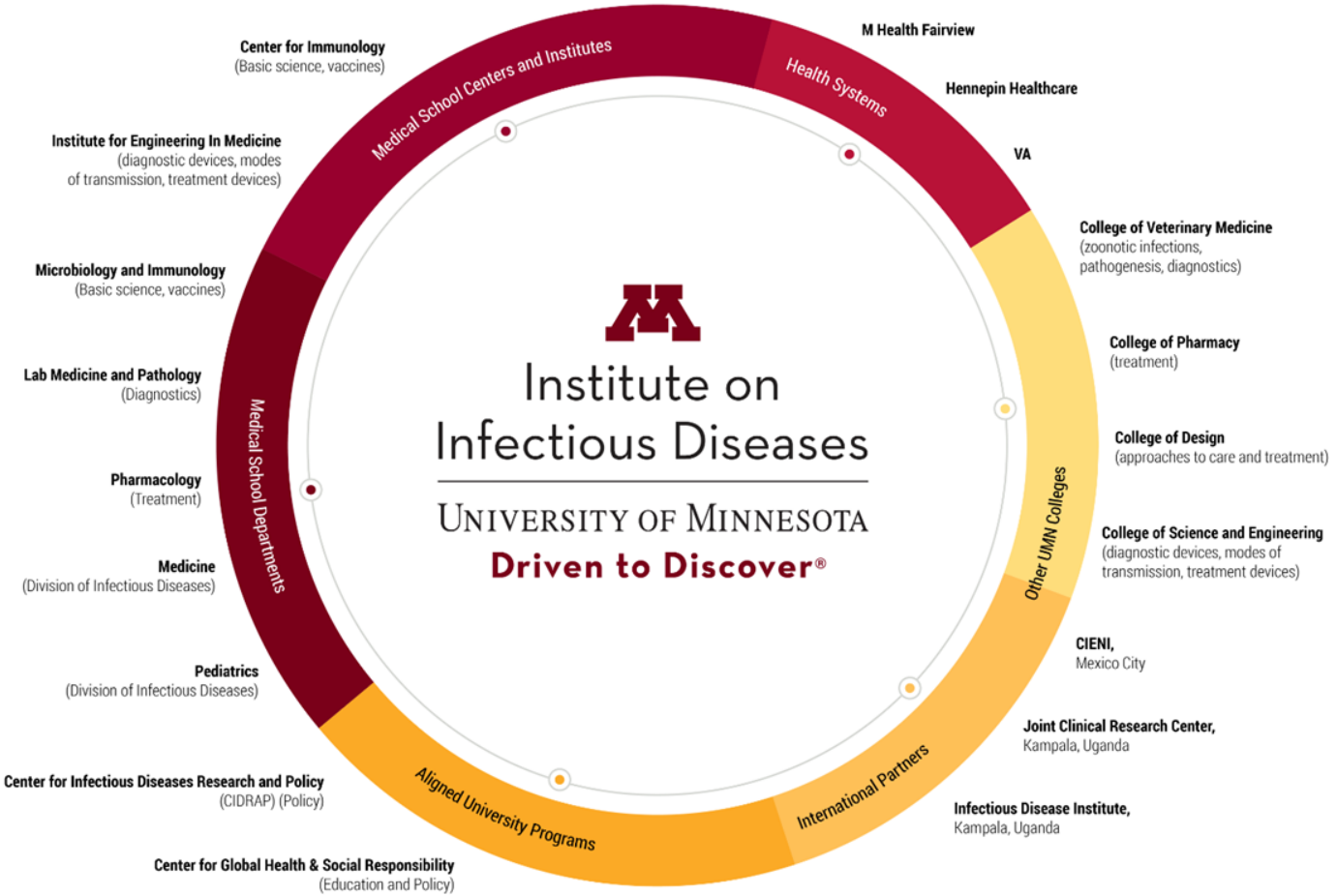
How it’s going

By 2030,
1 in 5
>65 years

Not just lifespan “healthspan”

90% of US health costs are related to aging

Geroscience is rapidly growing field


Institute on Infectious Diseases
University of Minnesota
Driven to Discover®
Medical School Centers and Institutes
Health Systems
Other UMN Colleges
International Partners
Aligned University Programs
Medical School Departments
Center for Immunology
(Basic science, vaccines)
Institute for Engineering In Medicine
(diagnostic devices, modes of transmission, treatment devices)
Microbiology and Immunology
(Basic science, vaccines)
Lab Medicine and Pathology
(Diagnostics)
Pharmacology
(Treatment)
Medicine
(Division of Infectious Diseases)
Pediatrics
(Division of Infectious Diseases)
Center for Infectious Diseases Research and Policy
(CIDRAP) (Policy)
Center for Global Health & Social Responsibility
(Education and Policy)
M Health Fairview
Hennepin Healthcare
VA
College of Veterinary Medicine
(zoonotic infections, pathogenesis, diagnostics)
College of Pharmacy
(treatment)
College of Design
(approaches to care and treatment)
College of Science and Engineering
(diagnostic devices, modes of transmission, treatment devices)
CIENI,
Mexico City
Joint Clinical Research Center,
Kampala, Uganda
Infectious Disease Institute,
Kampala, Uganda

Questions?