NCI Serology Studies

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Principal Deputy Director

NCI Council of Research Advocates (NCRA) meeting

July 16, 2020
Topics for today

• Frederick National Laboratory for Cancer Research
• Serology at Frederick National Lab
• Serology dashboard
• Serology network
• Cancer prevention & screening
Frederick National Laboratory for Cancer Research (FNLCR)

- The only Federally-Funded Research and Development Center (FFRDC) dedicated exclusively to biomedical research
  
  
  Operated in the public interest by Leidos Biomedical Research, Inc. on behalf of the National Cancer Institute

**Mission**

Provide a unique national resource for the development of new technologies and the translation of basic science discoveries into novel agents for the prevention, diagnosis and treatment of cancer and AIDS.
Adaptive Coronavirus Treatment Trial (ACCT): Hospitalized COVID-19 patients on Remdesivir treatment improved faster than those on placebo

The White House

April 29, 2020

Remdesivir for the Treatment of Covid-19 — Preliminary Report

Supplemental funding from Congress

- Enacted April 24th
- $306M for NCI to develop, validate, improve, and implement serological testing and associated technologies
- COVID-19-focused and distinct from annual appropriation
FNLCR Serology Laboratory
“No one wants to have COVID-19, but everyone wants to have had it.”

Maura Judkis
Washington Post
May 7
FNLCR HPV Serology Laboratory

Support for NCI vaccine trials and epidemiological studies
NCI Costa Rica Vaccine Trial

Collaboration with the extramural HPV vaccine community
cCRADAs
– Moffitt Cancer Center
– University of London

HPV serology standardization initiative (reference lab)
Partners: BMGF, CDC, PHE, NIBSC, KI, and WHO

Thanks to Ligia Pinto, FNLCR
Convert part of HPV serology lab to SARS-CoV-2 serology

**Ongoing project:**
Characterize performance of many SARS-CoV-2 serology devices submitted to FDA; submit our results to FDA

*A collaborative research effort with several groups: NIAID, FDA, CDC, Mount Sinai, others*

**Future project:**
Serological responses of cancer patients in COVID-19; longitudinal trial of cancer patients
Summary of initial 70 commercial serology devices evaluated by FNLCR serology laboratory

- Focus on IgG antibody tests; IgM becomes positive at about the same time as IgG and decreases faster than IgG
- **Sensitivity** (detect true positives): Varies from 30% to 100%
- **Specificity** (does not detect false-positives): Varies from 87% to 100%
- Results sent to FDA to help FDA determine suitability for Emergency Use Authorization (EUA)
Seroprevalence studies; specificity

• Antibody tests can be used now for seroprevalence studies; antibody tests should be able to identify everyone who had symptomatic infection and most who had asymptomatic infection.

• Importance of high specificity: If a test has 95% specificity and the seroprevalence rate is found to be 5%,

  ➢ 50% of the positives will be false-positives
Additional activities at FNL serology lab

• FNL protein expression lab is producing large amounts of SARS-CoV-2 antigens for use in serologic assays, at FNL and NIBIB

• Serology lab is developing quantitative SARS-CoV-2 antibody assays
  • Until now, assay results have been qualitative

• Serology lab is developing a “standard” pooled serum for US govt and beyond; collaboration with NIAID, CDC, BARDA
  • Will eventually be linked to WHO standard serum when it is available
Some SARS-CoV-2 serology questions

- It is not currently known:
  - whether being antibody-positive is associated with protection against reinfection
  - what antibody levels may be associated with protection
  - how long protection will last
- NCI is co-funding extramural research with NIAID and CDC to address these questions
- For candidate SARS-CoV-2 vaccines, will induction of neutralizing antibodies confer protection?
  - The serological standard will enable direct comparisons of immunogenicity between candidate vaccines
Tracking SARS-CoV-2 seroprevalence
Developing a SARS-CoV-2 serology data warehouse and dashboard

- Early June: HHS, CDC, NIAID ask NCI to develop data warehouse & dashboard for tracking SARS-CoV-2 seroprevalence and other US-based serology studies

- Builds on FNL dashboard expertise developed with NCI Clinical Trials Reporting Program (CTRP), other databases
  - Collaboration between NIAID, CDC, NCI

- Key features:
  - A publicly accessible data warehouse to systematically document and track SARS-CoV-2 serology studies and associated test results
  - A tracking dashboard to visualize SARS-CoV-2 serology data and present results overall and by key strata
<table>
<thead>
<tr>
<th>Study Title</th>
<th>Subjects Enrolled</th>
<th>Age Group</th>
<th>Sampling Strategy</th>
<th>Study Group</th>
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</thead>
<tbody>
<tr>
<td>NCI COVID-19 in Cancer Patients, NCCAPS Study</td>
<td>2,000</td>
<td>Adults</td>
<td>Longitudinal</td>
<td>NCI</td>
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<tr>
<td>A Phase 2 Trial of infliximab in Coronavirus Disease 2019 (COVID-19)</td>
<td>17</td>
<td>Adults</td>
<td>Prospective</td>
<td>Tufts Medical Center</td>
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<tr>
<td>Application of Desferal to Treat COVID-19</td>
<td>50</td>
<td>Children and Adults</td>
<td>Cross-sectional</td>
<td>Kernanubh I B Medical Science</td>
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<td>A Study Evaluating the Efficacy and Safety of High-Titer Anti-SARS-CoV-2 Plasma in Hospitalized Patients With COVID-19 Infection</td>
<td>131</td>
<td>Adults</td>
<td>Recruited</td>
<td>Medical College</td>
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<td>Study to Evaluate the Efficacy and Safety of Tocilizumab Versus Corticosteroids in Hospitalized COVID-19 Patients With High Risk of Progression</td>
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<td>University of Antioquia, Colombia</td>
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<td>Effectiveness and Safety of Medical Treatment for SARS-CoV-2 (COVID-19) in Colombia</td>
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<td>Inhaled Nitric Oxide for Preventing Progression in COVID-19</td>
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<td>Hyperbaric Oxygen Therapy (HBOT) as a Treatment for COVID-19</td>
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<td>A Study of Hydroxychloroquine Compared to Placebo as Treatment for People With COVID-19</td>
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<td>MSKCC</td>
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<td>A Study of N-acetylcysteine in Patients with COVID19 Infection</td>
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<td>BCG Vaccine for Health Care Workers as Defense Against COVID 19</td>
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<td>Adults</td>
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<td>Texas A&amp;M</td>
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<td>A Study to Evaluate the Safety, Tolerability and Pharmacokinetics (PK) of TAK-981 in Adult</td>
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Dynamic Popups showing any data elements deemed appropriate.
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Clear highlight of seroprevalence

- Total Number of Studies: 20
- Total Number of Subjects: 19,261
- Average Number of Subjects: 963
- Average Duration: 12 months
- Average Seroprevalence: 2.71%
Extramural Serological Sciences Network
Serological Sciences Network for COVID-19 (SeroNet)

GOALS

To rapidly expand understanding of all aspects of the immune response associated with SARS-CoV-2 viral infection.

• Increase national capacity for high-quality serological testing
• Develop serological assays for deployment to test for SARS-CoV-2 induced immune responses
• Understand the mechanisms driving the serological, humoral and cellular immune responses
• Determine the serological correlates of disease pathogenesis and protection against future infection
Serological Sciences for COVID-19 (SeroNet)

RFA-CA-20-038 Closes 7/22
SARS-CoV-2 Serological Sciences Centers of Excellence (U54 Clinical Trial Optional)

RFA-CA-20-039 Closes 7/22
Research Projects in SARS-CoV-2 Serological Sciences (U01 Clinical Trial Optional)

RFP Solicitation S20-119 Closes 7/16
Serological Sciences Network Capacity Building Centers
SeroNet “hub and spokes”

4-8 CBCs: Serological Sciences Capacity Building Centers (RFP)

4-8 U54s: Serological Sciences Centers of Excellence (RFA)

5-10 U01s: Serological sciences projects (RFA)
COVID-19 and cancer screening
President’s Cancer Panel

• Cancer screening in the COVID-19 era
  • Cervical, colorectal, breast, lung

• Can we get screening uptake to be ever higher than prior to COVID-19 epidemic?

• Are there opportunities to bring screening to the patient instead of the patient to screening?
Using the COVID-19 to help overcome higher cervical cancer mortality rates in minority women

- FDA is willing to consider self-collected vaginal specimens for cervical cancer screening. Could enable screening of “hard to reach” women, which could decrease cervical cancer incidence and mortality.
Thanks to

- Ligia Pinto, Troy Kemp, Jim Cherry: NCI Frederick Serology lab
- Dom Espisito, FNL Protein Expression Lab
- Ned Sharpless, Dinah Singer, Jim Doroshow
- Tony Kerlavage, Stephen Chanock, Neal Freedman, Jonas de Almeida
- Brent Coffey and his FNL team
- Florian Krammer, Carlos Cordon-Carlo: Mount Sinai Medical Center
- Many colleagues at NIAID, FDA, CDC, BARDA