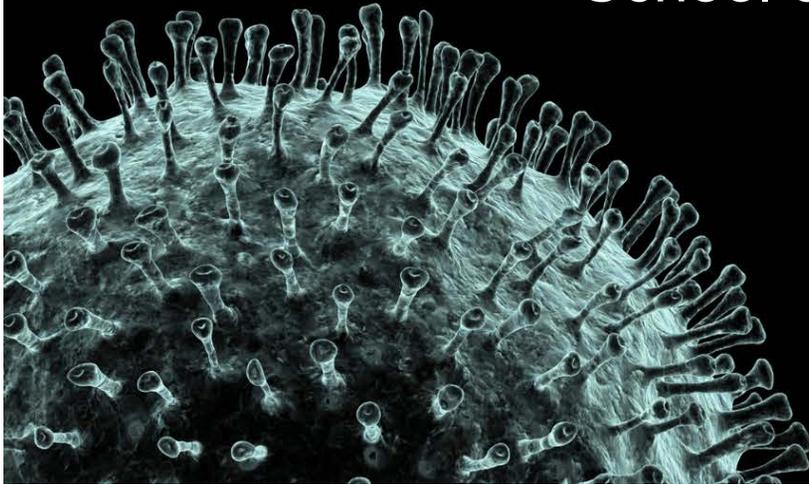


COVID-19 Conversations



Arturo Casadevall, MD, PhD

Chair, Molecular Microbiology and
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COVID19Conversations.org

[#COVID19Conversations](https://twitter.com/COVID19Conversations)



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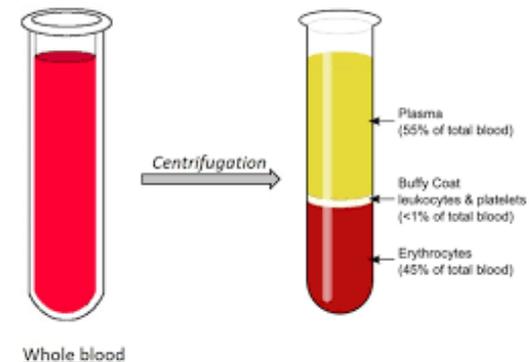
Convalescent Plasma for Prophylaxis and Treatment of COVID19

Arturo Casadevall MD, PhD

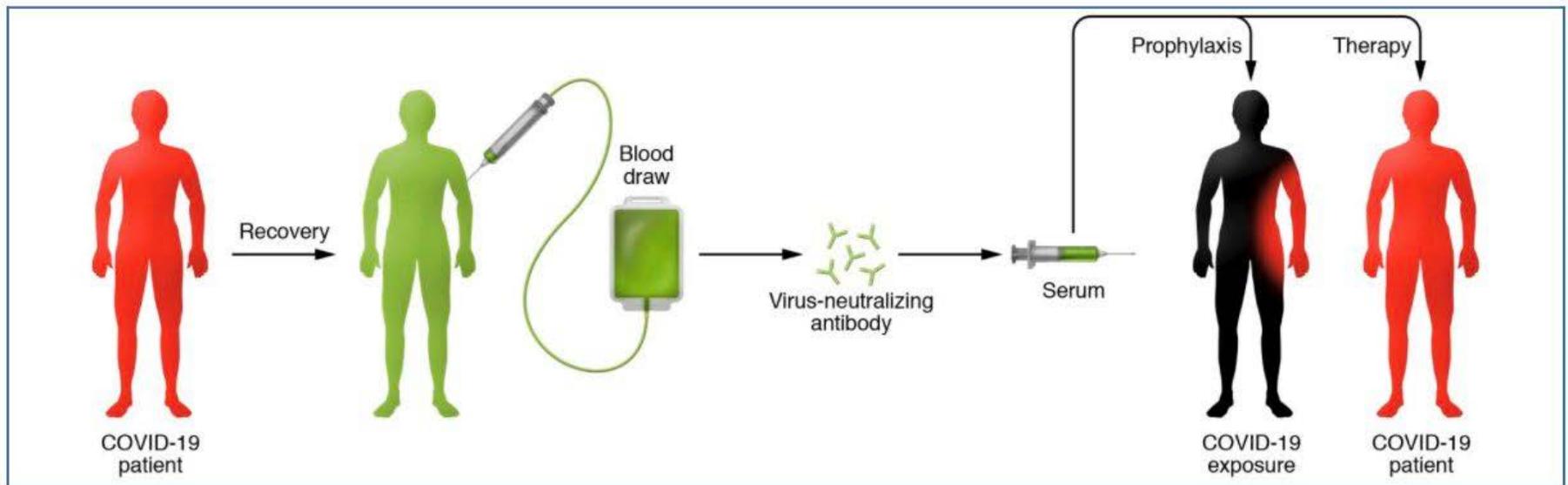
Johns Hopkins School of Public Health

What is convalescent plasma?

- Plasma is the liquid in the blood that holds the blood cells
- It is obtained by separating the cells from the liquid
- Differs from 'sera' in that it contains clotting factors
- Can be obtained from donors by plasmapheresis
- Obtained by standard transfusion practices



Principles of Convalescent Plasma Usage



Convalescent Serum (Plasma) used in past epidemics



THE USE OF CONVALESCENT I
FLUENZA PNEUMONIA—A PRE

1918

L. W. McGUIE



Use of Convalescent M
Control Meas.
Preparatory S

1934



American Journal of Dis

VOLUME 71

JANUARY 19

1946

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Specific Immunoglobulin (antibody) is the active component in convalescent plasma

- Pathogen (virus) specific immunoglobulin develops during late disease and early convalescent period.
- Immunoglobulin includes both IgM and IgG
- IgG half-life about 20 days
- Complex mixture of antibodies
- Effective immunoglobulins
 - Neutralizing antibody
 - Non-neutralizing antibody mediates antiviral functions through IgG receptor (antibody-dependent cellular cytotoxicity, ADCC; phagocytosis, complement activation)

Convalescent Plasma for coronavirus disease

SARS Coronavirus (2003)

Hong-Kong Study: 80 patients with SARS coronavirus infection treated with convalescent sera. A higher discharge rate among those treated with convalescent sera (58.3% vs 15.6%: $P < 0.001$)

Y. Cheng · R. Wong · Y. O. Y. Soo · W. S. Wong ·
C. K. Lee · M. H. L. Ng · P. Chan · K. C. Wong ·
C. B. Leung · G. Cheng

MERS Coronavirus

Anecdotal use – well tolerated but efficacy difficult to assess

China uses Convalescent Plasma against COVID19

JAMA | Preliminary Communication

Treatment of 5 Critically Ill Patients With COVID-19 With Convalescent Plasma

JAMA 2020

Effectiveness of convalescent plasma treatment in patients with COVID-19

PNAS 2020

Journal Pre-proof

CHEST 2020

Treatment with convalescent plasma for critically ill patients v

Italy Uses Convalescent Plasma against COVID19

Covid, la terapia col plasma funziona. Già dieci i pazienti che sono migliorati, due addirittura dimessi

Di redazione - 2 Aprile 2020



Coronavirus, aumentano i contagi a Mantova. Ma il plasma dai donatori dà i primi risultati



Dopo cinque giorni di calo nuovo rialzo dei contagiati: + 115. La terapia applicata su 12 pazienti: otto sono già migliorati

Two Publications with Convalescent Plasma Information

The convalescent sera option for containing COVID-19

Arturo Casadevall¹ and Liise-anne Pirofski²

First published March 13, 2020 - [More info](#)

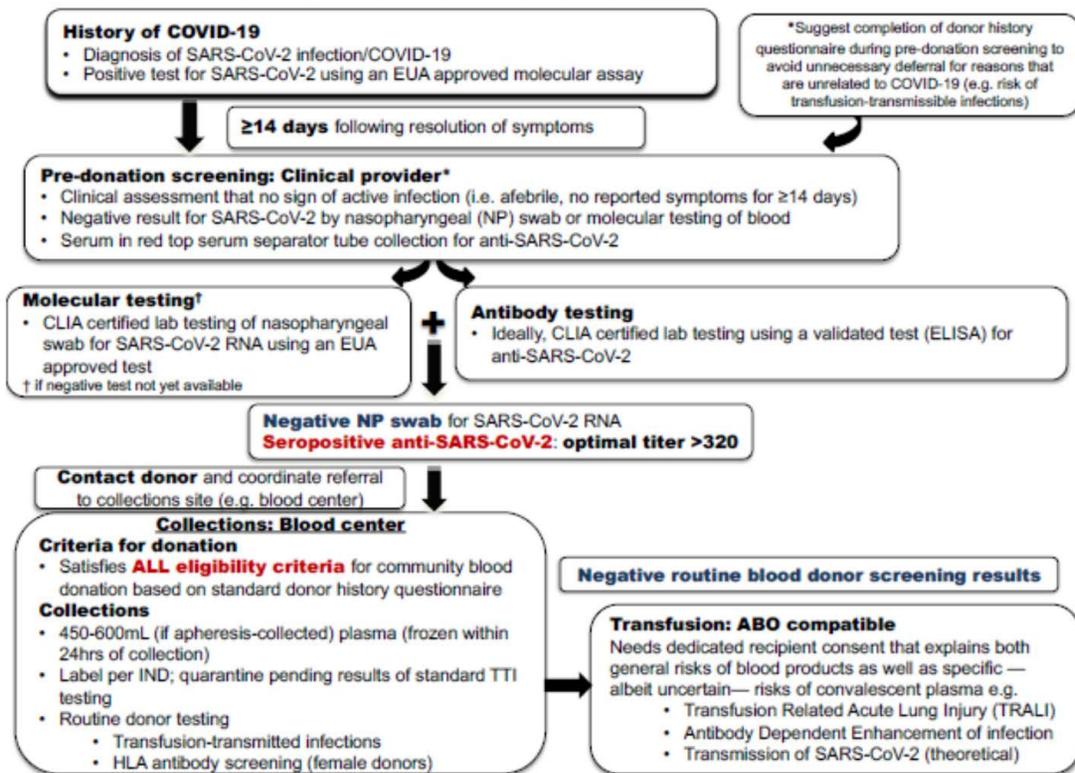
As of early 2020, humanity is confronting a pandemic in severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). SARS-CoV-2 causes coronavirus disease, abbreviated as COVID-19. At the time of this writing, SARS-CoV-2 is spreading in multiple countries, threatening a pandemic that will affect billions of people. This virus appears to be a new human pathogen. Currently there are no vaccines, monoclonal antibodies (mAbs), or drugs available for SARS-CoV-2, although many are in rapid development and some may be available in a short time. This Viewpoint argues that human convalescent serum is an option for prevention and treatment of COVID-19 disease that could be rapidly available when there are sufficient numbers of people who have recovered and can donate immunoglobulin-containing serum.

Deployment of convalescent plasma for the prevention and treatment of COVID-19

Evan M. Bloch,¹ Shmuel Shoham,² Arturo Casadevall,³ Bruce S. Sachais,⁴ Beth Shaz,⁴ Jeffrey L. Winters,⁵ Camille van Buskirk,⁵ Brenda J. Grossman,⁶ Michael Joyner,⁷ Jeffrey P. Henderson,⁸ Andrew Pekosz,³ Bryan Lau,⁹ Amy Wesolowski,⁹ Louis Katz,¹⁰ Hua Shan,¹¹ Paul G. Auwaerter,² David Thomas,² David J. Sullivan,³ Nigel Paneth,¹² Eric Gehrie,¹ Steven Spitalnik,¹³ Eldad Hod,¹³ Lewis Pollack,¹⁴ Wayne T. Nicholson,⁷ Liise-anne Pirofski,¹⁵ Jeffrey A. Bailey,¹⁶ and Aaron A.R. Tobian¹

First published April 7, 2020 - [More info](#)

COVID19 Convalescent Plasma Protocol



<https://www.nbcnews.com/health/health-news/plasma-treatment-being-tested-new-york-may-be-coronavirus-gamechanger-n1178436>

FDA Actions (www.fda.gov)

- **March 24** Compassionate use of convalescent plasma allowed
- **April 3, 2020.** Hopkins granted permission of clinical trials of convalescent plasma in high risk individuals
- **April 3, 2020.** FDA allows Expanded Access to Convalescent Plasma for the Treatment of Patients With COVID-19
- **April 8, 2020.** Recommendations for Investigational COVID-19 Convalescent Plasma (<https://www.fda.gov/vaccines-blood-biologics/investigational-new-drug-ind-or-device-exemption-ide-process-cber/recommendations-investigational-covid-19-convalescent-plasma>)

Risks

Known

- Transfusion reaction
- Infectious disease

Theoretical

- Antibody pro-inflammatory reaction

Risk-Benefit analysis suggests Benefits >> Risk for all age groups. Bloch et al. JCI 2020

Current Status

- Compassionate use being done USA
- Many countries deploying convalescent plasma (UK, France, Italy, Spain, Argentina, Panama...etc)
- Clinical trials in preparation
 - Prophylactic use
 - Early therapeutic use
 - Late therapeutic use
 - Pediatric protocol
- Major problem – logistical
 - Plasma is scarce commodity



Donation Information

Red Cross

New York Blood Center

Specific institutions (Mt Sinai in NYC, Methodist in Houston, Hopkins)

ccpp19.org

Closing thoughts

Convalescent plasma history provides strong encouragement for use

Convalescent plasma supported by strong theory of antibody action

Plasma therapy is relatively safe (as safe as transfusion practices)

Efficacy against COVID19

Anecdotal evidence and patient case series encouraging

Need randomized control trials to know if, when and how to use

Challenge today: LOGISTICAL, LOGISTICAL, LOGISTICAL...will get easier.