

# Indicators of Predictable COVID-19 Immunity and Possible Novel Therapeutic Discovered by Machine Learning

*Study Published in JMIRx Peer-reviewed Journal*

BOSTON, MA, USA, October 21, 2020 /EINPresswire.com/ -- Bioinformatix.io, an industry leader in applying AI and machine learning to solve biomedical and public health problems, is proud to



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*Eric Luellen*

announce the publication of co-founder and Chief Data Scientist [Eric Luellen](#)'s newest comparative effectiveness research study in the peer-reviewed JMIRx Med special edition on COVID-19.

[The study](#), entitled A Machine Learning Explanation of the Pathogen-Immune Relationship of SARS-CoV-2 (COVID-19), and a Model to Predict Immunity and Therapeutic Opportunity, appears in the [JMIR Theme Issue 2020: COVID-19 special issue](#). The article is available at <https://xmed.jmir.org/2020/1/e23582>.

The study's primary objective was to use machine learning to identify distinct patterns in the pathogen-host immune relationship that can differentiate - or predict - COVID-19 symptom immunity. Approximately 80% of those infected with COVID-19 are resistant; however, they are asymptomatic, unknown carriers who can still infect others who, up until now, were unidentifiable.

Insights into the health of this 80% are crucial in the fight against this infectious disease before the eventual availability of mass vaccinations. "Understanding what makes them immune could inform public health policies as to who needs to be protected - and why, and assist with prioritizing mass vaccinations," Luellen states. "(It could also) possibly lead to a novel treatment for those who cannot, or will not, be vaccinated once vaccines are approved."

The study utilized immune profiles from 74 COVID-19-positive patients in China - 37 symptomatic and 37 asymptomatic - at a primary-care hospital in the Wanzhou District. Using advanced machine-learning techniques, algorithms worked to understand the pathogen-immune relationship and predict immunity.

As a result, the study identified that:

- Introducing stem cell growth factor-beta (SCGF- $\beta$ ) into the machine-learning analysis enabled two algorithms to classify and predict COVID-19 symptom immunity with 100% accuracy;
- Without SCGF- $\beta$ , two other immune-system molecules -- Interleukin-16 (IL-16) and Macrophage colony-stimulating factor (M-CSF) could predict immunity with 94.8% accuracy; and,
- Thirty-four different common immune factors have statistically significant associations with COVID-19 symptoms, while 19 immune factors appear to have no statistically significant association.

The study concluded that three distinct immunological factors and levels could identify which patients are likely to be asymptomatic or immune to a COVID-19 infection:

- SCGF- $\beta$  (>127,637); or,
- Interleukin-16 (IL-16) (>45); and,
- Macrophage colony-stimulating factor (M-CSF) (>57).

The results suggest that testing levels of these three immunological factors may be a valuable tool at the point of care for managing and preventing outbreaks. A secondary outcome suggests that stem-cell therapy with SCGF- $\beta$  and M-CSF therapeutics may be a novel treatment for COVID-19.

"I'm proud to share these initial results," Luellen said. "They need to be replicated in a larger case-control study; however, it's insights like these that are critical in the ongoing fight against the spread of COVID-19. Our work is just beginning."

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