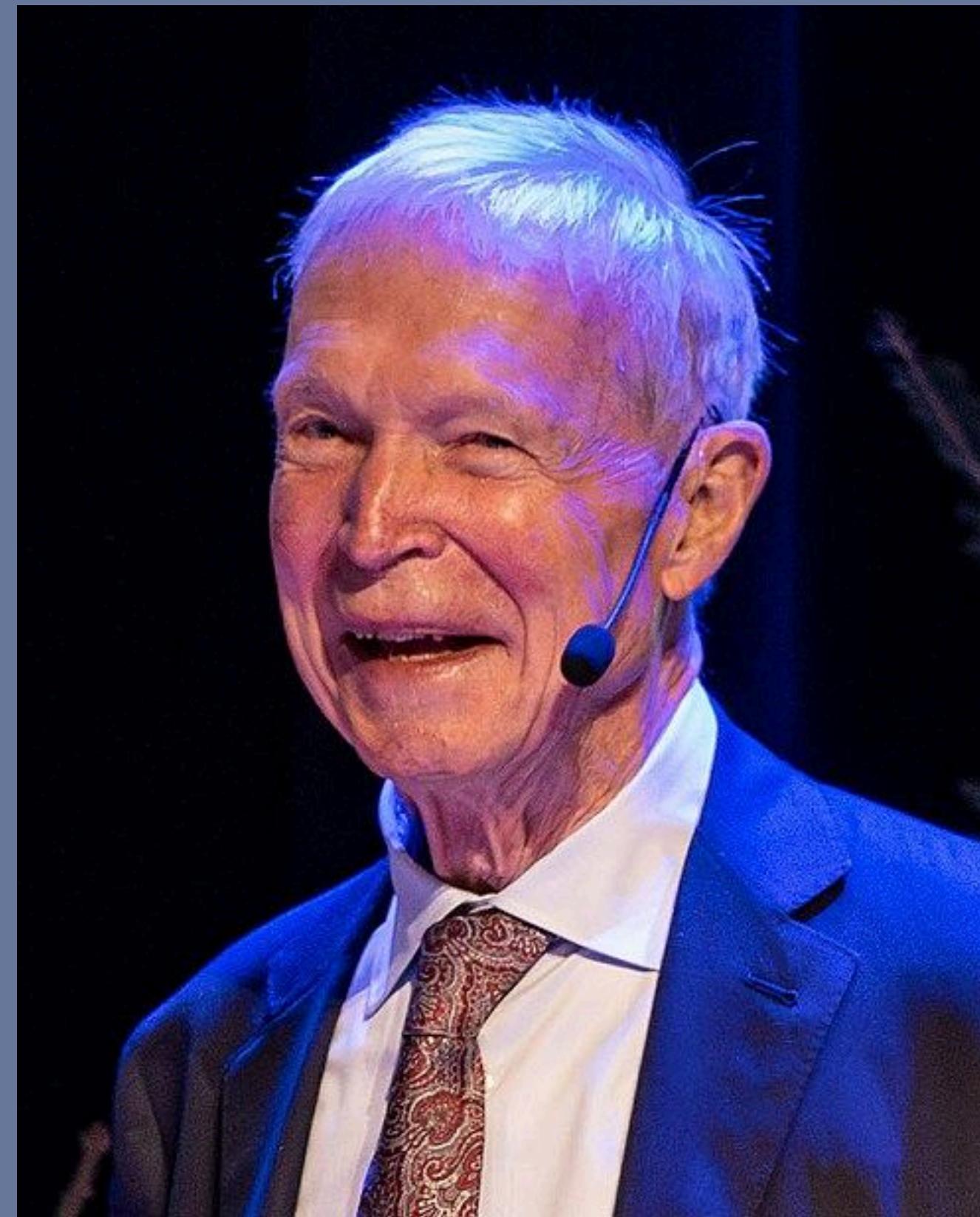


James Watson



Francis Crick

- **B.Sc. in Physics at University College London in 1937.**
- **Ph.D. in Molecular Biology (X-ray crystallography of proteins)**
- **Inspired by Erwin Schrödinger's 1944 book "What is Life?"**
- **Proposed DNA's double helix structure in 1953.**
- **Nobel Prize in 1962.**



John Hopfield

- **Kinetic proofreading mechanism for DNA/protein synthesis in 1974.**
- **Quantitative model for oxygen binding to hemoglobin in 1971.**
- **Hopfield Network development in 1982.**

Hiroaki Kitano

- **B.A. in Physics; Ph.D. in Computer Science**
- **Leading the shift from reductionist to system-level biology.**
- **Head of the Systems Biology Institute (SBI)**



Uri Alon

- **Ph.D. in Theoretical Physics**
- **Design principles in biology (Network motifs)**



Alex Zhavoronkov

- M.S. in Biotechnology from Johns Hopkins University.
- Ph.D. in Physics and Mathematics from Moscow State University
- Founded Insilico Medicine, an AI drug discovery company

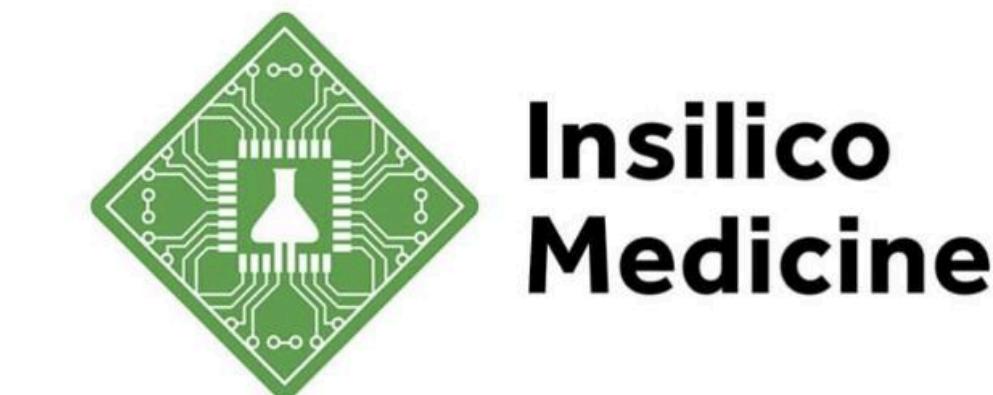
Insilico's AI-designed rentosertib shows promise in first phase 2a trial results

By Brian Buntz | June 5, 2025



An AI-designed drug, rentosertib, from Insilico Medicine improved lung function by 98.4 mL in a 71-patient idiopathic pulmonary fibrosis study published June 3 in [Nature Medicine](#), marking what may be the first peer-reviewed phase 2a result for a molecule generated, with its target discovered, entirely by generative AI.

In an email, Insilico CEO Alex Zhavoronkov, Ph.D. said the paper on the study, which was published in [Nature Medicine](#), was "very important."



- Top-down approach



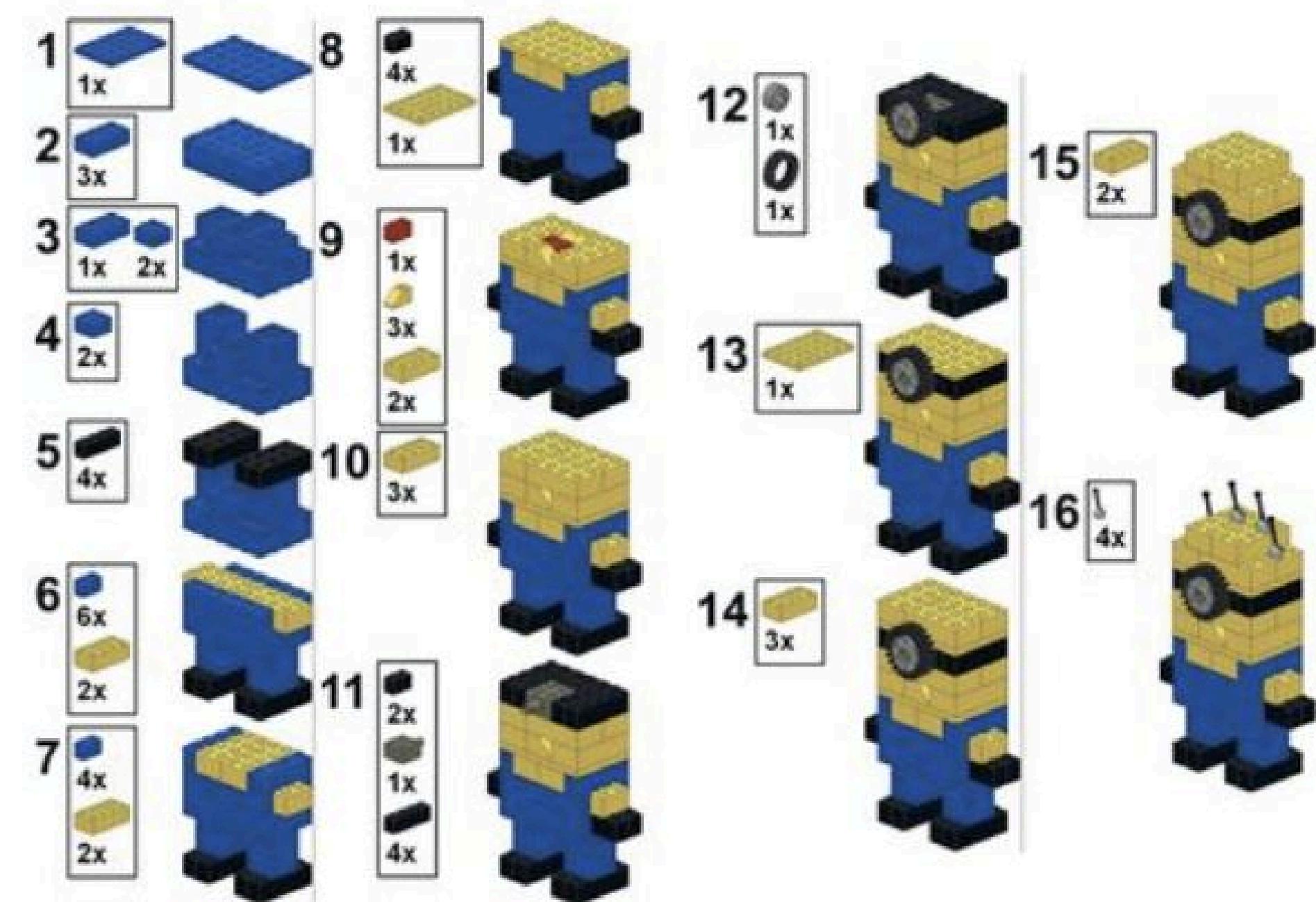
algorithms &
software tools

handle, analyze,
interpret



Data-driven

- Bottom-up approach



Study interactions between 'parts' to
understand 'the function' of a living cell.

Hypothesis-driven

Modeling as a predictive tool

J. Physiol. (1952) 117, 500–544

A QUANTITATIVE DESCRIPTION OF MEMBRANE CURRENT AND ITS APPLICATION TO CONDUCTION AND EXCITATION IN NERVE

By A. L. HODGKIN AND A. F. HUXLEY

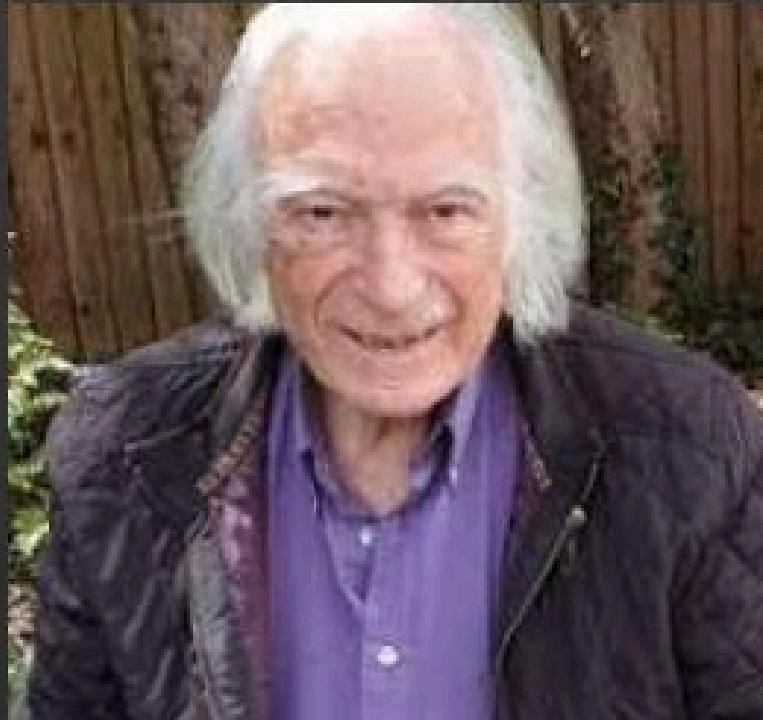
From the Physiological Laboratory, University of Cambridge

(Received 10 March 1952)

$$C \frac{dV}{dt} = I_{ext} - G_{Na}(V - E_{Na}) - G_{K1}(V - E_K) - G_L(V - E_L)$$



Denis Noble's Heart modeling



2017

Human *In Silico* Drug Trials Demonstrate Higher Accuracy than Animal Models in Predicting Clinical Pro-Arrhythmic Cardiotoxicity

Elisa Passini^{1*}, Oliver J. Britton¹, Hua Rong Lu², Jutta Rohrbacher², An N. Hermans², David J. Gallacher², Robert J. H. Greig³, Alfonso Bueno-Orovio¹ and Blanca Rodriguez¹

Digital twin heart models

2022



From: Gonsard 2024 [Review] Digital twins for chronic lung diseases

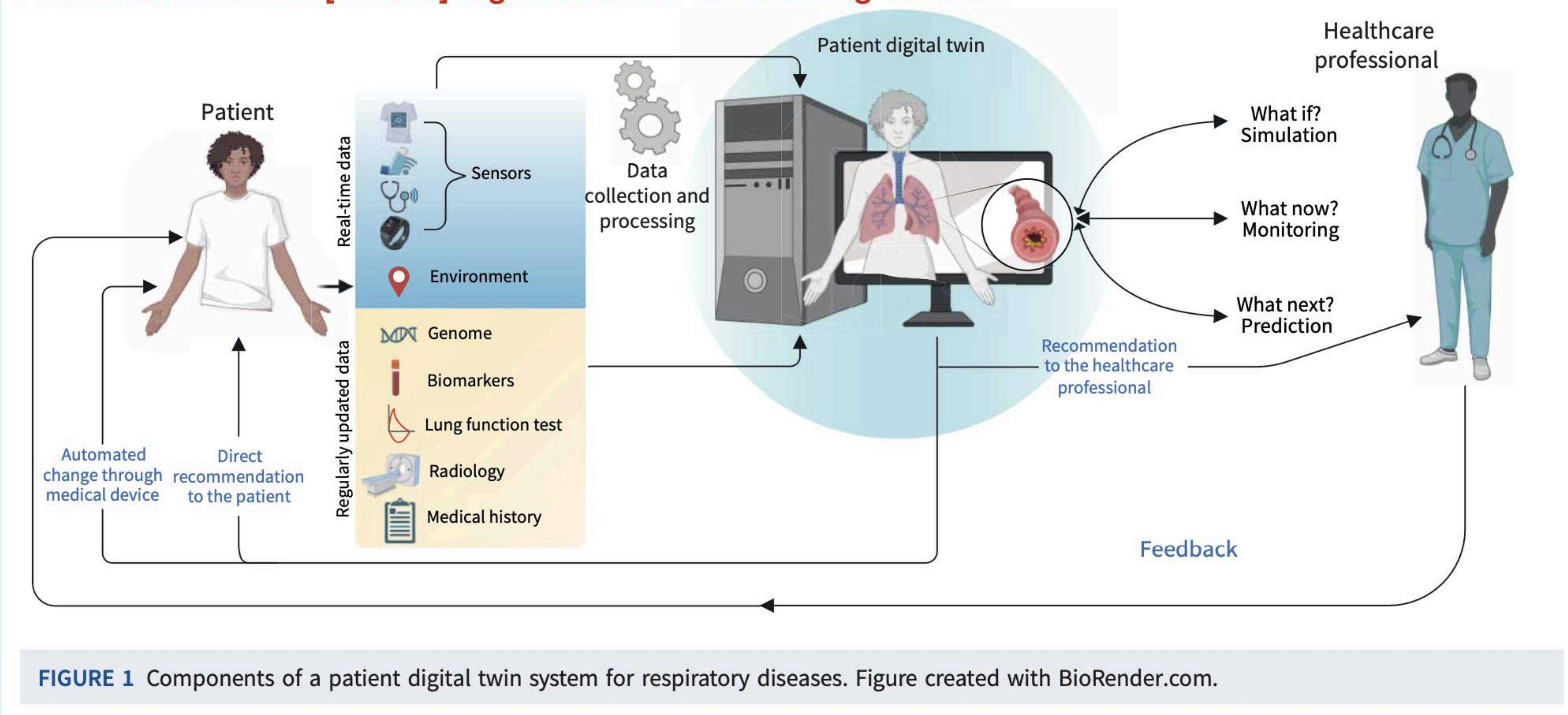


FIGURE 1 Components of a patient digital twin system for respiratory diseases. Figure created with BioRender.com.