Zastosowania sztucznej inteligencji w erze Covid i post-Covid

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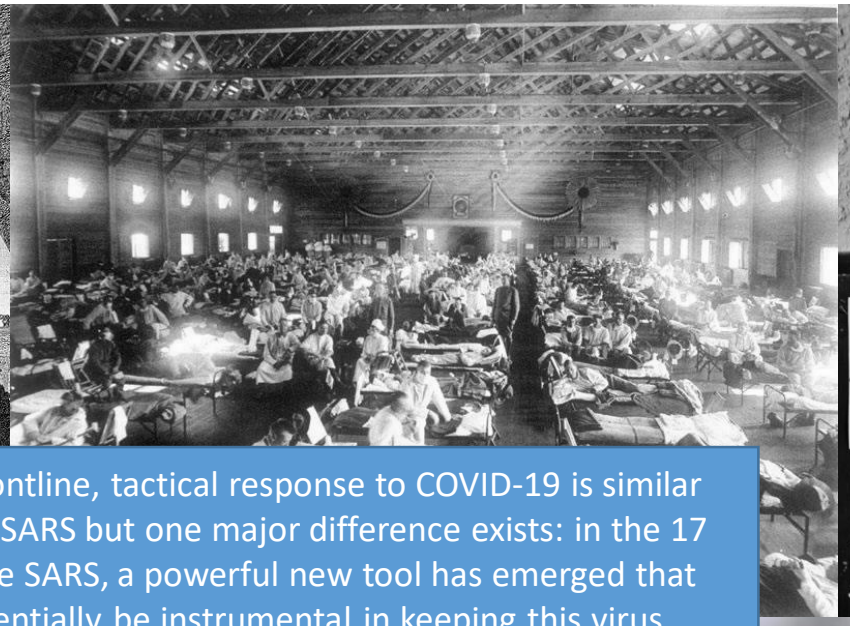
Pandemia w XXI wieku. Czy coś się zmieniło?



On the frontline, tactical response to COVID-19 is similar to that of SARS but one major difference exists: in the 17 years since SARS, a powerful new tool has emerged that could potentially be instrumental in keeping this virus within reasonable limits—namely, artificial intelligence (AI)

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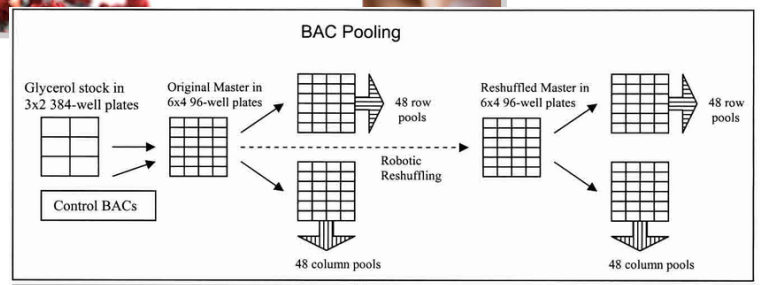
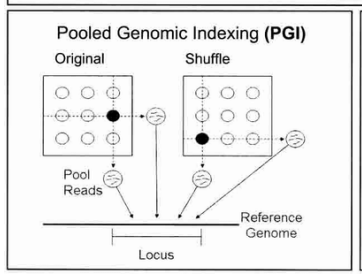
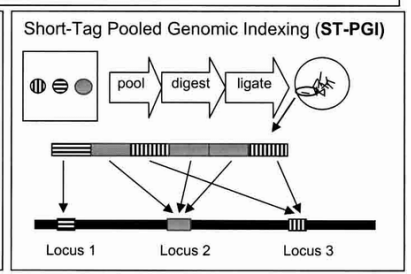
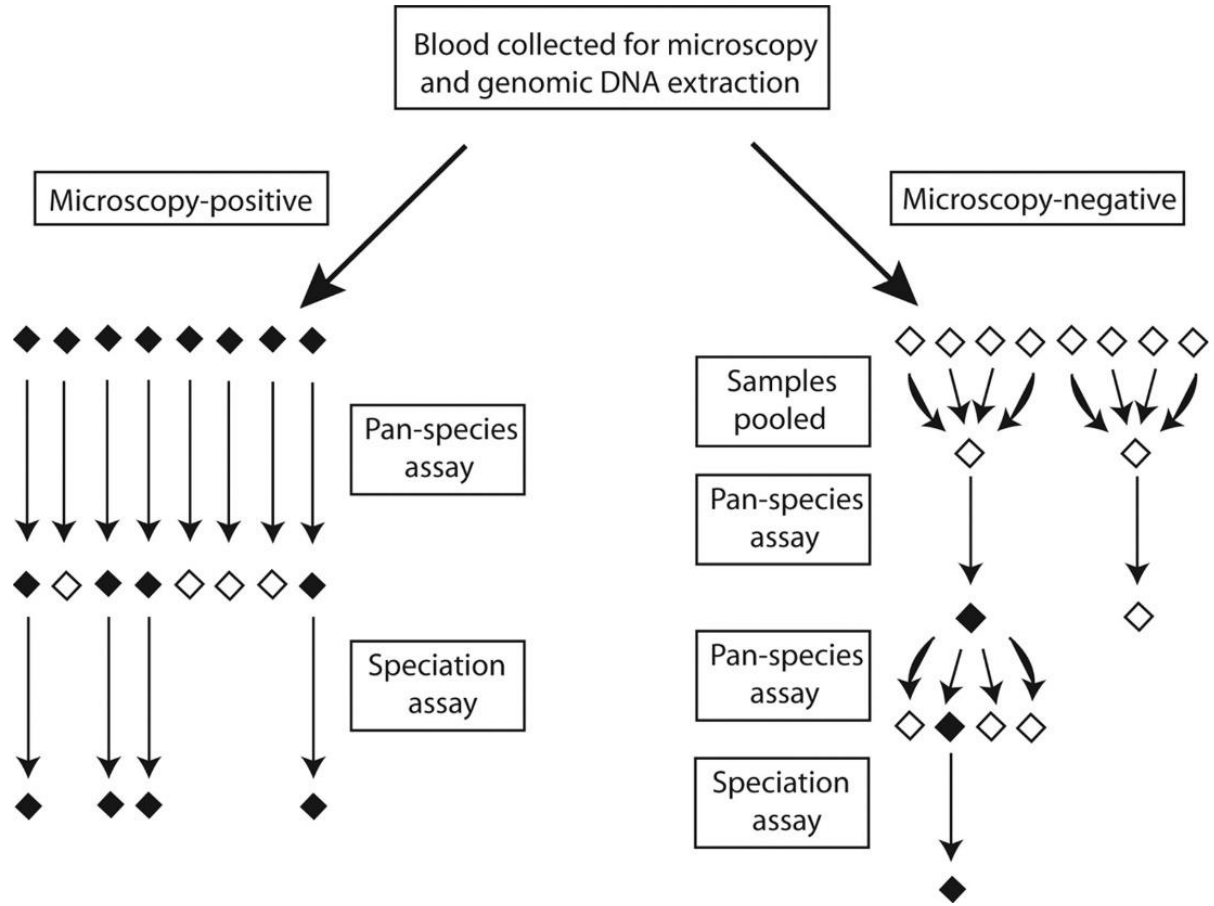
(Pool) test optimization and scheduling



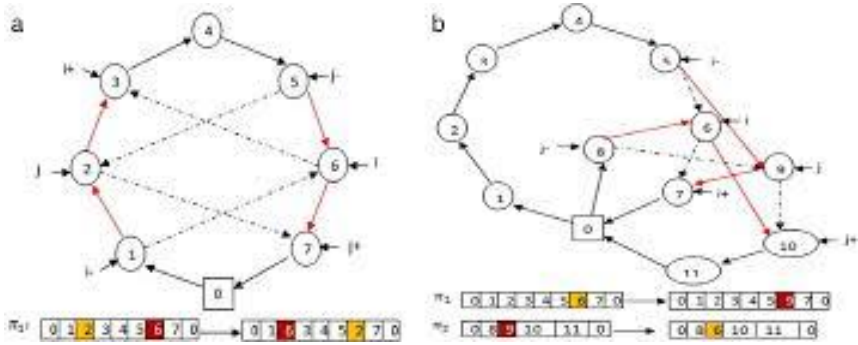






(Pool) test optimization and scheduling

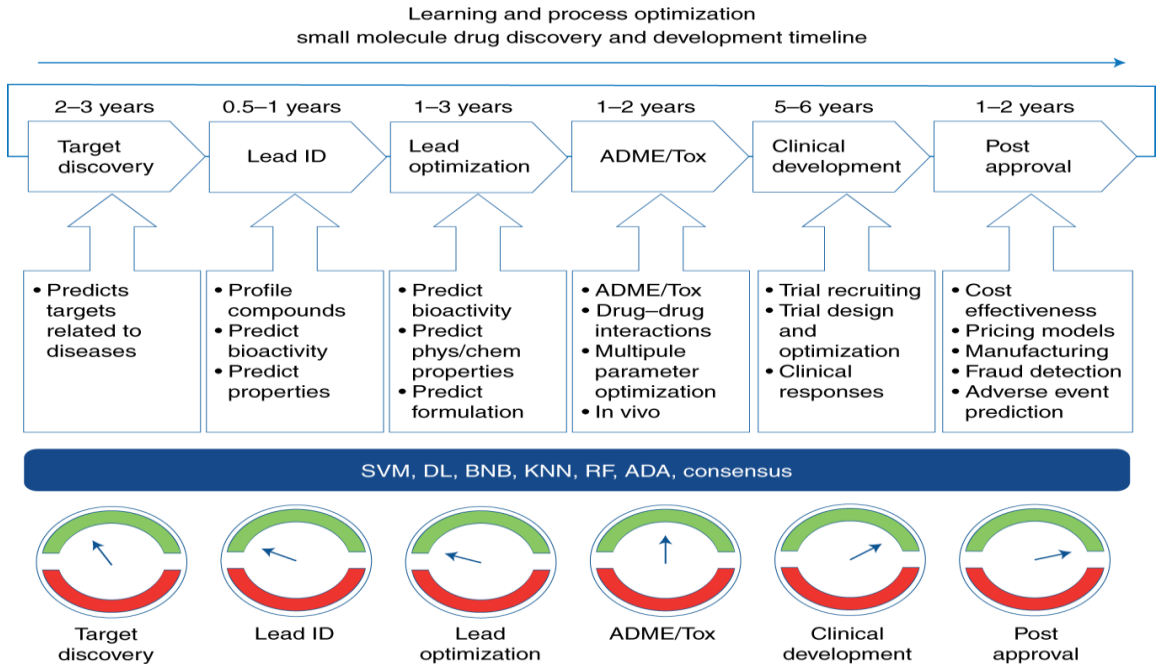
- Proste modele testów grupowych (z reguły) nie uwzględniają:
  - Efektu rozcieńczania (dilution) – spadek dokładności testów wraz z powiększaniem grupy
  - Heterogeniczności populacji – różne prawdopodobieństwa pozytywnego testu
  - Kryteriów typu minimalizacja false negatives
  - Elastycznych schematów testowania
- Miejsce na inteligentne algorytmy optymalizacji?



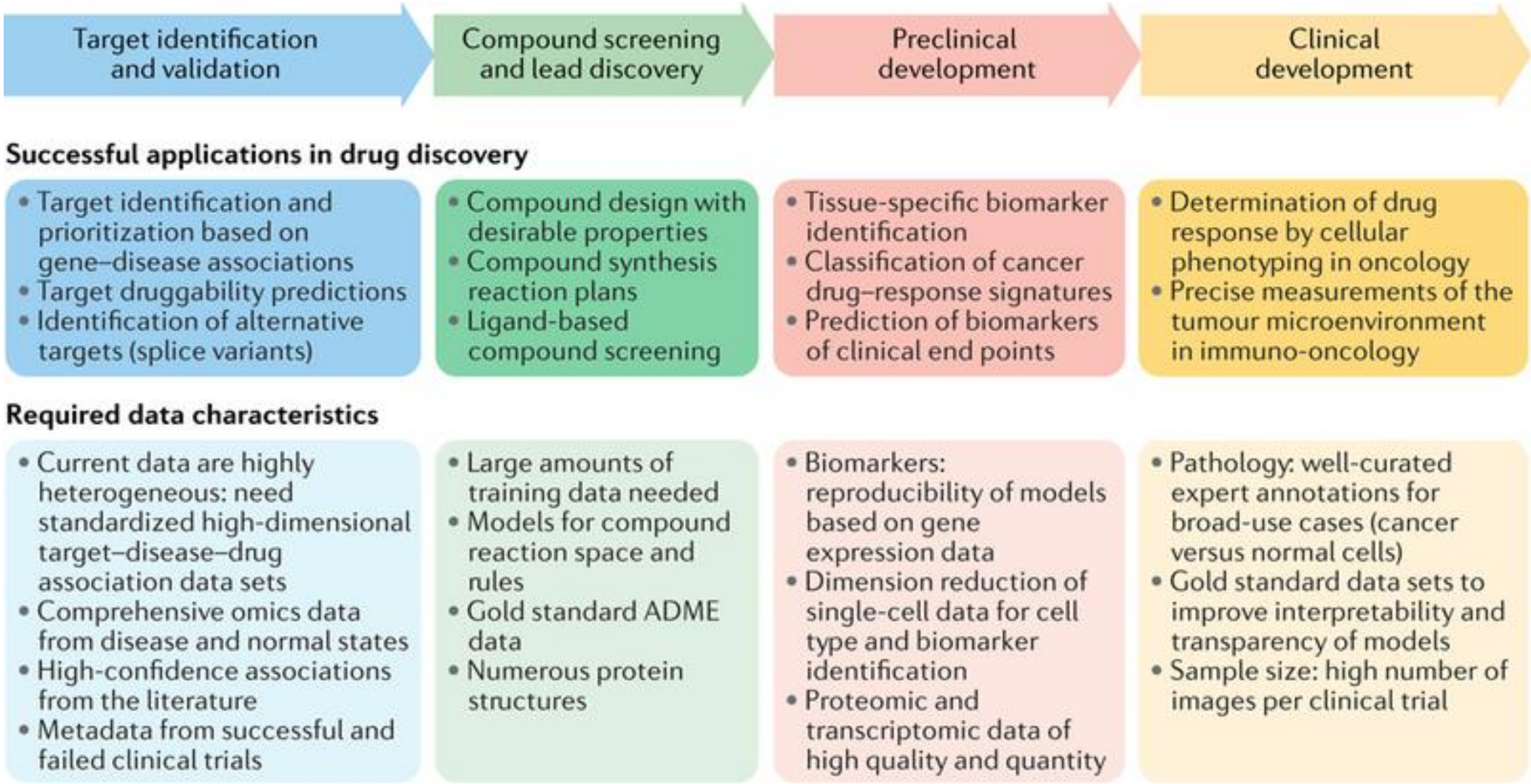
- Inne wyzwanie – logistyka testów
  - Często czas ważniejszy od kosztów
  - Np. Skewed vehicle routing problem – minimalizacja łącznego/maksymalnego czasu obsługi klientów

Drug discovery and development

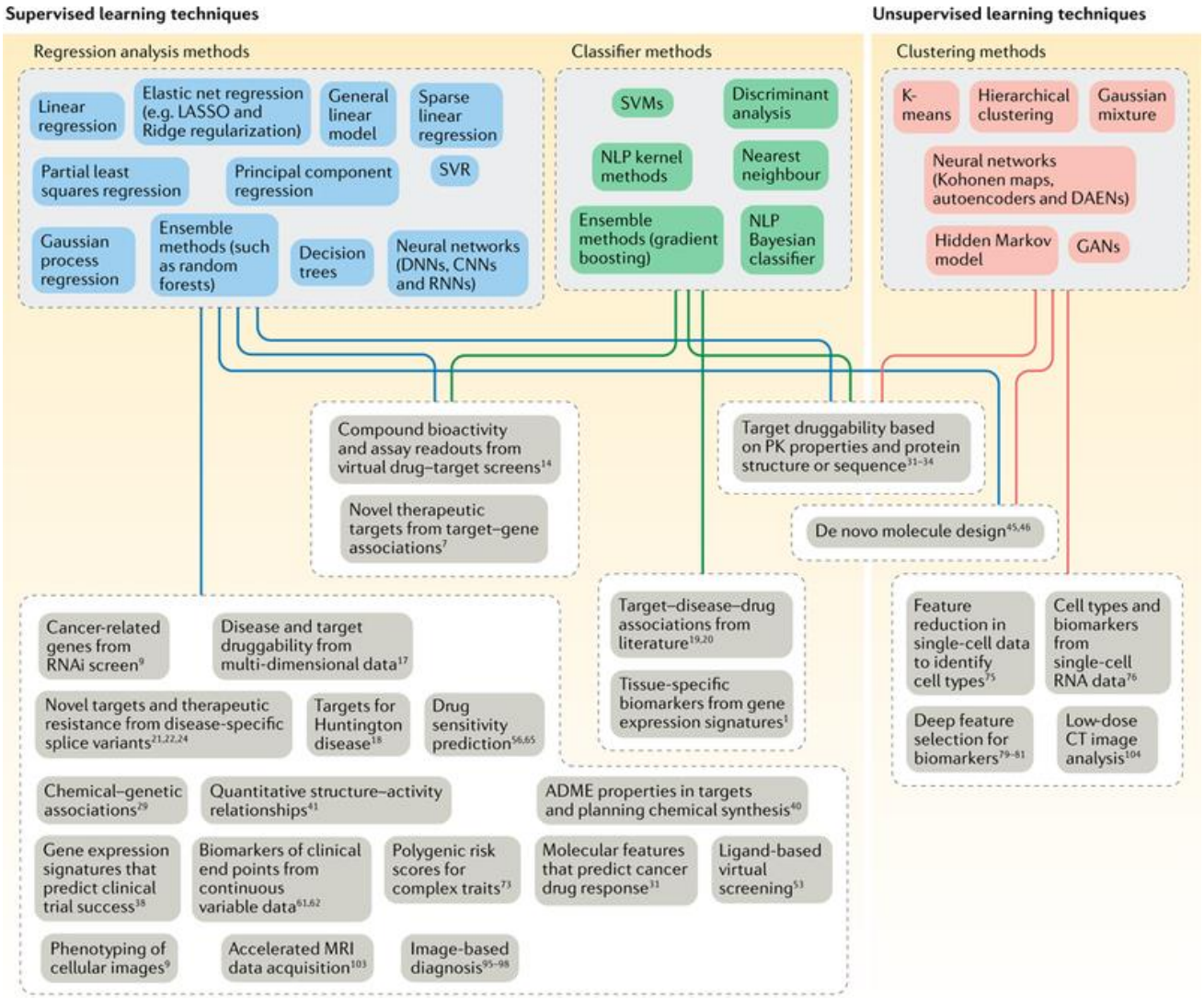
- On average, it takes **at least ten years** for **a new medicine** to complete the journey **from initial discovery to the marketplace**, with clinical trials alone taking six to seven years on average. The average cost to research and develop each successful drug is estimated to be **$2.6 billion**.
  - http://phrma-docs.phrma.org/sites/default/files/pdf/rd_brochure_022307.pdf

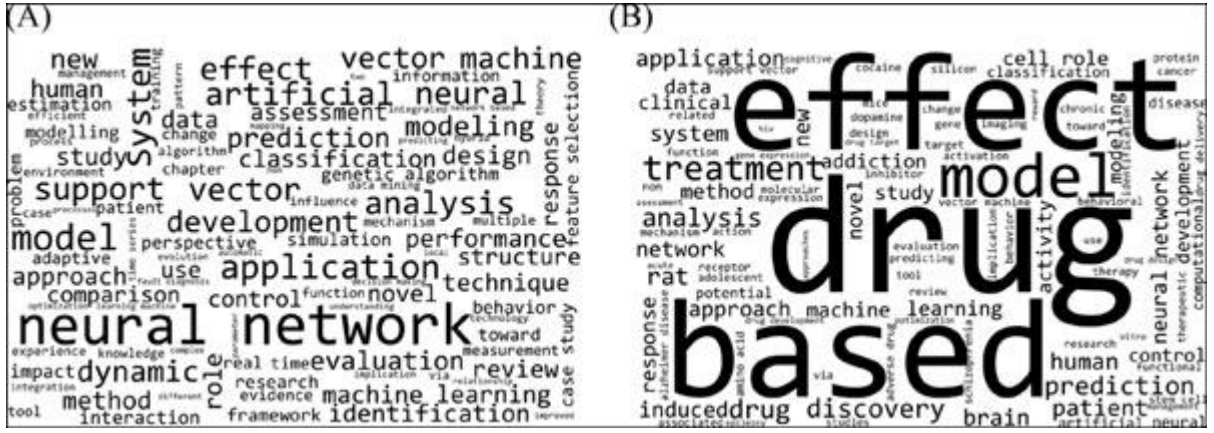


Drug discovery and development



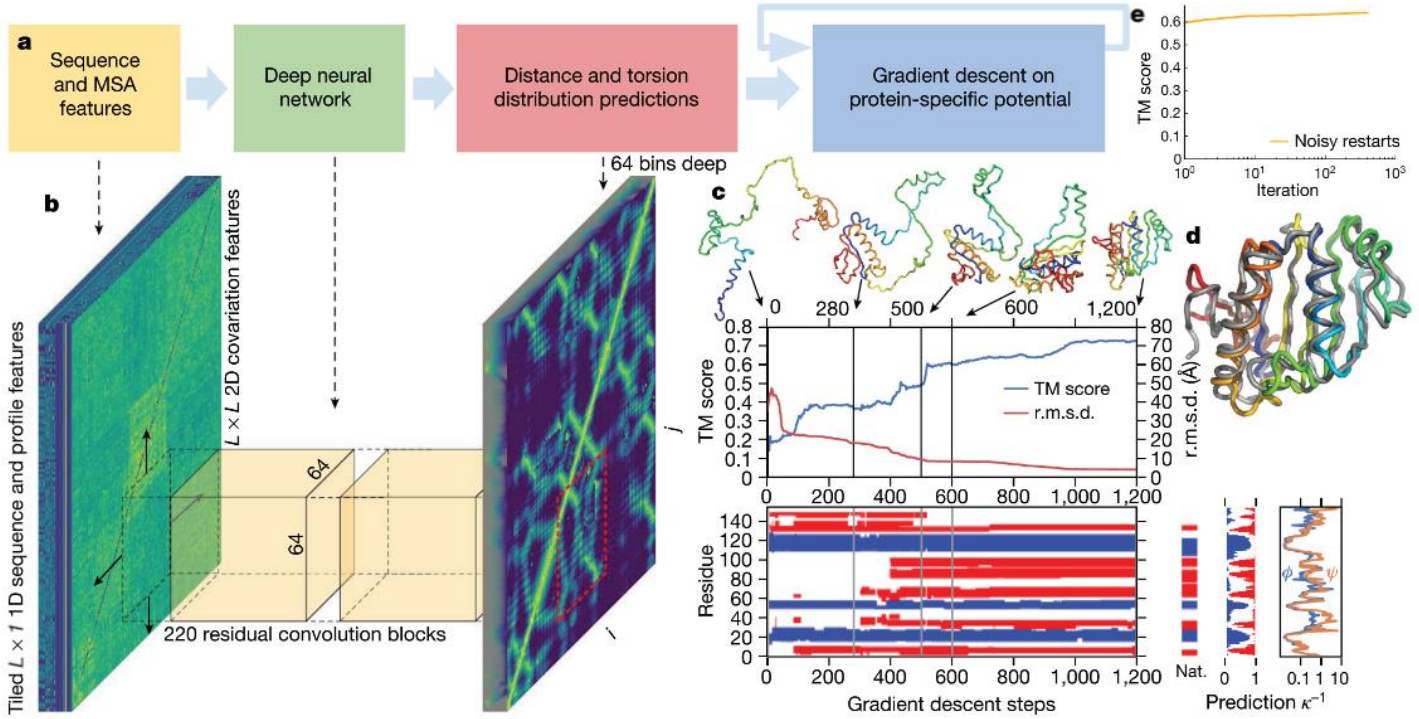
Drug discovery and development





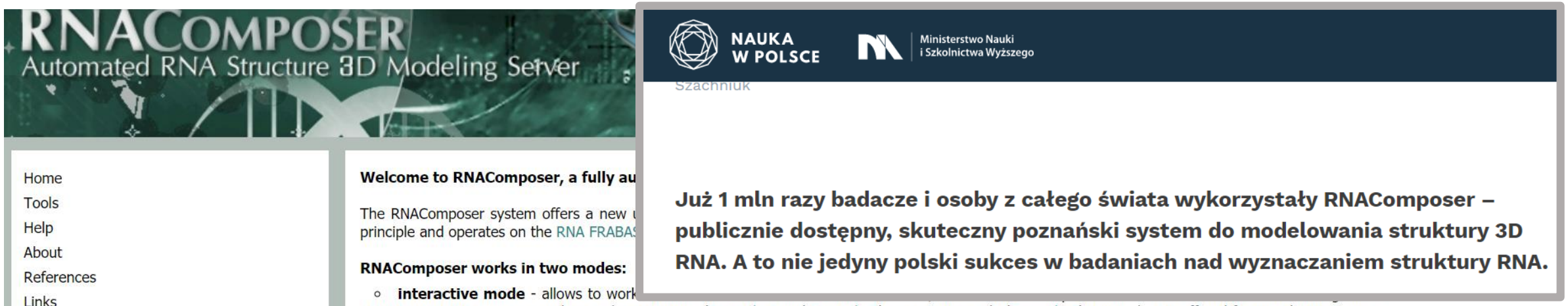
Vaccine development

- E.g. Predictions of the virus structure
- DeepMind AlphaPhold



Nature 2019

Vaccine development



Rapid diagnosis

- Center for Connected Health Care UG develops and trains an AI-based algorithm for the intermittent measurement of the QT interval from those 'smart' devices: very low energy consuming
- Instituto Tecnológico Informática develops a tool to support healthcare personnel for diagnosis, prognosis and screening to allow early prediction of cases of pneumonia caused by COVID19 by analyzing and processing torax x-ray images
- Neosperience S.p.A. evaluates the feasibility and applicability of the Artificial Intelligence - Machine Learning project to the analysis of pulmonary and cardiac radiographic and ultrasound images, acquired through chest X-ray and pulmonary and echocardiographic transthoracic ultrasound examination at the patient's bed, in the current and contingent COVID emergency- 19
- Bournemouth University. AI method for monitoring and analysing citizens breathing signals using mobile sensing technology in order to early detect those with early symptoms of breathing conditions.
- Sensifai Belgium Automatic detection of Covid-19 in x-ray and CT scan images

Rapid diagnosis

StethoMe®
Smart Stethoscope

PL

Nasza odpowiedź na COVID-19

Zdalne, bezpieczne badania płuc w warunkach domowych wspierane zaawansowaną analizą AI
#StayHome with StethoMe

Dowiedz się więcej

Automatyczna analiza dźwięków osłuchowych

Moduł AI wspierający diagnostykę

System StethoMe® opiera się na medycznych algorytmach sztucznej inteligencji - StethoMe® AI. Dzięki nim system **informuje o pojawieniu się nieprawidłowych dźwięków charakterystycznych dla infekcji dróg oddechowych, zapalenia oskrzeli i płuc, astmy czy POChP.**

StethoMe® AI identyfikuje świsty, furczenia, rzężenia grubo i drobnobańkowe. Lekarz zdalnie otrzymuje gotowy raport badania, może również odsłuchać dźwięki i obejrzeć ich analizę graficzną.

Behavior control

- Reinhold Technik GMBH & Co KG inexpensive camera system that continously checks the minimum distance between people in shops
- E.ON Digital Technology/ Stanford University **AI-based hand washing coach**
- Landing AI has developed a tool that can track people's locations in real time to see if pedestrians are getting too close to each other.

Zastosowania AI w erze Covid i post-Covid

- (Pool) test optimization and scheduling
- Drug & Vaccine discovery and development
- Rapid diagnosis
- Behavior control

- AI in Telemedicine
- AI in telework and robotics
- Knowledge sharing
- Early warnings
- Discovery of transmition paths
- Prediction of the evolution of the pandemic
- Misinformation discovery and prevention
- Medical staff scheduling
- Medical staff protection
- Optimization in post-crisis economy