

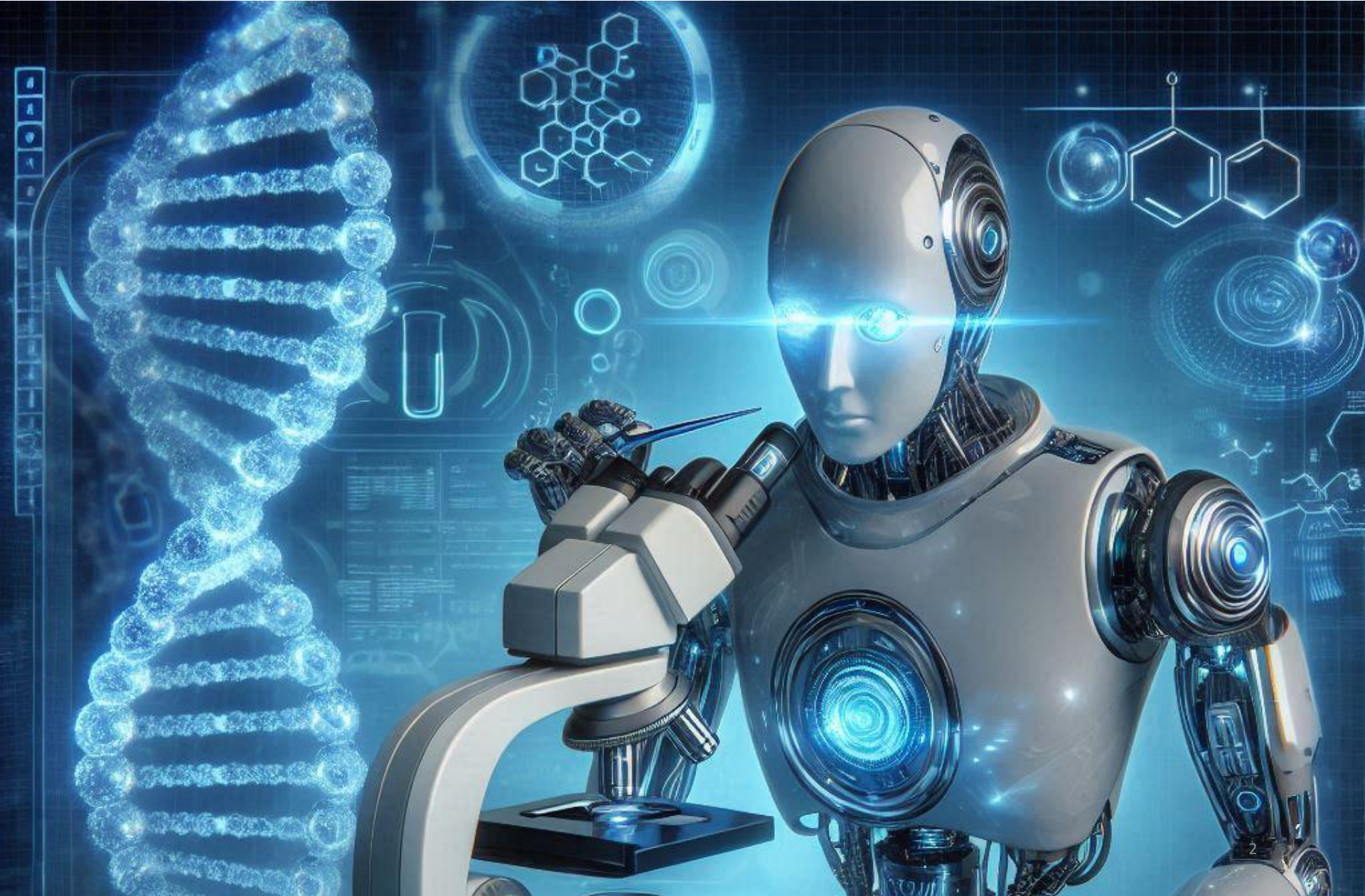
Round Table 2: Exploitation AI&Genomics

“Exploring potential applications, data integration, and partnership with the industry SMEs”

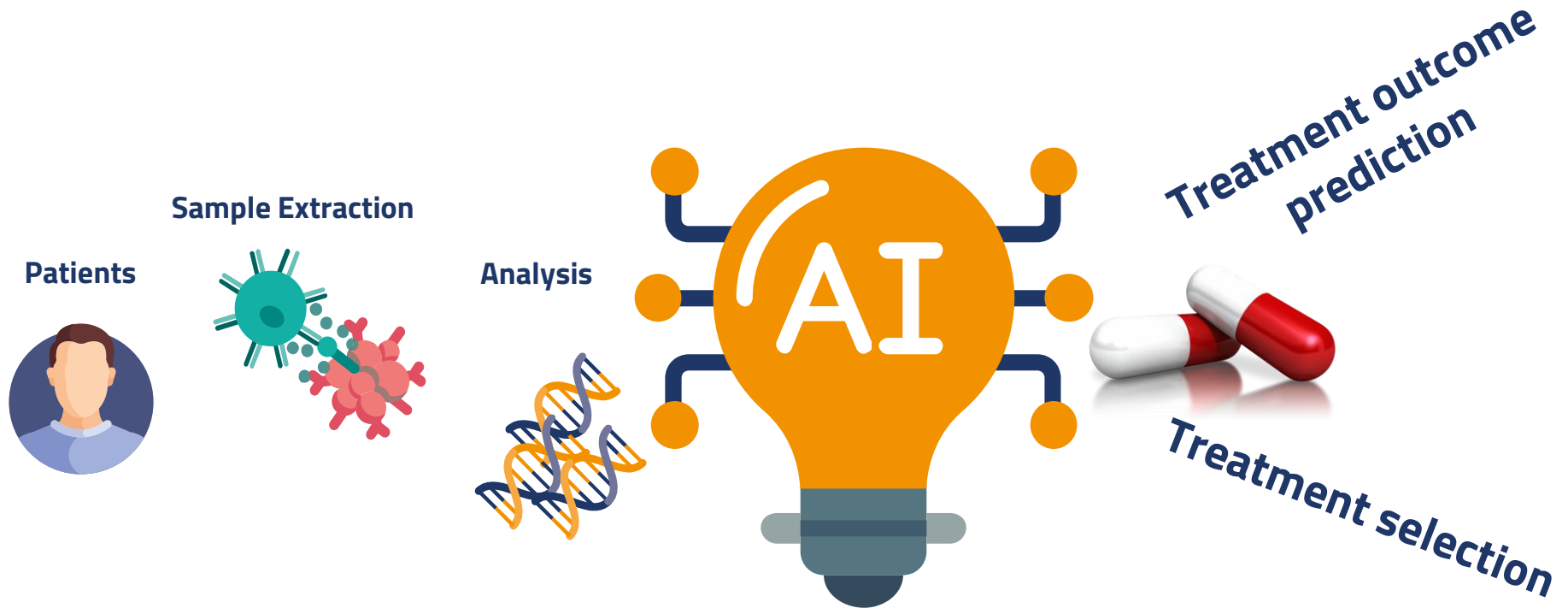
Moderator: Prof. Fabio Massimo Zanzotto,
University of Rome Tor Vergata, REVERT AI Responsible



REVERT - targeted therapy for advanced colorectal cancer patients

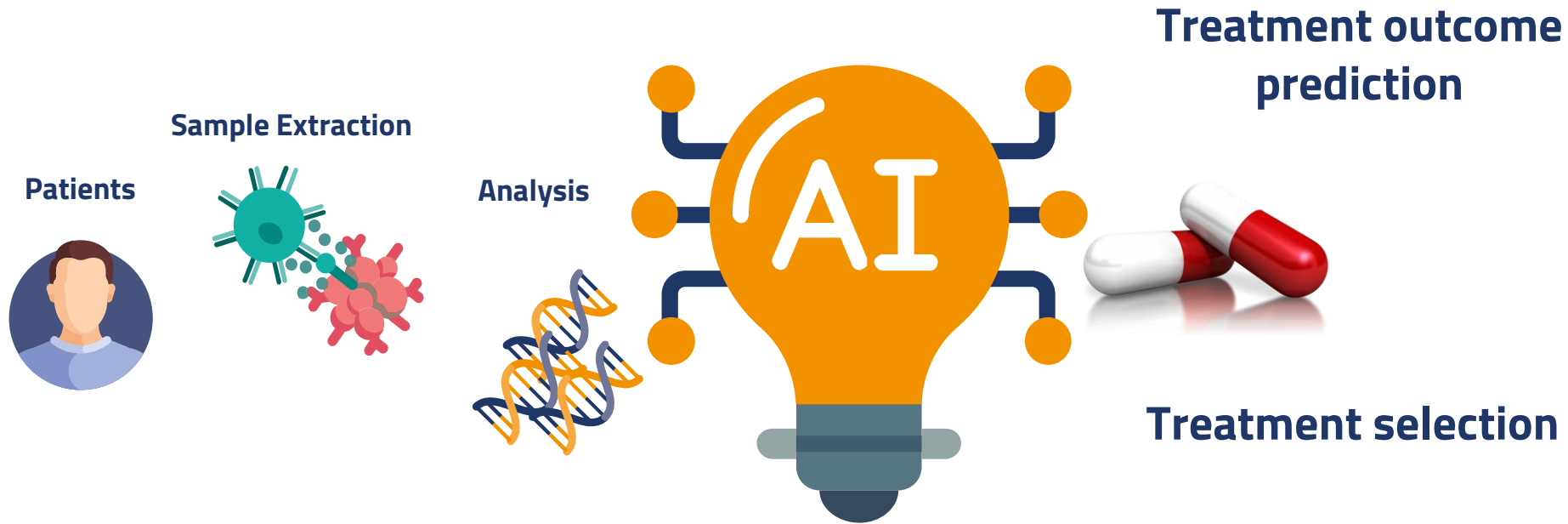


Personalized Predictive Medicine



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 848098.

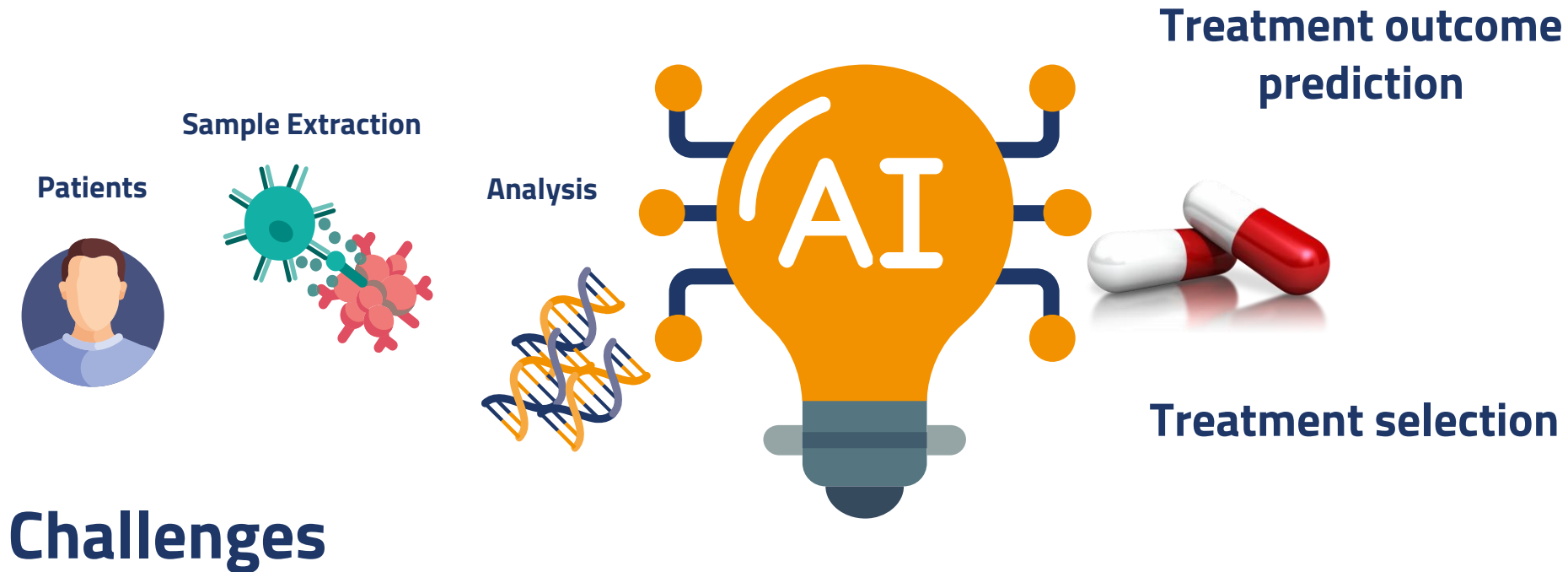




Challenges



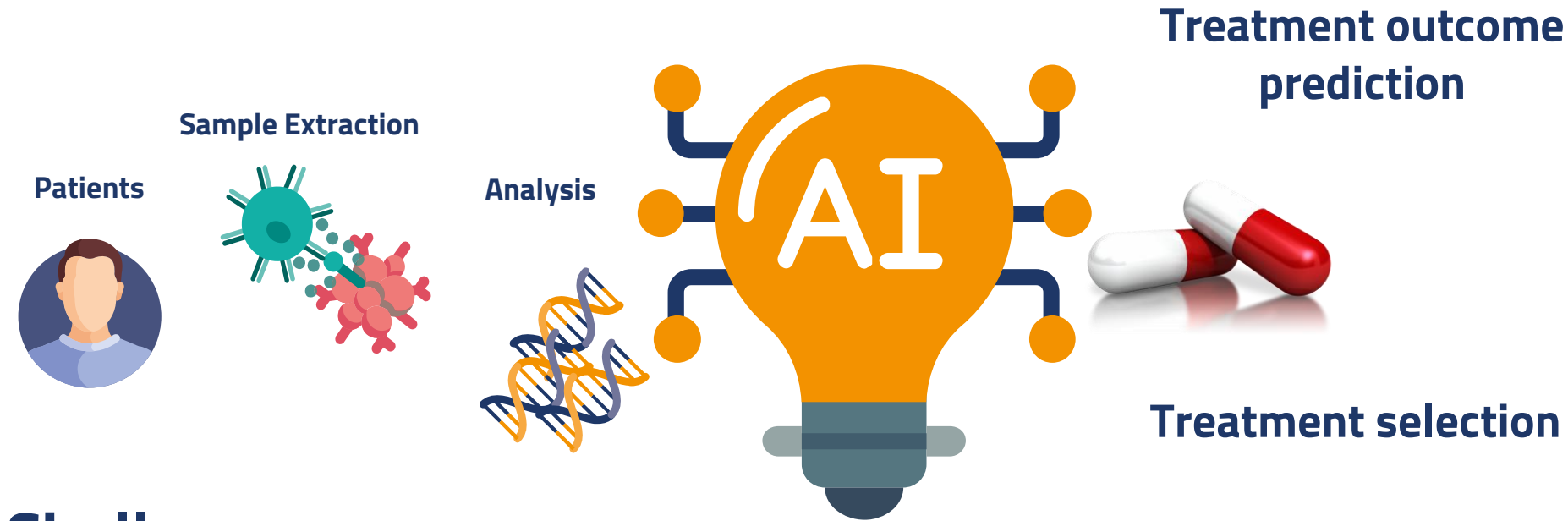
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Explaining AI decisions to clinicians



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Challenges

Explaining AI decisions to clinicians

**More important challenge:
evaluating XAI models**



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Evaluating explainable Artificial Intelligence

An **evaluation procedure of explainability** based on **Forward-simulatability (FS)** for **post-hoc evaluation**

Method:

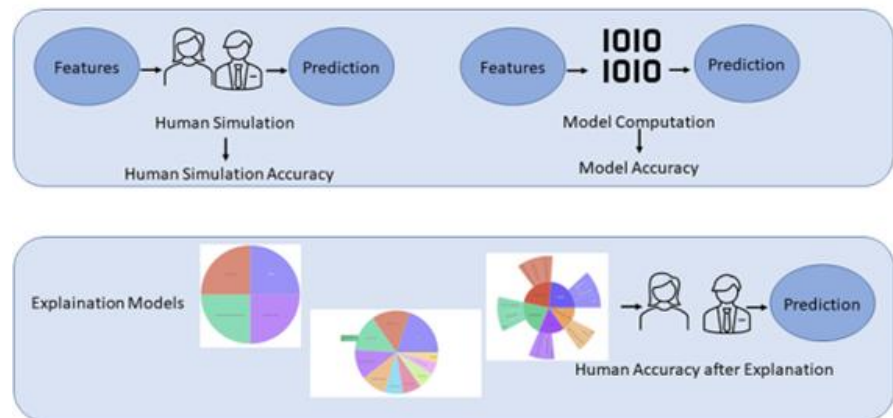
- Clinicians are asked to take decisions by looking at explanations
- The explanation method is good if clinicians take the same decision of the ML system

FS has been proposed in NLP and we overcome the limits for its application in cancer treatments

- We defined FS Score
- FSS allows comparison among different Explanation Method



Forward-simulatability

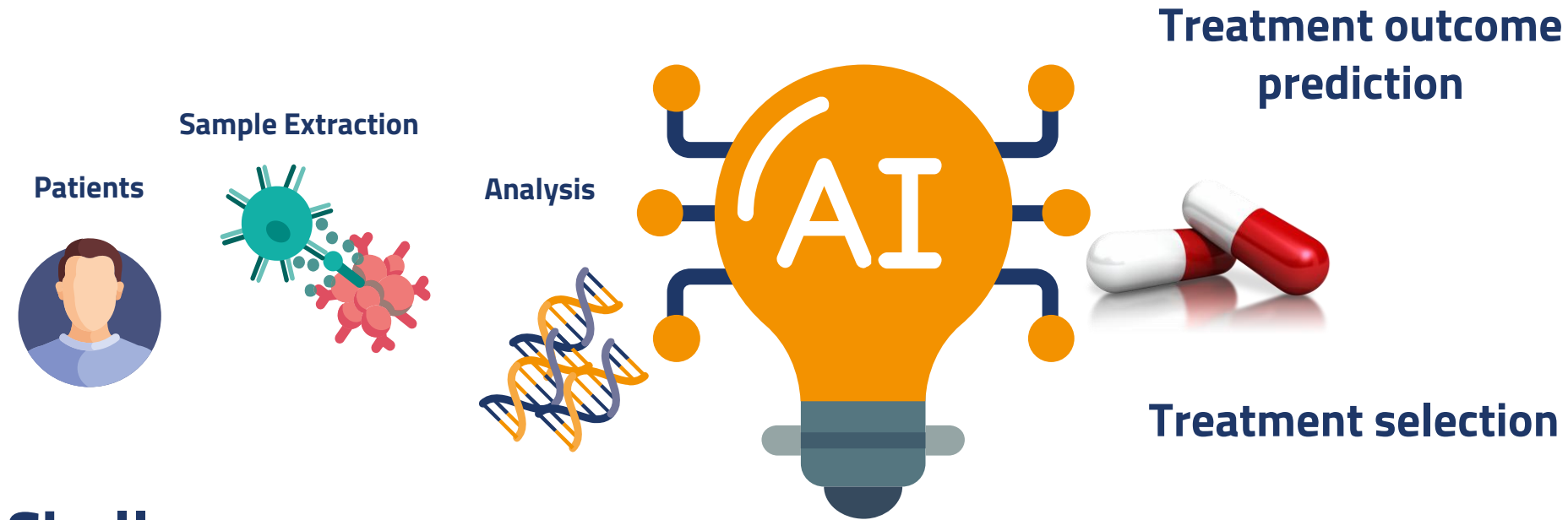


Scarpato, N., Nourbakhsh, A., Ferroni, Riondino, S., Roselli, M., Fallucchi, F., Barbanti, P., Guadagni, F. & Zanzotto, F.M. Evaluating Explainable Machine Learning Models for Clinicians. *Cogn Comput* 16, 1436–1446 (2024). <https://doi.org/10.1007/s12559-024-10297-x>



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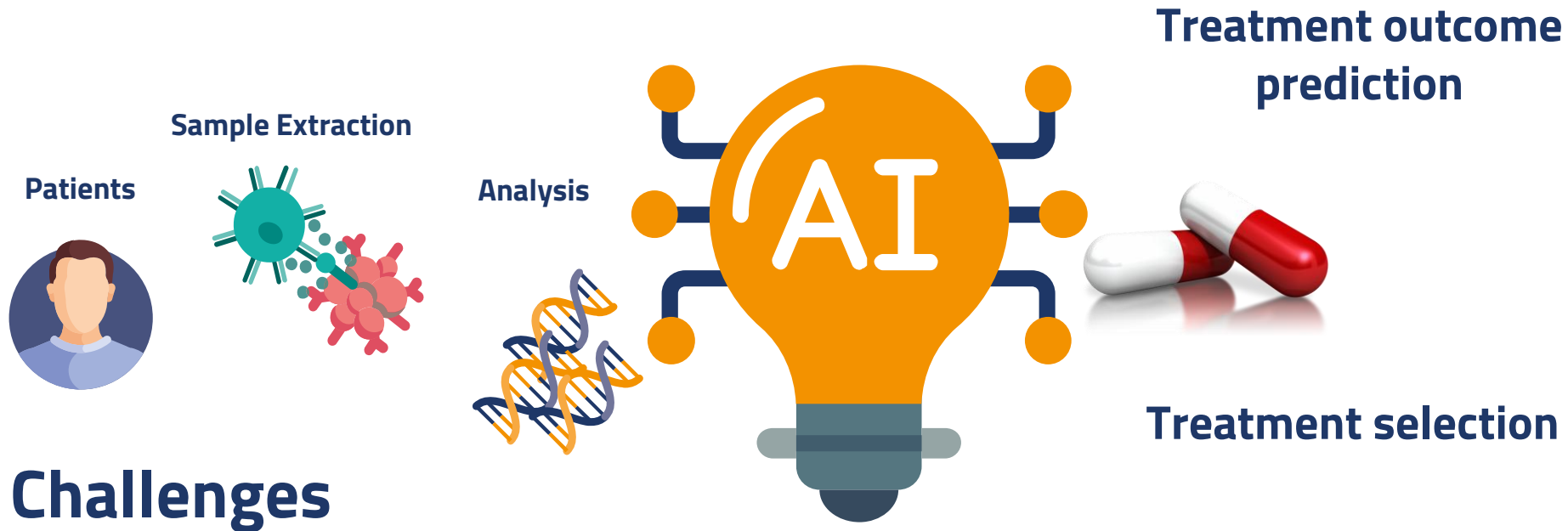
Challenges

Explaining AI decisions to clinicians

**More important challenge:
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Challenges

Explaining AI decisions to clinicians

AI needs training data!



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AI needs training data!

Exploiting retrospective patients

Clinical data	Genomic data	Transcriptomic data	Treatment	Follow Up	Outcome

Noemi Scarpato, Silvia Riondino, Aria Nourbakhsh, Mario Roselli, Patrizia Ferroni, Fiorella Guadagni, Fabio Massimo Zanzotto, Drug recommendation ranking for personalized medicine using outcomes of retrospective cancer patients, Expert Systems with Applications, Volume 256, 2024,



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AI needs training data!

Exploiting retrospective patients

Treatments change over time

Clinical data	Genomic data	Transcriptomic data	Treatment	Follow Up	Outcome

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AI needs training data!

Exploiting retrospective patients

Treatments change over time

Informed Consents are project specific

Clinical data	Genomic data	Transcriptomic data	Treatment	Follow Up	Outcome
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NOT enough training data!

Noemi Scarpato, Silvia Riondino, Aria Nourbakhsh, Mario Roselli, Patrizia Ferroni, Fiorella Guadagni, Fabio Massimo Zanzotto, Drug recommendation ranking for personalized medicine using outcomes of retrospective cancer patients, Expert Systems with Applications, Volume 256, 2024,



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REVERT - taRgeted thERapy for adVanced colorEctal cancerR paTients



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GDPR AI Act



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REVERT - taRgeted thERapy for adVanced colorEctal cancerR paTients



GDPR

REVERT - targeted therapy for advanced colorectal cancer patients	
Panelists	
Alina Capitanu	PROFESSOR, UNIVERSITY OF MEDICINE AND PHARMACY OF BUCHAREST
Bjorn Rottler	ASSISTANT PROFESSOR, UNIVERSITY OF WÜRZBURG
Pablo Conesa-Zamora	ASSISTANT PROFESSOR, UNIVERSITY OF NAVARRA
Knut Kurack	ASSISTANT PROFESSOR, UNIVERSITY OF WÜRZBURG
Raniero Romagnoli	ASSISTANT PROFESSOR, UNIVERSITY OF NAVARRA
Enrico Lorenzini	ASSISTANT PROFESSOR, UNIVERSITY OF NAVARRA

AI Act



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Panelists

Alina Capitanu

IMAGO, IMAGO-MOL Cluster, REVERT Partner *

Bjorn Rotter

Gen XPro GMBH, REVERT Partner

Pablo Conesa-Zamora

ServicioMurciano de Salud, REVERT Partner

Knut Rurack

BAM, BUNDESANSTALT Bundesanstalt für Materialforschung und-
prüfung, REVERT Partner

Raniero Romagnoli

Almawave Chief Technology Officer, OBDA Systems Chief Executive

Enrico Lorenzini

Marketing Communications & Business Development Director,
Alveo



Question to Pablo

Which do you think would be the approach for using omics data in predicting response in mCRC?



Question to Knut

To which extent data standardization need to be implemented at a European level to foster research in AI and Genomics?



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Question to Alina

How does the imago-Mol Cluster via MEDIC NEST Meta Cluster ensure that its industry partnerships drive innovation while remaining committed to its mission of delivering impactful, patient-centered healthcare solutions?



Question to Raniero

Which possibilities do you see for potential application of AI in Medicine and how can this technology be accepted?



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Question to Enrico

What do you think Europe can do to foster the application of research on AI for Genomics?



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Question to Bjorn

What are the difficulties of reaching the market with AI solutions applied to omics?



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GDPR



AI Act



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NOT enough training data!

Solution

Active Informed Consents

Marco Gerardi, Katarzyna Barud, Marie-Catherine Wagner, Nikolaus Forgo, Francesca Fallucchi, Noemi Scarpato, Fiorella Guadagni, Fabio Massimo Zanzotto, **Active Informed Consent to Boost the Application of Machine Learning in Medicine**, under review and <https://arxiv.org/abs/2210.08987>



Active Informed Consents is part of a bigger project

Human-in-the-loop Artificial Intelligence

Key Principles

- Any AI system exploits *human knowledge*
- Hence

any decision of an AI system generating revenues

has to repay

the legitimate owners of this knowledge

