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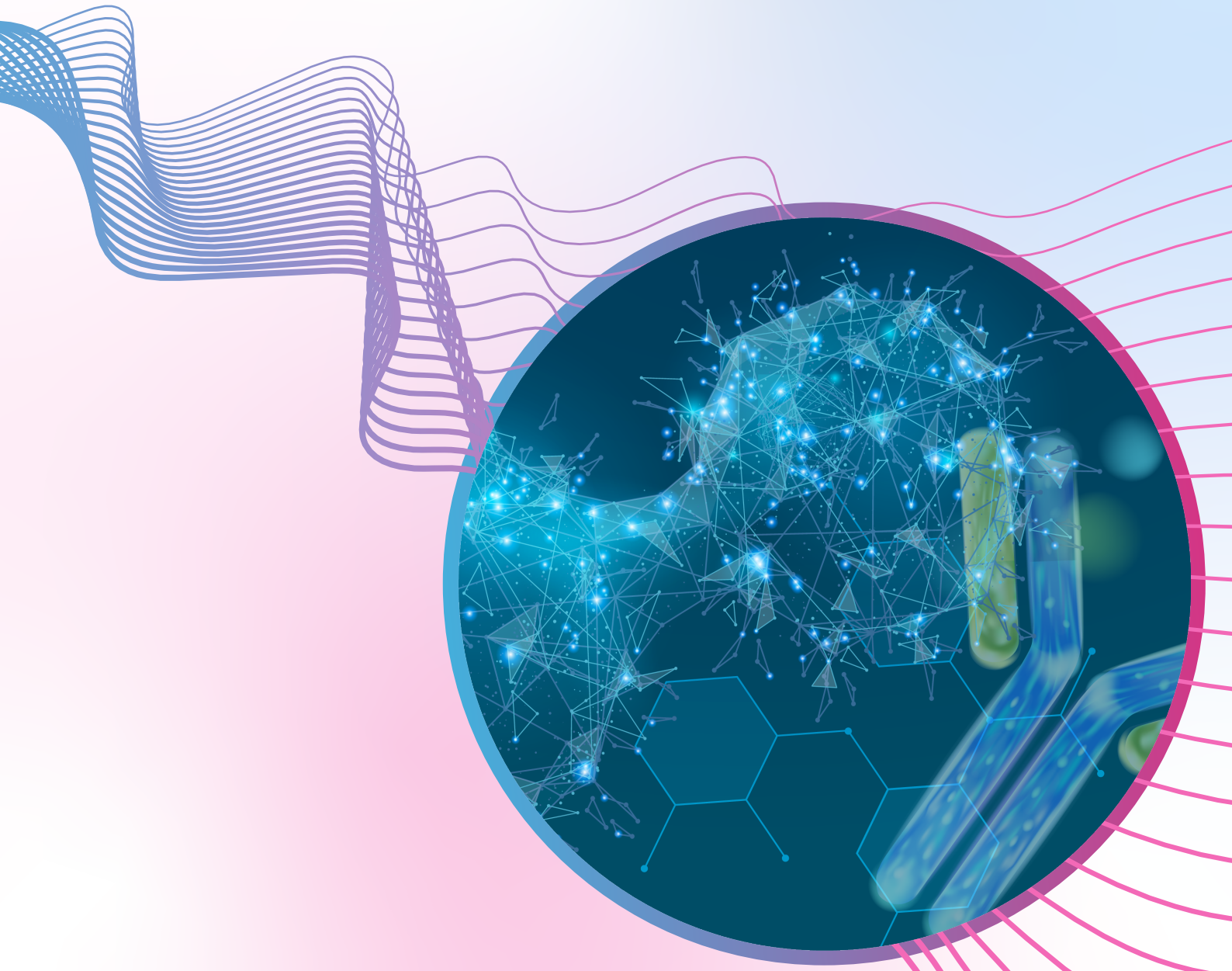
Combination feasibility prediction for checkpoint inhibitors

CASE STUDY



Purpose

The partner had a large molecule in the development pipeline for cancer indications. They were interested in combining their proprietary molecule with already approved immune check-point inhibitors to improve therapeutic efficacy.

Client

Industry
Biotech

Location
Europe

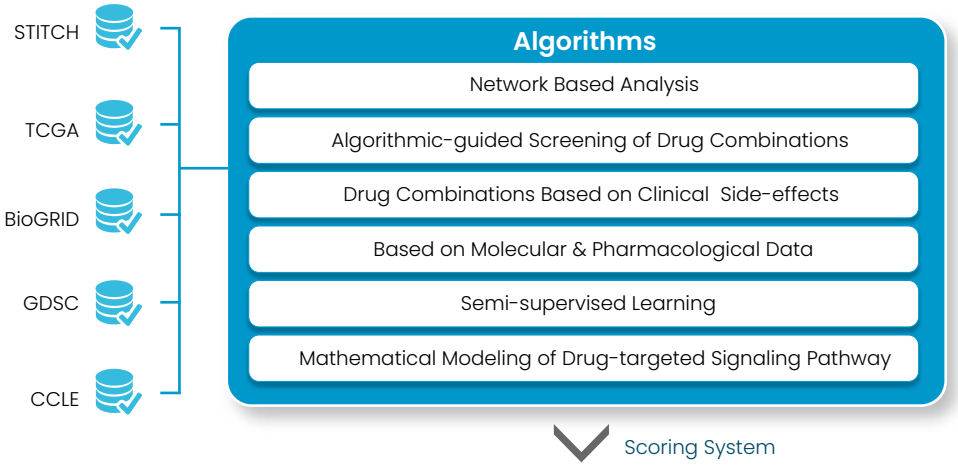
Sector
Oncology

Requirement

To prioritize cancer indications based on their sensitivity towards the combination of the biologic with a check point inhibitor (anti-PD-1/PDL-1). Publicly available data on successful and failed drug combinations was used for building predictive models.

Our approach

Machine learning models were built using to assess the sensitivity of cancer indications as well as patients to the drug combination. Based on the analysis, some cancer indications were prioritized for further assessment. A biological hypothesis was built to establish the synergistic role of the combination partners for cancer treatment.



Color scheme is based on Drug X response

	Overall cancer level				Each patient level insight			
	Anti-PD1 Sensitivity (RPART)	Anti-PD1 PLS score	Drug X PLS score	Both (Anti PD1+ DrugX) Sensitive	Total Sample	Sensitive sample (both Drug X+Anti PD1)	Resistant Sample	Response Rate (Anti-PD1 blocker)
ALL	0	2.08	0.55	Yes	750	131	619	17.47
LIHC	-1	0.01	0.31	Yes	373	185	188	49.60
PAAD	-1	0.74	0.29	Yes	179	57	122	31.84
OV	0	0.34	0.93	Yes	558	497	61	89.07
AML	0	2.26	0.72	Yes	542	77	465	14.21
BLCA	-1	2.44	-0.40	No	408	199	209	48.77
CHOL	**-1**	**-0.83**	**-0.30**	No	36	13	23	36.77
STAD	-1	0.41	0.61	No	415	164	251	39.52
TNBC BL1	-1	0.88	0.32	Yes	20	16	4	80.00
BRCA	-1	-0.20	-1.05	No				

RPART
0 → Resistant
1 → Sensitive
-1 → Sensitive

PLS score
Positive → Sensitive
Negative → Resistant

Yes → Must be Drug X positive and either of Anti PD1 predictor (RPART or PLS) as sensitive

Our contribution

- Prioritize the indication where indication therapy with PD-1 will work the best.
- Custom pathways were generated to understand crosstalk between the drug-induced signaling and checkpoint inhibitor signaling pathways.
- Feasibility/synergy prediction of the two-drug combination.
- Widen the list of indication where the query drug may be developed.
- Indications resistant or were partially sensitive to the monotherapy were predicted to be sensitive towards combination with the checkpoint inhibitor.

Our service portfolio

Data	**Data curation** Filter out the noise, focus your attention **Clinical data** Analysis-ready data for informed clinical decision-making **Semantic data** Refine your decisions, find your value
Insights	**Bioinformatics** Illuminating the path to faster discoveries **Data science** Unlock the power of data **Visualization** Pictures paint a thousand words
R&D technology	**Product design and development** Unlock your potential with data-driven design and development **Cloud enablement** Optimize your output on the cloud **Data engineering** Mitigate risks, protect your data, and rationalize your portfolio and processes.

Where data means more

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