Supplementary Material S1

Table S1 shows in detail the information used for the constitution of dataset 1. The dataset, as reported in the manuscript, is the same as that used in the work of Mendolia et al. (2022) [1].

Table S1: A summary of all proteins (active and inactive) used to create the final dataset [1].

Target	Kinase Name	PDB ID	Ligand Code*	Actives	Inactives
ACK	Activated Cdc42-associated Kinase	5ZXB	9KO	746	159775
ALK	Anaplastic Lymphoma Kinase	6E0R	HKJ	1665	227247
CDK1	Cyclin-Dependent Kinase 1	6GU2	F9Z	1241	124473
CDK2	Cyclin-Dependent Kinase 2	6INL	AJR	1924	225087
CDK6	Cyclin-Dependent Kinase 6	5L2S	6ZV	646	256561
INSR	INSulin Receptor	5E1S	5JA	1423	195990
ITK	IL2 inducible T cell Kinase	4RFM	3P6	1001	135007
JAK2	JAnus Kinase 2	6M9H	J9D	5526	577409
JNK3	c-Jun N-terminal Kinase 3	2B1P	AIZ	658	95252
MELK	Maternal Embryonic Leucine zipper Kinase	6GVX	TAK	1215	246662
CHK1	CHeckpoint Kinase 1	6FC8	D4Q	2175	21763
CK2A1	Casein Kinase II subunit alpha	6JWA	5ID	1053	10534
CLK2	Cdc-Like Kinase 2	6FYL	3NG	671	6800
DYRK1A	Dual specificity Tyrosine-phosphorylation-Regulated Kinase 1A	4YLK	4E2	1126	11274
EGFR	Epidermal Growth Factor Receptor	5GNK	80U	4757	47541
MAPK1/ERK2	Mitogen-Activated Protein Kinase 1	6OPH	6QB	3525	35237
GSK3B	Glycogen Synthase Kinase-3 beta	5F94	3UO	2578	25768
IRAK4	Interleukin-1 Receptor-Associated Kinase 4	6EG9	OLI	2131	21282
MAPK2K1	Mitogen-Activated Protein Kinase Kinase 1	4AN9	2P7	1254	12508
PDK1	3-Phosphoinositide-Dependent Kinase 1	3NAX	MP7	1117	11166

* Most affine lingands

Table S2 shows the results obtained from the tests on drugs with multiple bioactivities. The table shows the generic name of the drug, the target and the prediction expressed as a binary value.

References

[1] Mendolia, I., Contino, S., De Simone, G., Perricone, U., Pirrone, R.: Ember—embedding multiple molecular fingerprints for virtual screening. International Journal of Molecular Sciences **23**(44), 2156 (2022) https://doi.org/10.3390/ijms23042156

Generic name	Target	Prediction
(7S)-2-(2-aminopyrimidin-4-yl)-7-(2-fluoroethyl)-1,5,6,7-tetrahydro-4H-pyrrolo[3,2-c]pyridin-4-one	CDK2	1
(7S)-2-(2-aminopyrimidin-4-yl)-7-(2-fluoroethyl)-1,5,6,7-tetrahydro-4H-pyrrolo[3,2-c]pyridin-4-one	GSK3B	1
Apigenin	CDK6	1
Apigenin	CK2A1	1
Bisindolylmaleimide I	CHK1	1
Bisindolylmaleimide I	ERK2	1
Bisindolylmaleimide I	GSK3B	0
CI-1040	CHK1	1
CI-1040	ERK2	0
CI-1040	GSK3B	1
Debromohymenialdisine	CHK1	0
Debromohymenialdisine	ERK2	0
Debromohymenialdisine	MAPK2K1	1
Ellagic acid	CK2A1	1
Ellagic acid	GSK3B	1
FN-1501	CDK2	0
FN-1501	CDK6	1
Fostamatinib	ACK1	0
Fostamatinib	CHK1	1
Fostamatinib	CK2A1	1
Fostamatinib	CLK2	1
Fostamatinib	DYRK1A	1
Fostamatinib	GSK3B	0
Fostamatinib	INSR	1
Fostamatinib	IRAK4	0
Fostamatinib	ITK	1
Fostamatinib	JAK2	1
Fostamatinib	JNK3	1
Fostamatinib	MELK	0
Fostamatinib	PDK1	1
O6-CYCLOHEXYLMETHOXY-2-(4'-SULPHAMOYLANILINO) PURINE	CDK2	1
O6-CYCLOHEXYLMETHOXY-2-(4'-SULPHAMOYLANILINO) PURINE	CHK1	1
O6-CYCLOHEXYLMETHOXY-2-(4'-SULPHAMOYLANILINO) PURINE	GSK3B	1
Purvalanol	CDK2	1
Purvalanol	ERK2	0
Tetrabromo-2-Benzotriazole	CHK1	0
Tetrabromo-2-Benzotriazole	CK2A1	1
Tetrabromo-2-Benzotriazole	ERK2	0
Tetrabromo-2-Benzotriazole	GSK3B	0
Tetrabromo-2-Benzotriazole	MAPK2K1	0
Trilaciclib	CDK2	1
Trilaciclib	CDK6	1
Zanubrutinib	ITK	1
Zanubrutinib	JAK2	1

Table S2: Caption