Supplementary file: Mathematical modeling of the growth suppression of HER2$^+$ breast cancer colonies under the effect of trastuzumab and PD-1/PD-L1 inhibitor
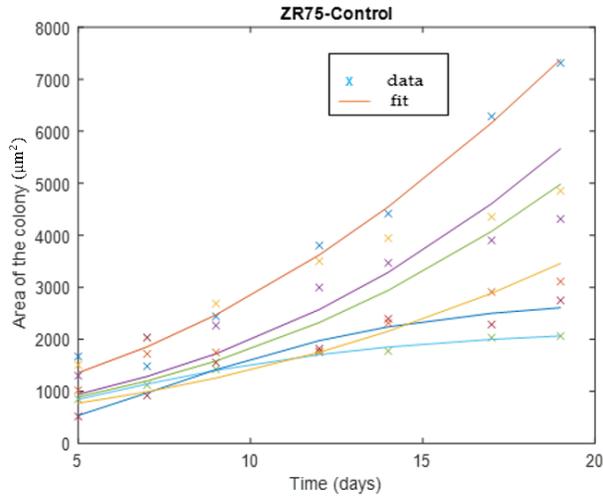
Agar assay-model fitting ZR75

Figure A1: Model fitting curves for ZR75, 6 sets of control data
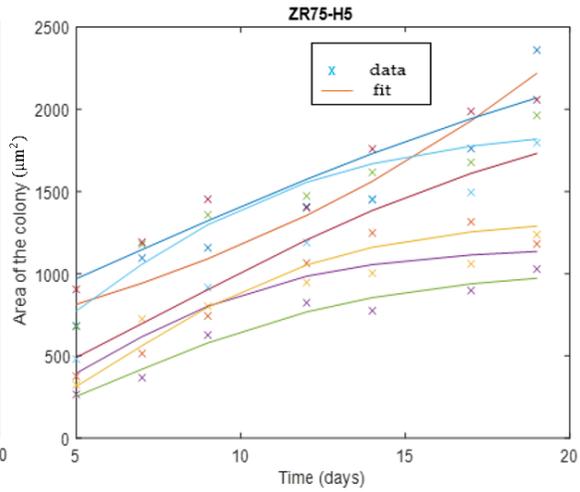

Figure A2: Model fitting curves for ZR75, 7 sets of H5 data
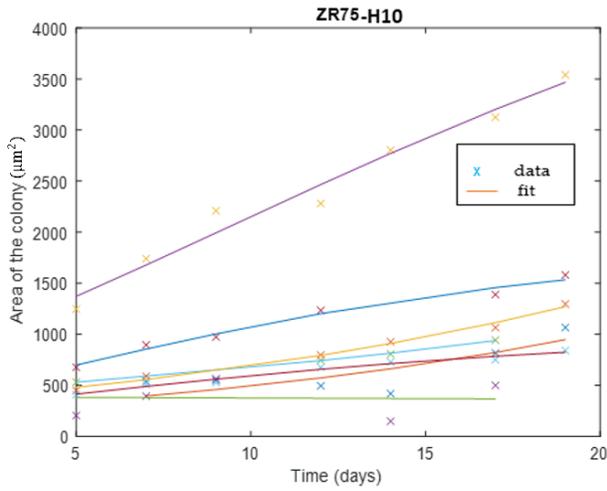

Figure A3: Model fitting curves for ZR75, 7 sets of H10 data

Figure A4: Model fitting curves for ZR75, 7 sets of H25 data

Figure A5: Model fitting curves for ZR75, 6 sets of H50 data

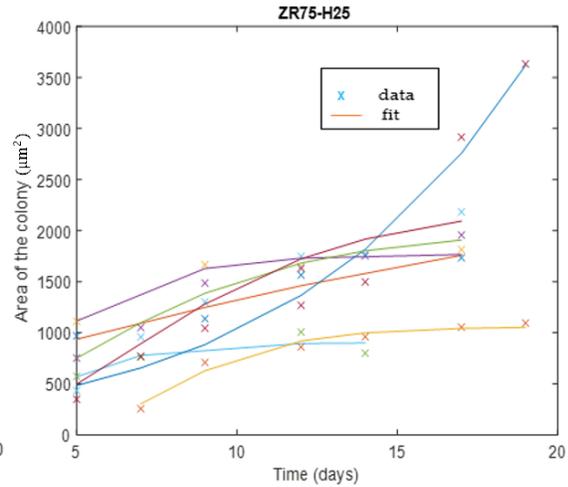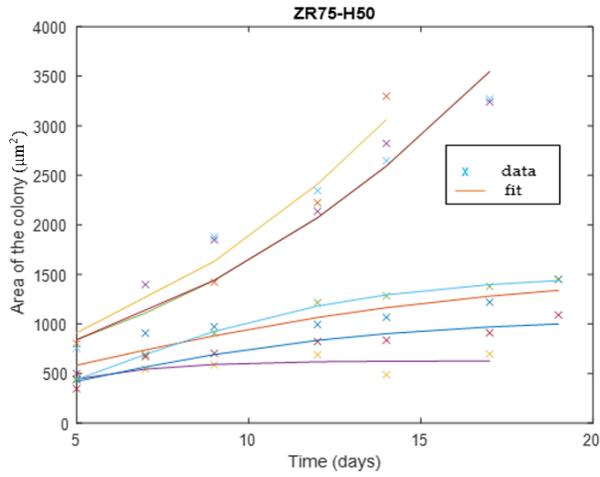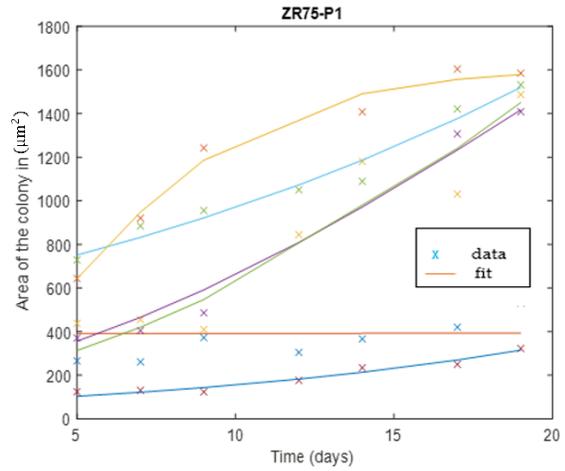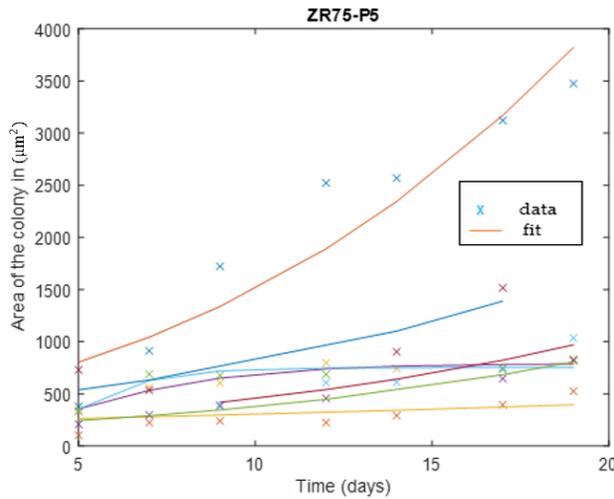Figure A6: Model fitting curves for ZR75, 6 sets of P1 data

Figure A7: Model fitting curves for ZR75, 7 sets of P5 data
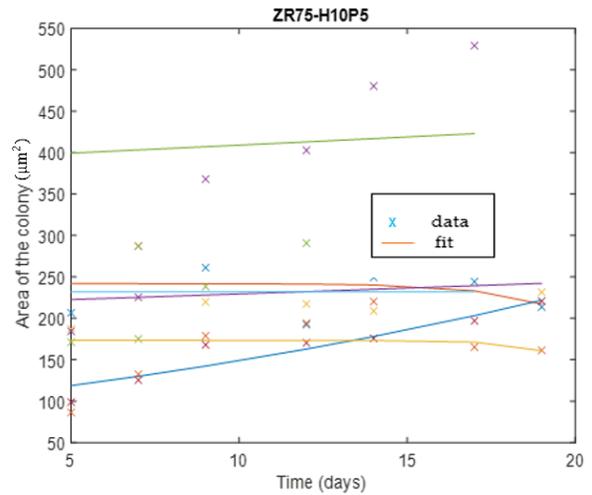

Figure A8: Model fitting curves for ZR75, 6 sets of H10P5 data
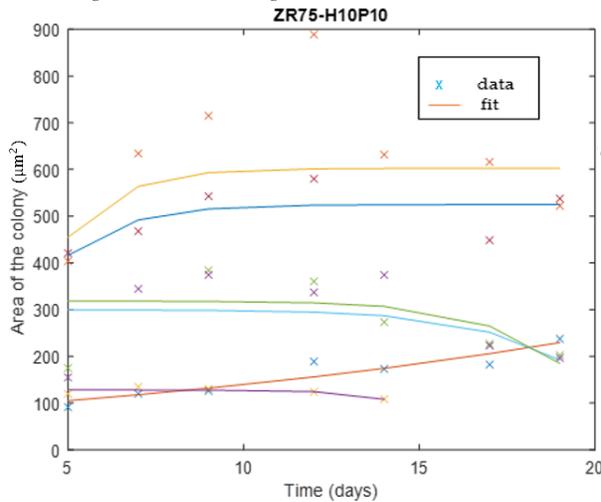

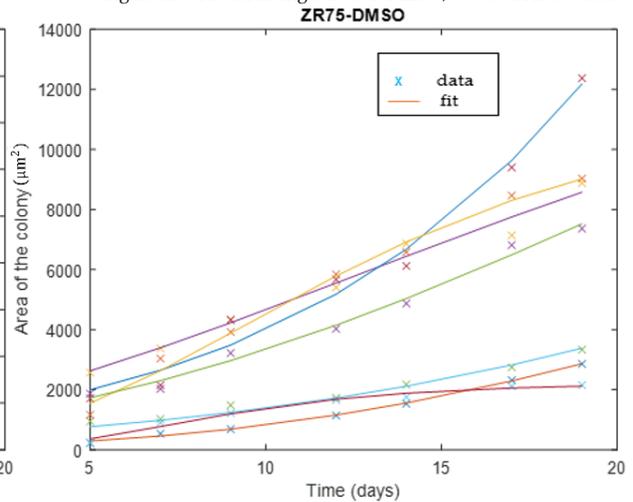Figure A9: Model fitting curves for ZR75, 6 sets of H10P10

Figure A110: Model fitting curves for ZR75, 7 sets of DMSO data

Table AT1: Drug induced growth inhibition of ZR75 colonies in agar assay. The drug effect parameter a is estimated using model (4) for two cases, case (1) by fixing k=1e6 μm^2, A_0=200 μm^2, and the growth rate of the untreated (control) colony is set as r_c=0.0240, case (2) by fixing k=1e6 μm^2, A_0=10 μm^2, and the growth rate of the untreated (control) colony is set as r_c=0.0404. The overall growth rate of treated colonies is r_{treat} =r-a and growth inhibition is calculated as % GI=(1-(r_{treat}/r_c)) ×100.

Set	No. of data set	Drug effect (a) days^{-1}, (mean (std. dev.))	Drug effect (a) days^{-1}, each curve, case 2
Control	6	-0.00612749342352310	-0.00633218849191378
		-0.00267914705080568	-0.00262532738193124
		0.00518832147421401	0.00516324219703852
		0.00330672467322264	0.00316569693054745
		0.00201060217408234	0.00188575209312794
		-0.00141541001183606	-0.00140278752371447
		Mean= 4.72663058923579e-05	**Mean= -2.42686961409293e-05**
		Std dev= 0.00420974142534772	**Std dev= 0.00422350569968956**
H5	7	0.00557241329006354	0.00523587790143663
		0.0103787600348873	0.0100269974906805
		0.00617613652661463	0.00608246306281112
		0.00543814210536747	0.00535381989704300
		0.00966894095361044	0.00941646058425729
		0.0121460422005404	0.0115707911823364
		0.00747210880646278	0.00712728125834817
		Mean= 0.00812179198822094	**Mean= 0.00783052733955902**
		Std dev= 0.00263284182042992	**Std dev= 0.00250818022425086**
H10	7	0.0132809131513060	0.0123257008860133
		0.000688836133061182	0.000669988971116384
		0.0114954490239165	0.00914037602731365
		0.00834363014481328	0.00843827825821444
		0.0106507450245906	0.0101328933864437
		0.0182041804214405	0.0157558941726825
		0.0134269497393157	0.0129210989499048
		Mean= 0.0108701005197777	**Mean= 0.00991203295024125**
		Std dev= 0.00542553527516648	**Std dev= 0.00478300025480849**
H25	7	0.00521528483456787	0.00384068688694981

		0.00436239893961209	0.00322862204249973
		0.00874248281564587	0.00317711229720570
		0.00228408652717466	0.00163037140671406
		0.0111884008688486	0.0107130324190371
		0.00372504903791874	0.00177888258213873
		0.00320657190775880	0.00107750943381074
		Mean= 0.00553203927593238	**Mean= 0.00363517386690799**
		Std dev= 0.00324016397071860	**Std dev= 0.00327923059226710**
H50	7	0.00920018666597362	0.00888994089151760
		0.0136966902433290	0.0113142769875071
		0.00856826827290443	0.00833579584397318
		0.0115943336437705	0.0111631040545341
		-0.00436486717765257	-0.0106381725154331
		-0.000904384428196315	-0.00295370381380634
		-0.000838334632684921	-0.00289219177118301
		Mean= 0.00527884179820626	**Mean= 0.00331700709672993**
		Std dev= 0.00713671421436876	**Std dev= 0.00870235982038088**
P1	6	0.0181681968064486	0.0169856339061427
		0.00991391650038746	0.00926764730718005
		0.00852680974257265	0.00823120170043477
		0.0230361280344447	0.0206674599451957
		0.00774395628354122	0.00774682379924620
		0.00999974027704771	0.00982154259513312
		Mean= 0.0128981246074071	**Mean= 0.0121200515422221**
		Std dev= 0.00622145881575175	**Std dev= 0.00537400613008875**
P5	6	0.0132720402715241	0.0129178542816114
		0.0134135308000528	0.0134105893206017
		0.00839651129582386	0.00624193918365589
		0.0193631717761220	0.0175805148272640
		0.0149164172739646	0.0142018990794279
		0.0133395482080111	0.0124675656224005
		Mean= 0.0137835366042497	**Mean= 0.0128033937191602**
		Std dev= 0.00352225630601051	**Std dev= 0.00369659186751847**
P10	5	0.0244672999311330	0.0232824418432795

		0.0248417274572760	0.0230446446476233
		0.0221958970246248	0.0209217608463690
		0.0254854030949932	0.0228518544510777
		0.0209476908419471	0.0208032266583806
		Mean= 0.0235876036699948	**Mean= 0.0221807856893460**
		Std dev= 0.00192706524083043	**Std dev= 0.00121377966527034**
P20	3	0.04072242886642159	0.0307527371366993
		0.0785370278248220	0.0405507362684397
		0.0423221463471105	0.0318665164589092
		Mean= 0.0538605343453828	**0.0343899966213494**
		Std dev= 0.0213854336368677	**0.00536434160396861**
H5P10	4	0.0209069780561113	0.0216143399111566
		0.0167942389301544	0.0202060346672416
		0.0105278244402237	0.0166782631303704
		0.0185489904973403	0.0214252422486852
		Mean= 0.0166945079809574	**Mean= 0.0199809699893635**
		Std dev= 0.00444304481526729	**Std dev= 0.00228854730969473**
H10P5	6	0.0215389088059332	0.0226965266484558
		0.0212743565304402	0.0226389399155868
		0.0183953039385395	0.0220064135348744
		0.0225541108528098	0.0249603510982070
		0.0233544438978524	0.0253383918764432
		0.0136272229046643	0.0168696664897599
		Mean= 0.0201240578217065	**Mean= 0.0224183815938879**
		Std dev= 0.00360174947184494	**Std dev= 0.00303552422636334**
H10P10	6	0.0224919391277188	0.0251018113674805
		0.0208643699870482	0.0296798544897880
		0.0212922066099078	0.0217927961333022
		0.0164994054048487	0.0164353448441155
		0.0147741448352111	0.0146477568859449
		0.0208721604069914	0.0212539195200374
		Mean= 0.0194657043952877	**Mean= 0.0214852472067781**
		Std dev= 0.00307370303551407	**Std dev= 0.00552507034257499**
H25P5	5	0.0222710365179979	0.0245842753599029
		0.0174708803994585	0.0208463486072463

		0.0174373769495569	0.0201035985902860
		0.0266831305478903	0.0294908162847293
		0.0109305738739683	0.0176507901290144
		Mean= 0.0189585996577744	**Mean= 0.0225351657942358**
		Std dev= 0.00590798697803105	**Std dev= 0.00461523758747623**
H25P10	5	0.0221765746970105	0.0236787939102669
		0.0201871269339115	0.0175566690312051
		0.0152014015933281	0.0165718828944796
		0.0170512348227609	0.0243735806049649
		0.0274529325568157	0.0304310405913556
		Mean= 0.0204138541207653	**Mean= 0.0225223934064544**
		Std dev= 0.00477451788587457	**Std dev= 0.00564308980941428**
H25P20	4	0.0246792470152909	0.0271741777304913
		0.0191693849584367	0.0323862352390351
		0.0231161676629216	0.0250586081322511
		0.0307011769611063	0.0413892180103348
		Mean= 0.0244164941494389	**Mean= 0.0315020597780281**
		Std dev= 0.00478850293047906	**Std dev= 0.00727521583380581**
H50P20	4	0.0222244451914550	0.0228537439395325
		0.0327859304460666	0.0562280303184286
		0.0327558092433201	0.0484340122663414
		0.0343517085617008	0.0654122697821262
		Mean= 0.0305294733606356	**Mean= 0.0482320140766072**
		Std dev= 0.00558662524439890	**Std dev= 0.0182865602767487**