

KRAS *in vivo* models



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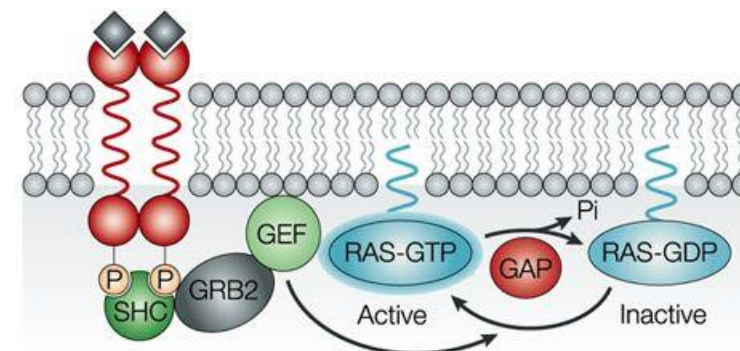
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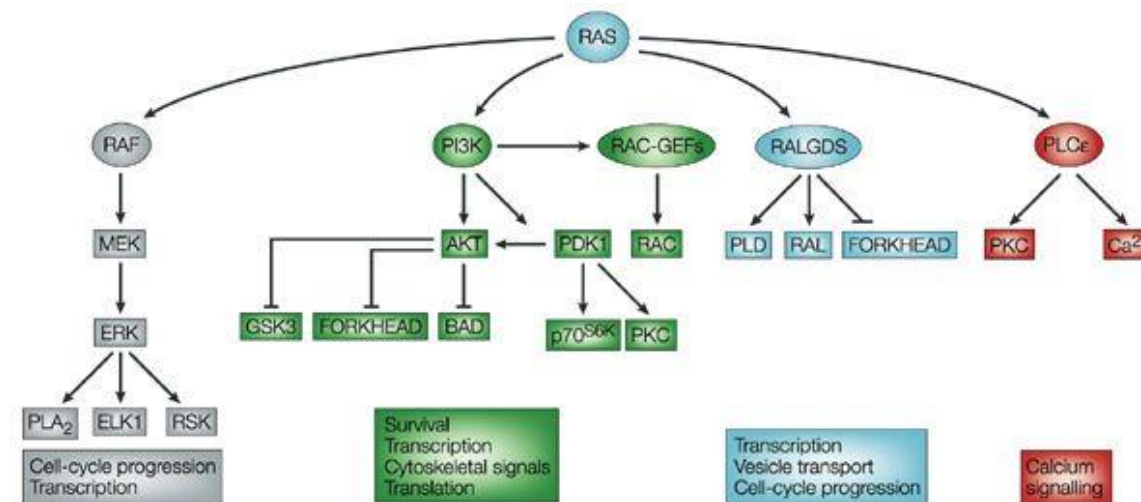
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KRAS biology and related signaling pathway

- The *KRAS* gene, which encoded an 21kDa membrane-localized GTPase transforming protein called KRAS, was first discovered and identified as a human proto-oncogene in 1982.
- KRAS belongs to the Ras superfamily functioning as on/off switches in regulating diverse cellular pathways for **cell growth, differentiation, proliferation and survival**. KRAS links growth promoting signals from the cell surface to the nucleus.
- KRAS is an enzyme (a GTPase) that converts a molecule called GTP into GDP. When KRAS is attached (bound) to GDP, it's in its "off" position and can't send signals to the nucleus. But when a GTP molecule arrives and binds to KRAS, KRAS is activated and sends its signal, and then it converts the GTP into GDP and returns to the "off" position.



Signalling upstream of RAS



Signalling downstream of RAS

KRAS mutation identified in human cancer

- When mutated, KRAS can act as an oncogene, causing normal cells to become cancerous. The mutations can shift the KRAS protein into the "on" position all the time. KRAS mutations are common in **pancreatic adenocarcinomas (98%), colorectal cancers (45%) and lung cancers (31%)**.

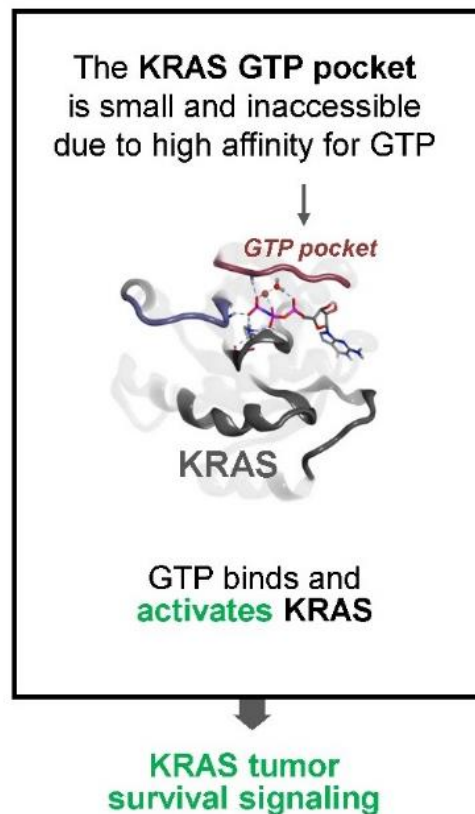
Table 1 | Frequency of RAS mutations in human cancers*

Cancer	% KRAS	% NRAS	% HRAS	% All RAS
Pancreatic ductal adenocarcinoma	97.7	0.0	0.0	97.7
Colorectal adenocarcinoma	44.7	7.5	0.0	52.2
Multiple myeloma	22.8	19.9	0.0	42.6
Lung adenocarcinoma	30.9	0.9	0.3	32.2
Skin cutaneous melanoma	0.8	27.6	1.0	29.1
Uterine corpus endometrioid carcinoma	21.4	3.6	0.4	24.6
Uterine carcinosarcoma	12.3	1.8	0.0	14.3
Thyroid carcinoma	1.0	8.5	3.5	12.5
Acute myeloid leukaemia	3.1	6.7	1.6	11.4
Bladder urothelial carcinoma	3.1	1.4	5.9	10.6
Gastric adenocarcinoma	11.4	0.9	0.0	10.0
Cervical adenocarcinoma	8.3	0.0	0.0	8.3
Head and neck squamous cell carcinoma	0.5	0.3	4.7	5.5
Diffuse large B cell lymphoma	5.2	0.0	0.0	5.2
Oesophageal adenocarcinoma	3.8	0.0	0.6	4.4
Chronic lymphocytic leukaemia	1.9	2.5	0.0	4.4
Lung squamous cell carcinoma	2.2	0.0	2.2	4.4
Small cell lung carcinoma	1.4	0.0	1.4	2.8

KRAS^{G12C} mutation and opportunity

- The G12C mutation results in an amino acid substitution at position 12 in KRAS, from a **glycine (G)** to a **cysteine (C)**, which occurs in 2% of all human cancers.
- In non-small cell lung cancer (NSCLC), KRAS^{G12C} is the most common mutation, comprising nearly half of all KRAS mutations.
- KRAS^{G12C} was recently identified to be potentially druggable by allele-specific covalent targeting of Cys-12 in vicinity to an inducible allosteric **Switch II Pocket (S-IIP)**.
- The series of Switch-II Pocket KRAS^{G12C} Inhibitors bind to and covalently react with the GDP-bound state of KRAS^{G12C} trapping it in an inactive conformation.

Historical Challenges in Targeting KRAS



The KRAS G12C Opportunity

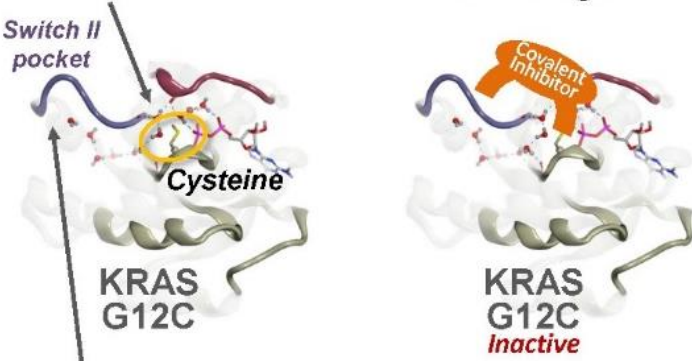
1. KRAS G12C has a **cysteine** present at **codon 12** in its mutated form
 2. A small, but expandable pocket is proximal to the mutated **cysteine 12** and **Switch II** region
 3. Inhibitor covalently binds to **codon 12** and binds in the induced **Switch II** region
 4. KRAS G12C is irreversibly **locked** in the **inactive state**
- 
- KRAS tumor survival signaling is halted**

Image from <https://www.mirati.com>

Selective KRAS^{G12C} Inhibitors in clinical trail

Drug	Inventor	Target	Status	Indications	Clinical trials identifier
AMG 510	Amgen	KRAS p.G12C	Phase 1	KRAS p.G12C Mutant Advanced Solid Tumors	NCT03600883
MRTX849	Mirati Therapeutics Inc.	KRAS p.G12C	Phase 1/2	Advanced Cancer Metastatic Cancer Malignant Neoplastic Disease	NCT03785249

<https://clinicaltrials.gov/>

KRAS related CDX models

Cancer type	Model ID	Tumor growth curve	Drugs tested	Dosage	TGI	Model genomics
Lung cancer	NCI-H358	Yes	AMG 510	30 mg/kg	114%	KRAS p.G12C
			ARS-1620	15 mg/kg 20 mg/kg	52% 86%	
	NCI-H2122	Yes	NA	NA	NA	KRAS p.G12C
	xNCI-H23	Yes	NA	NA	NA	KRAS p.G12C
	NCI-H441	Yes	NA	NA	NA	KRAS p.G12V
	SHP-77	Yes	NA	NA	NA	KRAS p.G12V
	A549	Yes	NA	NA	NA	KRAS p.G12S
	NCI-H460	Yes	NA	NA	NA	KRAS p.Q61H
	Calu-6	Yes	NA	NA	NA	KRAS p.Q61K

KRAS related CDX models

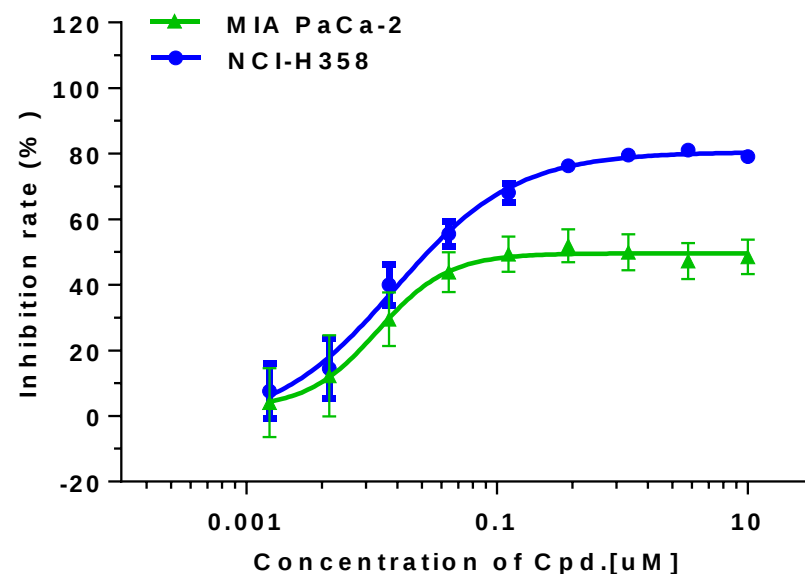
Cancer type	Model ID	Tumor growth curve	Drugs tested	Dosage	TGI	Model genomics
Pancreatic cancer	Mia-pa-ca-2	Yes	AMG 510	30 mg/kg	136%	KRAS p.G12C
			ARS-1620	50 mg/kg 200 mg/kg	126% 132%	
	xMia-pa-ca-2	Yes	ARS-1620	50 mg/kg	51%	KRAS p.G12C
	AsPc-1	Yes	NA	NA	NA	KRAS p.G12D
	CAPAN-1	Yes	NA	NA	NA	KRAS p.G12V

KRAS related CDX models

Cancer type	Model ID	Tumor growth curve	Drugs tested	Dosage	TGI	Model genomics
Colorectal cancer	LS 180	Yes	NA	NA	NA	KRAS p.G12D
	SW620	Yes	NA	NA	NA	KRAS p.G12V
	HCT-116	Yes	NA	NA	NA	KRAS p.G13D
	HCT-15	Yes	NA	NA	NA	KRAS p.G13D
	LoVo	Yes	NA	NA	NA	KRAS p.G13D
	T84	Yes	NA	NA	NA	KRAS p.G13D
Cervical cancer	SW756	Yes	NA	NA	NA	KRAS p.G12C
Leukemia	CCRF-CEM	Yes	NA	NA	NA	KRAS p.G12D
Breast cancer	MDA-MB-231	Yes	NA	NA	NA	KRAS p.G13D
Lymphoma	Daudi	Yes	NA	NA	NA	KRAS p.L187V
Sarcoma	SJSA-1	Yes	NA	NA	NA	KRAS p.Q61H

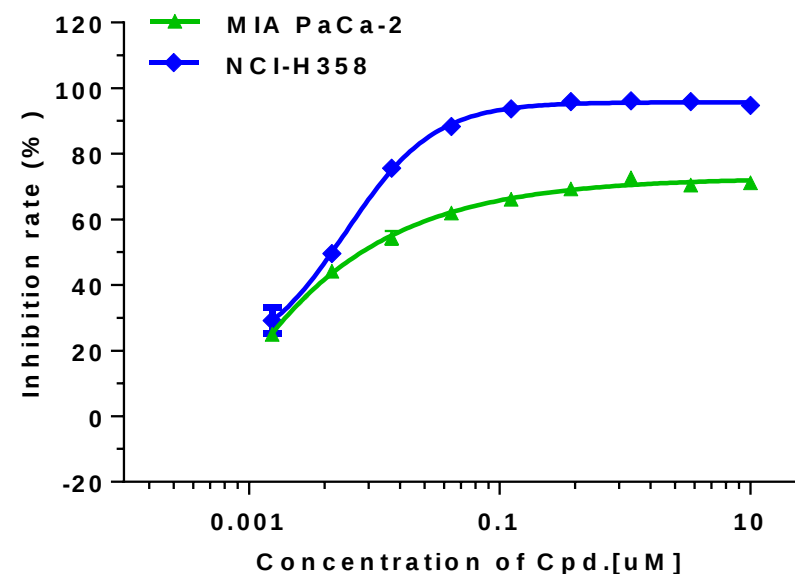
2D vs 3D validation of AMG510 on NCI-H358 and Mia-pa-ca-2

AMG 510 2D CTG



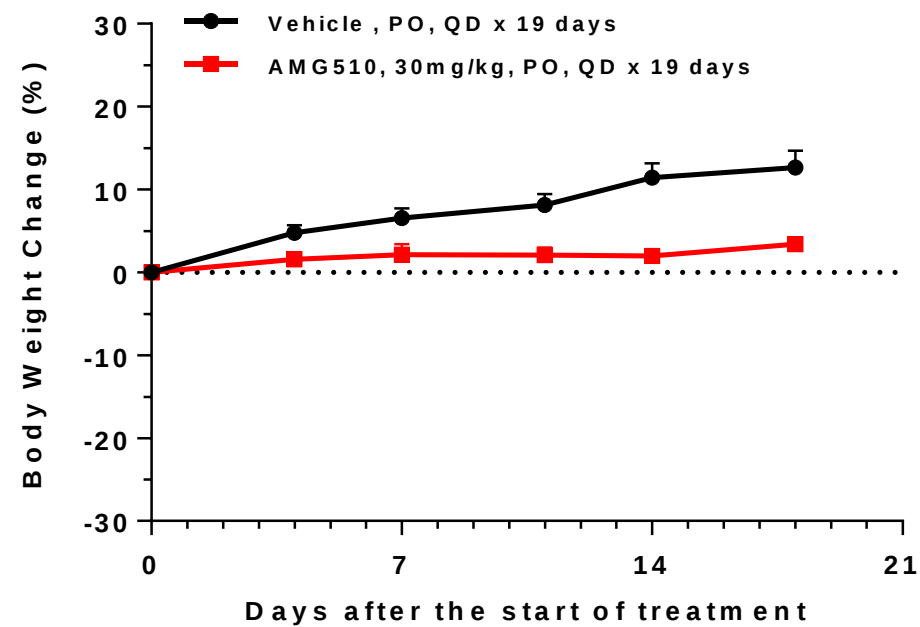
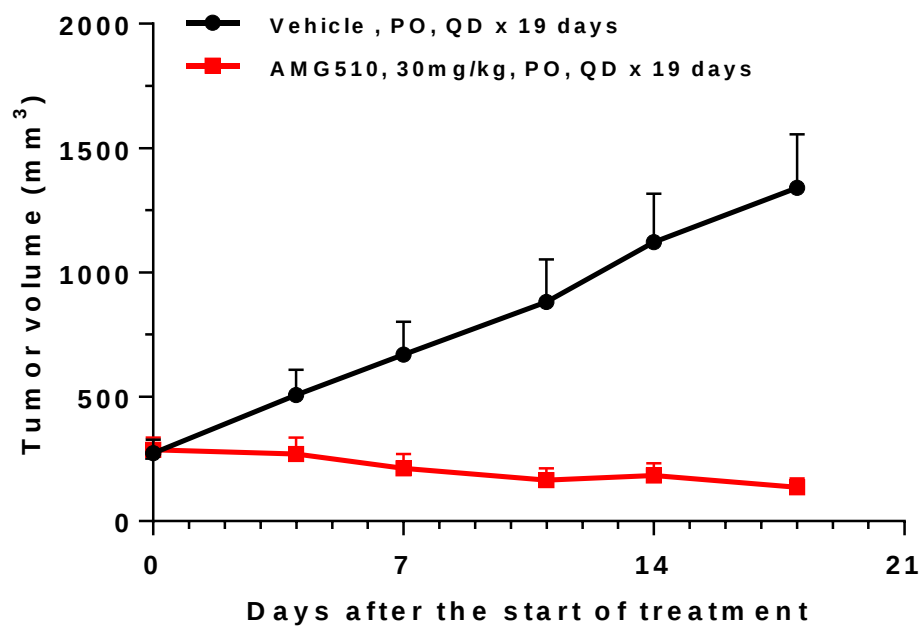
Compounds	Cell line	ReIC50(μM)	AbsIC50(μM)	Bottom(%)	Top(%)
AMG510	MIA PaCa-2	0.011	NA	2.28	49.6
	NCI-H358	0.015	0.028	-3.125	80.52

AMG510 3D CTG

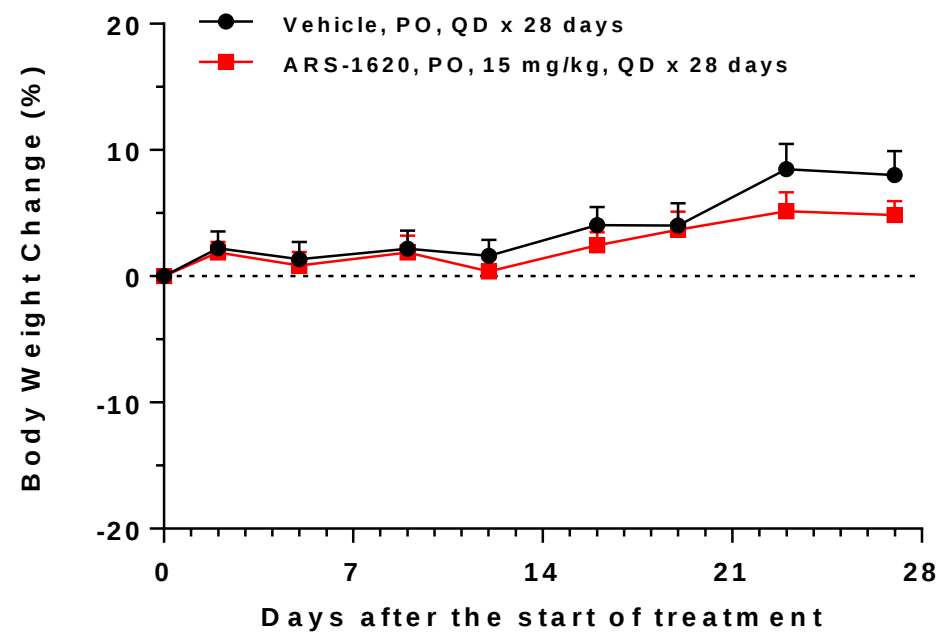
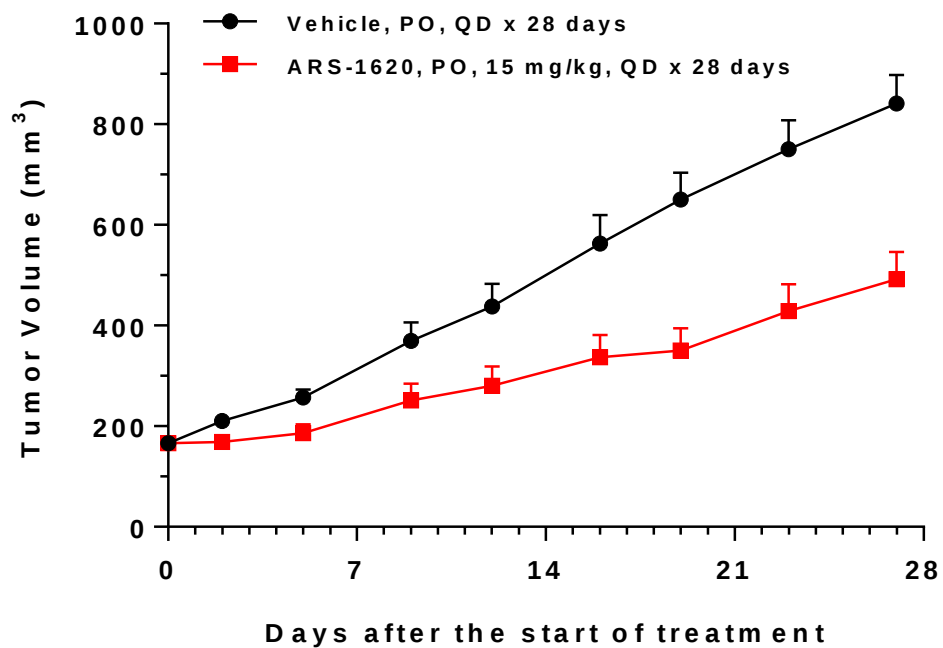


Compounds	Cell line	ReIC50(μM)	AbsIC50(μM)	Bottom(%)	Top(%)
AMG510	MIA PaCa-2	NA	0.008	25.007	72.657
	NCI-H358	0.006	0.005	29.163	96.147

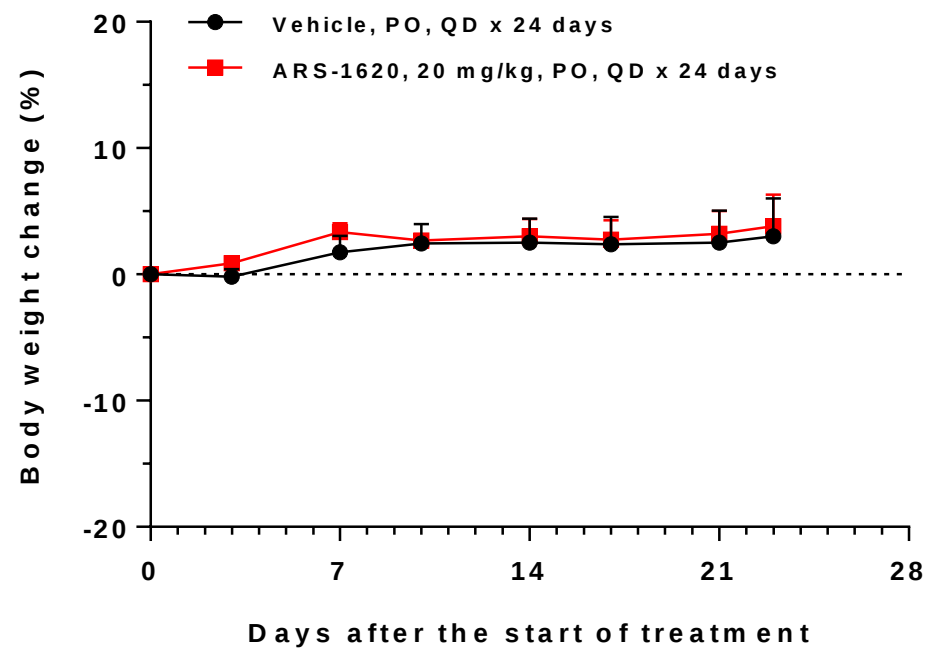
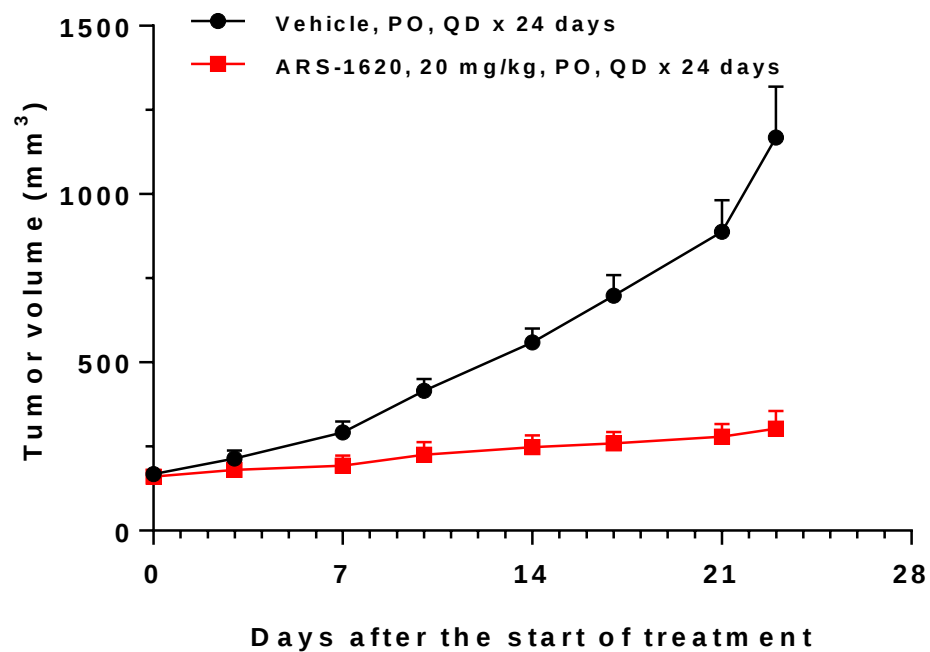
AMG 510 in NCI-H358 non-small cell lung cancer xenograft model



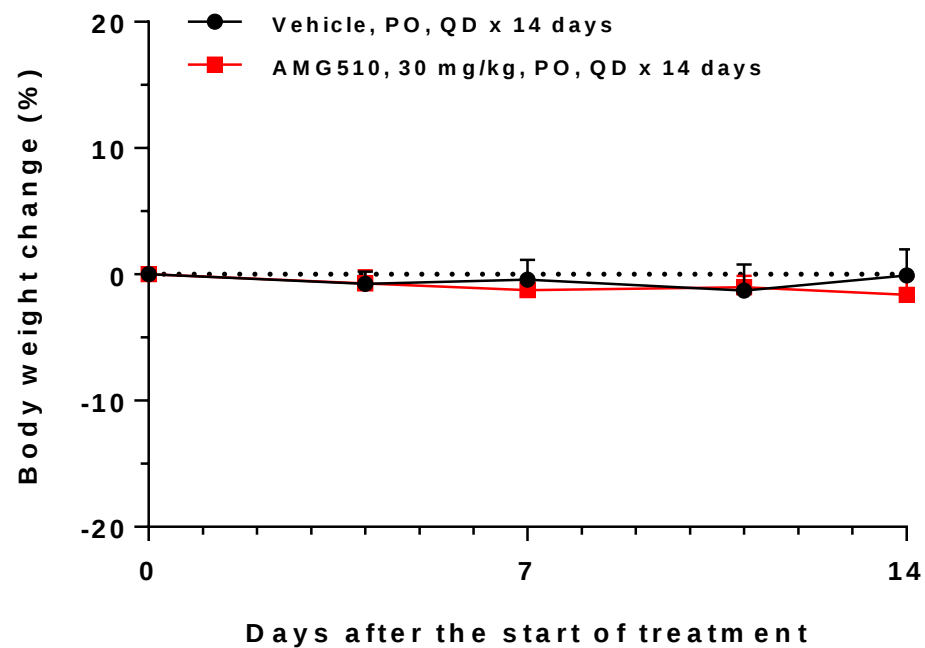
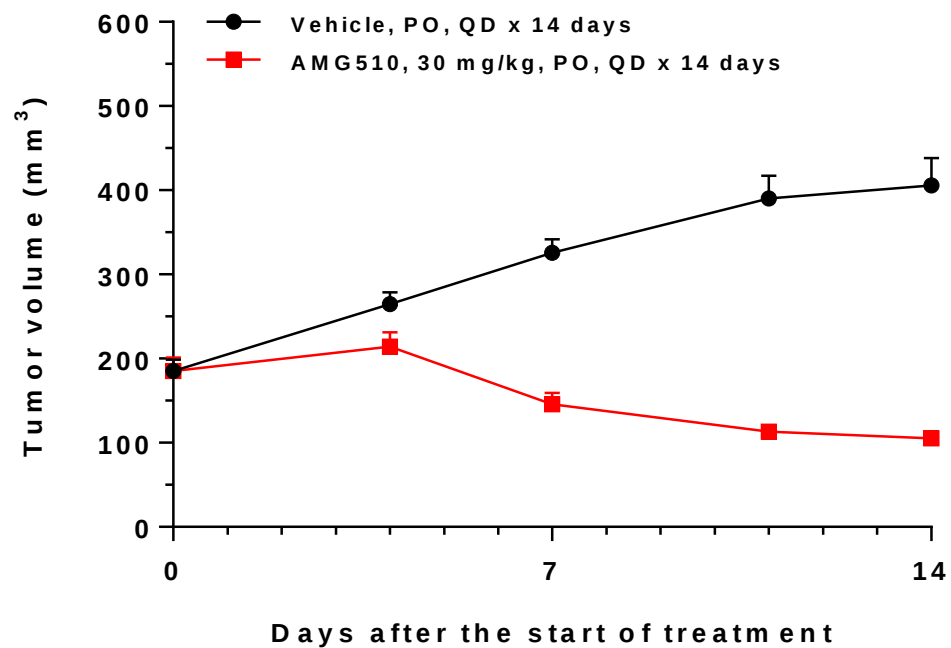
ARS-1620 in NCI-H358 non-small cell lung cancer xenograft model



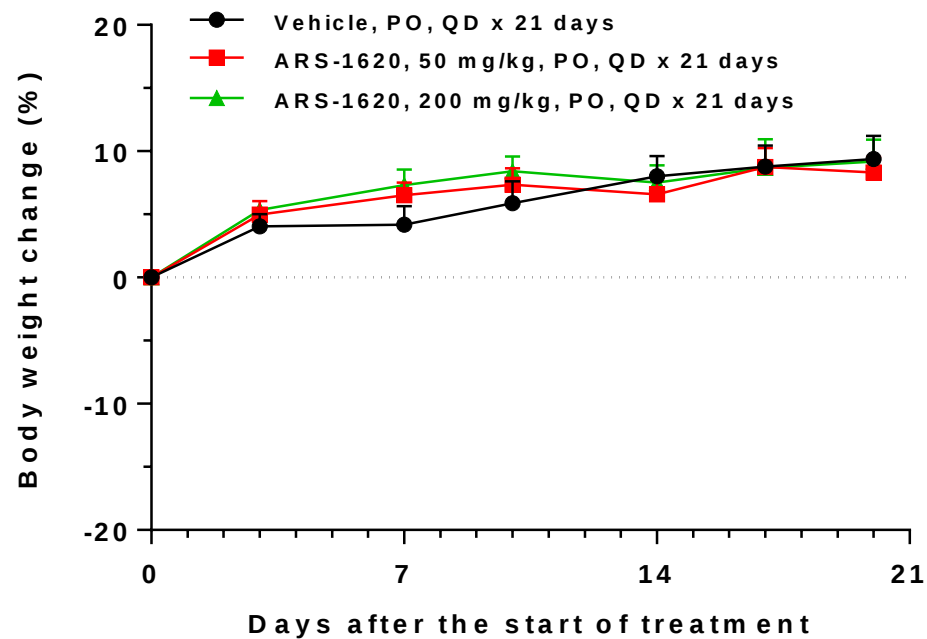
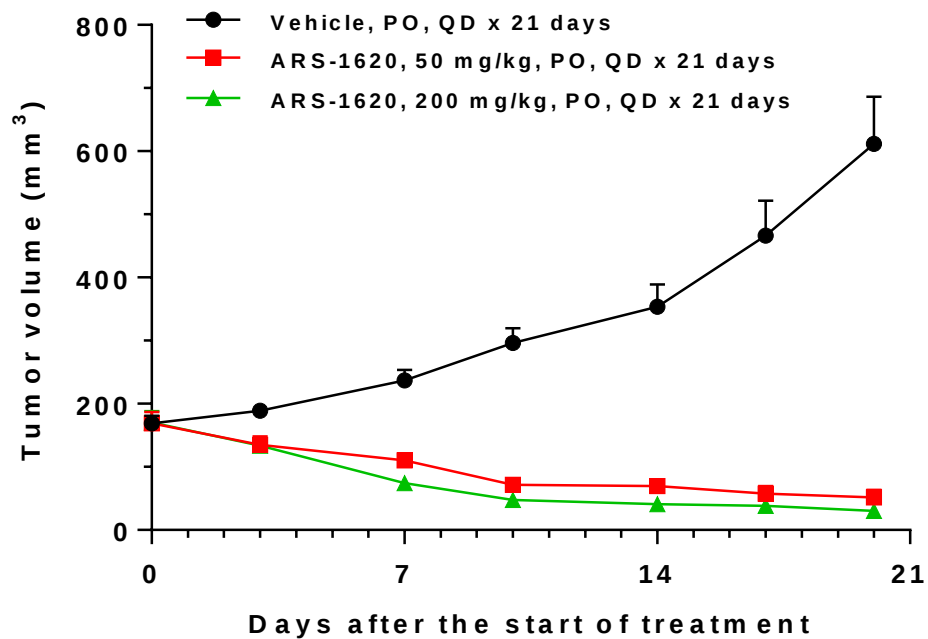
ARS-1620 in NCI-H358 non-small cell lung cancer xenograft model



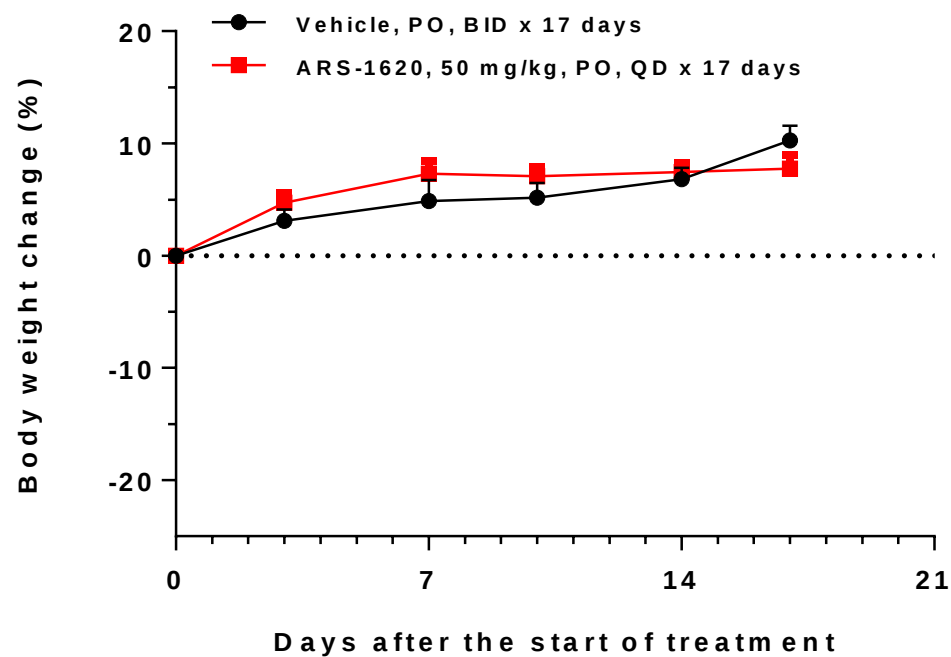
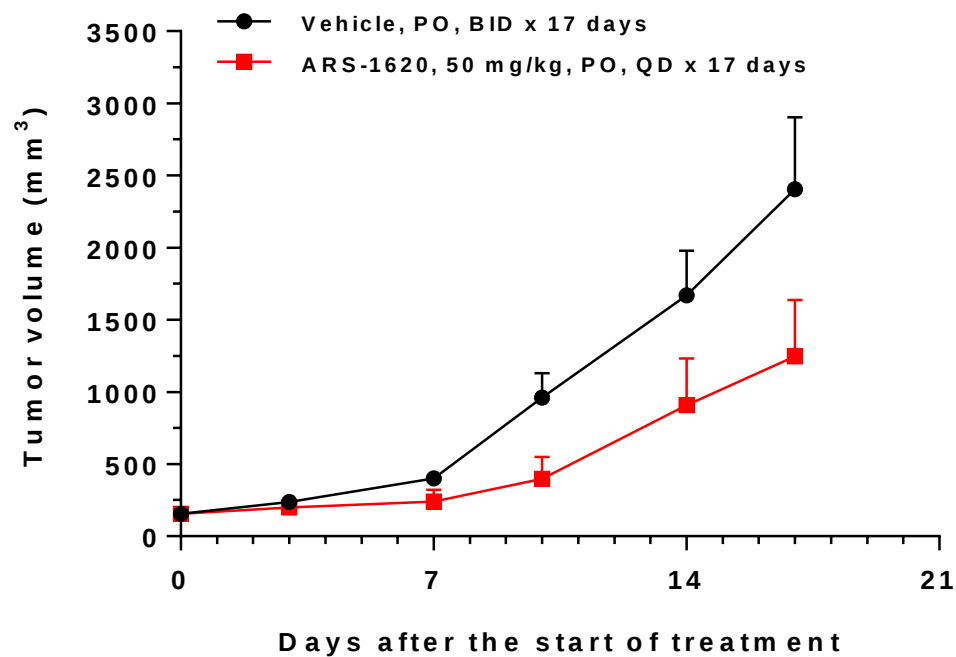
AMG 510 in Mia-pa-ca-2 pancreatic cancer xenograft model



ARS-1620 in Mia-pa-ca-2 pancreatic cancer xenograft model



ARS-1620 in xMia-pa-ca-2 pancreatic cancer xenograft model



Note: Model was established from **xMia-pa-ca-2** which went through *in vivo* passage once.

KRAS Mutation PDX models

G12A mutation

Gene	AA mutation	Cancer type	Model ID
KRAS	G12A	NSCLC	LU-01-0439
KRAS	G12A	Pancreatic cancer	PC-07-0001
KRAS	G12A	Pancreatic cancer	PC-07-0071

G12S mutation

Gene	AA mutation	Cancer type	Model ID
KRAS	G12S	Colorectal cancer	CO-04-0336
KRAS	G12S	Colorectal cancer	CO-04-0347
KRAS	G12S	Colorectal cancer	CO-04-0349

G12C mutation

Gene	AA mutation	Cancer type	Model ID
KRAS	G12C	NSCLC	LU-01-0030
KRAS	G12C	NSCLC	LU-01-0046
KRAS	G12C	NSCLC	LU-01-0361
KRAS	G12C	NSCLC	LU-01-0462
KRAS	G12C	Colorectal cancer	CO-04-0307
KRAS	G12C	Colorectal cancer	CO-04-0310
KRAS	G12C	Gastric cancer	ST-02-0331

G12R mutation

Gene	AA mutation	Cancer type	Model ID
KRAS	G12R	Pancreatic cancer	PC-07-0034
KRAS	G12R	Pancreatic cancer	PC-07-0045
KRAS	G12R	Pancreatic cancer	PC-07-0048
KRAS	G12R	Pancreatic cancer	PC-07-0067
KRAS	G12R	Pancreatic cancer	PC-07-0068

KRAS G12D Mutation PDX models

Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID
KRAS	G12D	Colorectal cancer	CO-04-0002	KRAS	G12D	Colorectal cancer	CO-04-0324
KRAS	G12D	Colorectal cancer	CO-04-0006	KRAS	G12D	Colorectal cancer	CO-04-0326
KRAS	G12D	Colorectal cancer	CO-04-0071	KRAS	G12D	Colorectal cancer	CO-04-0333
KRAS	G12D	Colorectal cancer	CO-04-0093	KRAS	G12D	Colorectal cancer	CO-04-0339
KRAS	G12D	Colorectal cancer	CO-04-0120	KRAS	G12D	Colorectal cancer	CO-04-0346
KRAS	G12D	Colorectal cancer	CO-04-0124	KRAS	G12D	Colorectal cancer	CO-04-0351
KRAS	G12D	Colorectal cancer	CO-04-0127	KRAS	G12D	Cholangiocarcinoma	CH-17-0047
KRAS	G12D	Colorectal cancer	CO-04-0289	KRAS	G12D	Cholangiocarcinoma	CH-17-0064
KRAS	G12D	Colorectal cancer	CO-04-0312	KRAS	G12D	Cholangiocarcinoma	CH-17-0100
KRAS	G12D	Colorectal cancer	CO-04-0323				

KRAS G12D Mutation PDX models

Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID
KRAS	G12D	Pancreatic cancer	PC-07-0002	KRAS	G12D	Pancreatic cancer	PC-07-0036
KRAS	G12D	Pancreatic cancer	PC-07-0003	KRAS	G12D	Pancreatic cancer	PC-07-0058
KRAS	G12D	Pancreatic cancer	PC-07-0013	KRAS	G12D	Pancreatic cancer	PC-07-0059
KRAS	G12D	Pancreatic cancer	PC-07-0014	KRAS	G12D	Pancreatic cancer	PC-07-0062
KRAS	G12D	Pancreatic cancer	PC-07-0022	KRAS	G12D	Pancreatic cancer	PC-07-0064
KRAS	G12D	Pancreatic cancer	PC-07-0024	KRAS	G12D	Gastric cancer	ST-02-0216
KRAS	G12D	Pancreatic cancer	PC-07-0033	KRAS	G12D	Gastric cancer	ST-02-0322
KRAS	G12D	Pancreatic cancer	PC-07-0037	KRAS	G12D	Gastric cancer	ST-02-0326
KRAS	G12D	Pancreatic cancer	PC-07-0040	KRAS	G12D	Gastric cancer	ST-02-0393
KRAS	G12D	Pancreatic cancer	PC-07-0046	KRAS	G12D	Gastric cancer	ST-02-0506
KRAS	G12D	Pancreatic cancer	PC-07-0051				
KRAS	G12D	Pancreatic cancer	PC-07-0052				

KRAS G12V Mutation PDX models

Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID
KRAS	G12V	Colorectal cancer	CO-04-0084	KRAS	G12V	Pancreatic cancer	PC-07-0035
KRAS	G12V	Colorectal cancer	CO-04-0128	KRAS	G12V	Pancreatic cancer	PC-07-0039
KRAS	G12V	Colorectal cancer	CO-04-0340	KRAS	G12V	Pancreatic cancer	PC-07-0041
KRAS	G12V	Colorectal cancer	CO-04-0341	KRAS	G12V	Pancreatic cancer	PC-07-0042
KRAS	G12V	NSCLC	LU-01-0013	KRAS	G12V	Pancreatic cancer	PC-07-0044
KRAS	G12V	NSCLC	LU-01-0034	KRAS	G12V	Pancreatic cancer	PC-07-0054
KRAS	G12V	NSCLC	LU-01-0037	KRAS	G12V	Pancreatic cancer	PC-07-0057
KRAS	G12V	NSCLC	LU-01-0430	KRAS	G12V	Pancreatic cancer	PC-07-0061
KRAS	G12V	NSCLC	LU-01-0430	KRAS	G12V	HCC	LI-03-1204
KRAS	G12V	NSCLC	LU-01-0486	KRAS	G12V	Cholangiocarcinoma	CH-17-0005
KRAS	G12V	Pancreatic cancer	PC-07-0012	KRAS	G12V	Cholangiocarcinoma	CH-17-0049
KRAS	G12V	Pancreatic cancer	PC-07-0018	KRAS	G12V	Cholangiocarcinoma	CH-17-0060

Other Type KRAS Mutation PDX models

Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID
KRAS	A146T	Colorectal cancer	CO-04-0001	KRAS	L159S	Head and Neck cancer	HN-13-0225
KRAS	A146T	Colorectal cancer	CO-04-0003	KRAS	S122F	Head and Neck cancer	HN-13-0277
KRAS	A146T	Colorectal cancer	CO-04-0028	KRAS	L159F	NSCLC	LU-01-0032
KRAS	A146T	Colorectal cancer	CO-04-0299	KRAS	T158R	NSCLC	LU-01-0058
KRAS	A146T	Colorectal cancer	CO-04-0304	KRAS	T158K	NSCLC	LU-01-0709
KRAS	Q61H	Colorectal cancer	CO-04-0026	KRAS	T158S	HCC	LI-03-0018
KRAS	K176N	Colorectal cancer	CO-04-0065	KRAS	G115E	HCC	LI-03-0143
KRAS	A59E	Colorectal cancer	CO-04-0111	KRAS	Y157C	HCC	LI-03-0164
KRAS	Q61L	Colorectal cancer	CO-04-0285	KRAS	M111T	HCC	LI-03-0653
KRAS	Q61H	Colorectal cancer	CO-04-0331	KRAS	T158I	HCC	LI-03-0838
KRAS	I84T	Colorectal cancer	CO-04-0318	KRAS	R161M	HCC	LI-03-1205
KRAS	K179N	Colorectal cancer	CO-04-0123	KRAS	L159F	DLBCL	LY-24-0169
KRAS	177_178del	Colorectal cancer	CO-04-0127	KRAS	L159S	Cholangiocarcinoma	CH-17-0047
KRAS	175_175del	Cholangiocarcinoma	CH-17-0019	KRAS	V14I	Pancreatic cancer	PC-07-0071

Lung cancer PDX model with KRAS Mutation

Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation
NSCLC	LU-01-0439	KRAS	G12A	NSCLC	LU-01-0430	KRAS	G12V
NSCLC	LU-01-0030	KRAS	G12C	NSCLC	LU-01-0430	KRAS	G12V
NSCLC	LU-01-0046	KRAS	G12C	NSCLC	LU-01-0486	KRAS	G12V
NSCLC	LU-01-0361	KRAS	G12C	NSCLC	LU-01-0032	KRAS	L159F
NSCLC	LU-01-0462	KRAS	G12C	NSCLC	LU-01-0709	KRAS	T158K
NSCLC	LU-01-0013	KRAS	G12V	NSCLC	LU-01-0058	KRAS	T158R
NSCLC	LU-01-0034	KRAS	G12V	NSCLC	LU-01-0037	KRAS	G12V

Colorectal cancer PDX with KRAS Mutation

Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation
Colorectal cancer	CO-04-0307	KRAS	G12C	Colorectal cancer	CO-04-0326	KRAS	G12D
Colorectal cancer	CO-04-0310	KRAS	G12C	Colorectal cancer	CO-04-0333	KRAS	G12D
Colorectal cancer	CO-04-0002	KRAS	G12D	Colorectal cancer	CO-04-0339	KRAS	G12D
Colorectal cancer	CO-04-0006	KRAS	G12D	Colorectal cancer	CO-04-0346	KRAS	G12D
Colorectal cancer	CO-04-0071	KRAS	G12D	Colorectal cancer	CO-04-0351	KRAS	G12D
Colorectal cancer	CO-04-0093	KRAS	G12D	Colorectal cancer	CO-04-0336	KRAS	G12S
Colorectal cancer	CO-04-0120	KRAS	G12D	Colorectal cancer	CO-04-0347	KRAS	G12S
Colorectal cancer	CO-04-0124	KRAS	G12D	Colorectal cancer	CO-04-0349	KRAS	G12S
Colorectal cancer	CO-04-0127	KRAS	G12D	Colorectal cancer	CO-04-0084	KRAS	G12V
Colorectal cancer	CO-04-0289	KRAS	G12D	Colorectal cancer	CO-04-0128	KRAS	G12V
Colorectal cancer	CO-04-0312	KRAS	G12D	Colorectal cancer	CO-04-0340	KRAS	G12V
Colorectal cancer	CO-04-0323	KRAS	G12D	Colorectal cancer	CO-04-0341	KRAS	G12V
Colorectal cancer	CO-04-0324	KRAS	G12D				

Colorectal cancer PDX with KRAS Mutation

Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation
Colorectal cancer	CO-04-0007	KRAS	G13D	Colorectal cancer	CO-04-0331	KRAS	Q61H
Colorectal cancer	CO-04-0295	KRAS	G13D	Colorectal cancer	CO-04-0285	KRAS	Q61L
Colorectal cancer	CO-04-0334	KRAS	G13D	Colorectal cancer	CO-04-0283	KRAS	R161M
Colorectal cancer	CO-04-0337	KRAS	G13D	Colorectal cancer	CO-04-0127	KRAS	177_178del
Colorectal cancer	CO-04-0345	KRAS	G13D	Colorectal cancer	CO-04-0001	KRAS	A146T
Colorectal cancer	CO-04-0350	KRAS	G13D	Colorectal cancer	CO-04-0003	KRAS	A146T
Colorectal cancer	CO-04-0355	KRAS	G13D	Colorectal cancer	CO-04-0028	KRAS	A146T
Colorectal cancer	CO-04-0318	KRAS	I84T	Colorectal cancer	CO-04-0299	KRAS	A146T
Colorectal cancer	CO-04-0065	KRAS	K176N	Colorectal cancer	CO-04-0304	KRAS	A146T
Colorectal cancer	CO-04-0123	KRAS	K179N	Colorectal cancer	CO-04-0111	KRAS	A59E
Colorectal cancer	CO-04-0314	KRAS	L159M	Colorectal cancer	CO-04-0026	KRAS	Q61H

Pancreatic cancer PDX model with KRAS Mutation

Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation
Pancreatic cancer	PC-07-0001	KRAS	G12A	Pancreatic cancer	PC-07-0051	KRAS	G12D
Pancreatic cancer	PC-07-0071	KRAS	G12A	Pancreatic cancer	PC-07-0052	KRAS	G12D
Pancreatic cancer	PC-07-0002	KRAS	G12D	Pancreatic cancer	PC-07-0058	KRAS	G12D
Pancreatic cancer	PC-07-0003	KRAS	G12D	Pancreatic cancer	PC-07-0059	KRAS	G12D
Pancreatic cancer	PC-07-0013	KRAS	G12D	Pancreatic cancer	PC-07-0062	KRAS	G12D
Pancreatic cancer	PC-07-0014	KRAS	G12D	Pancreatic cancer	PC-07-0064	KRAS	G12D
Pancreatic cancer	PC-07-0022	KRAS	G12D	Pancreatic cancer	PC-07-0034	KRAS	G12R
Pancreatic cancer	PC-07-0024	KRAS	G12D	Pancreatic cancer	PC-07-0045	KRAS	G12R
Pancreatic cancer	PC-07-0033	KRAS	G12D	Pancreatic cancer	PC-07-0048	KRAS	G12R
Pancreatic cancer	PC-07-0036	KRAS	G12D	Pancreatic cancer	PC-07-0067	KRAS	G12R

Pancreatic cancer PDX model with KRAS Mutation

Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation
Pancreatic cancer	PC-07-0037	KRAS	G12D	Pancreatic cancer	PC-07-0068	KRAS	G12R
Pancreatic cancer	PC-07-0040	KRAS	G12D	Pancreatic cancer	PC-07-0012	KRAS	G12V
Pancreatic cancer	PC-07-0046	KRAS	G12D	Pancreatic cancer	PC-07-0018	KRAS	G12V
Pancreatic cancer	PC-07-0035	KRAS	G12V	Pancreatic cancer	PC-07-0061	KRAS	G12V
Pancreatic cancer	PC-07-0039	KRAS	G12V	Pancreatic cancer	PC-07-0047	KRAS	G13D
Pancreatic cancer	PC-07-0041	KRAS	G12V	Pancreatic cancer	PC-07-0054	KRAS	G12V
Pancreatic cancer	PC-07-0042	KRAS	G12V	Pancreatic cancer	PC-07-0057	KRAS	G12V
Pancreatic cancer	PC-07-0044	KRAS	G12V	Pancreatic cancer	PC-07-0071	KRAS	V14I

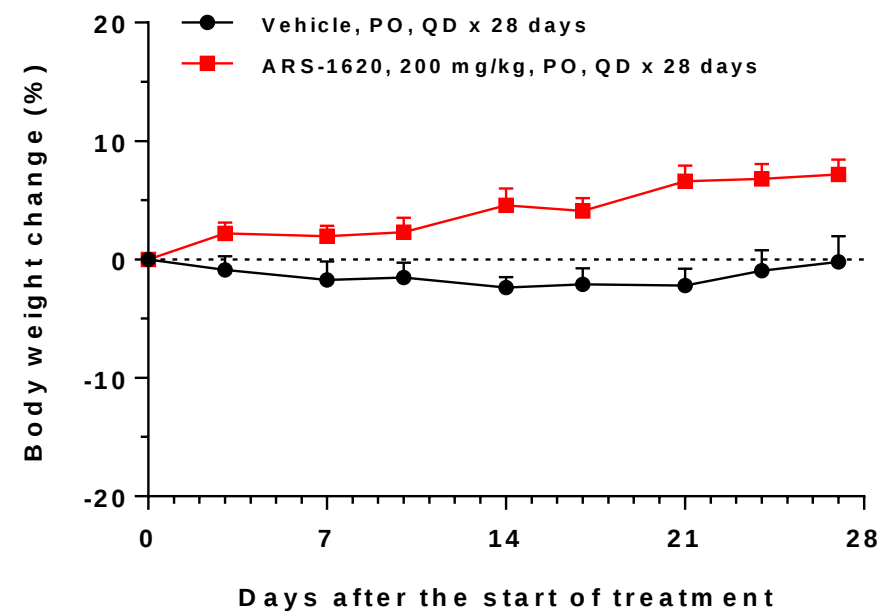
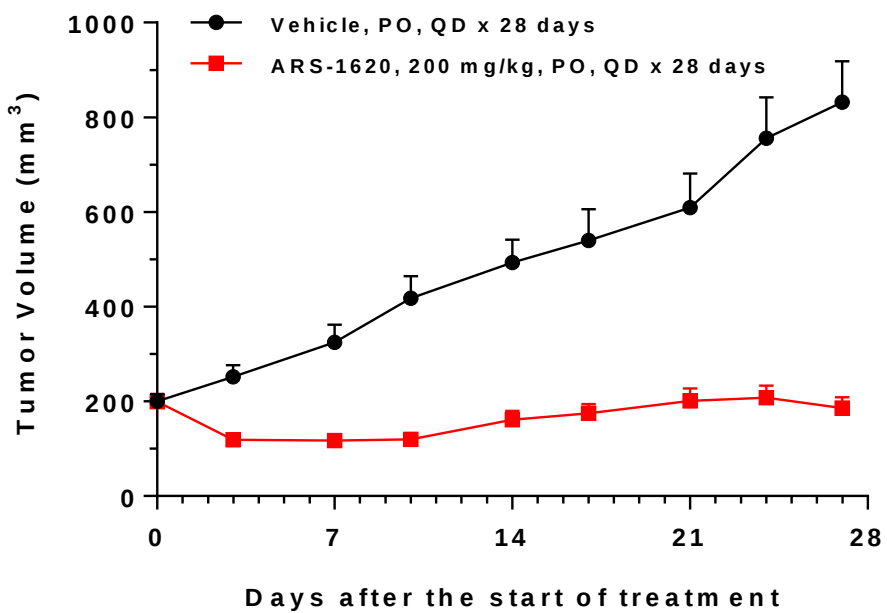
Gastric cancer PDX model with KRAS Mutation

Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation
Gastric cancer	ST-02-0331	KRAS	G12C	Gastric cancer	ST-02-0360	KRAS	G13D
Gastric cancer	ST-02-0216	KRAS	G12D	Gastric cancer	ST-02-0393	KRAS	G12D
Gastric cancer	ST-02-0322	KRAS	G12D	Gastric cancer	ST-02-0506	KRAS	G12D
Gastric cancer	ST-02-0326	KRAS	G12D	Gastric cancer	ST-02-0329	KRAS	G13D

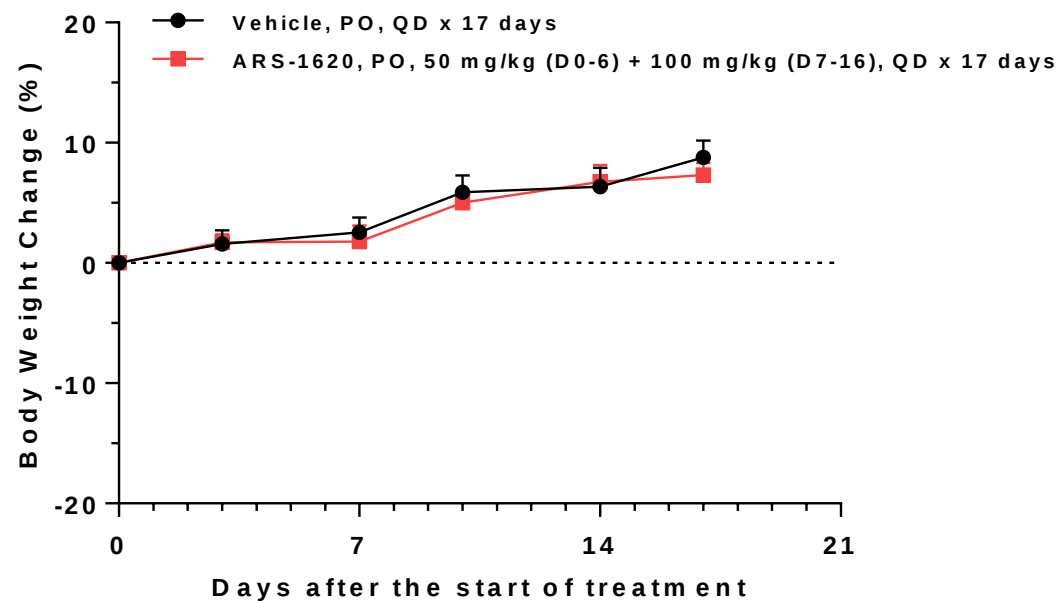
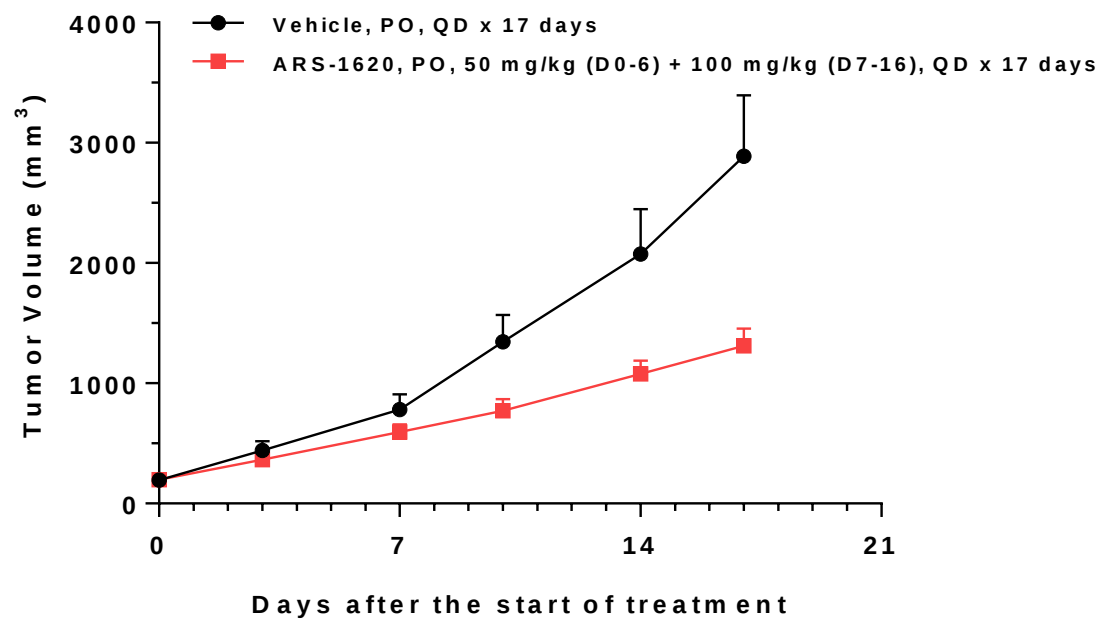
Other cancer type PDX model with KRAS Mutation

Cancer type	Model ID	Gene	AA mutation	Cancer type	Model ID	Gene	AA mutation
Cholangiocarcinoma	CH-17-0047	KRAS	G12D	HCC	LI-03-0143	KRAS	G115E
Cholangiocarcinoma	CH-17-0064	KRAS	G12D	HCC	LI-03-1204	KRAS	G12V
Cholangiocarcinoma	CH-17-0100	KRAS	G12D	HCC	LI-03-0653	KRAS	M111T
Cholangiocarcinoma	CH-17-0005	KRAS	G12V	HCC	LI-03-1205	KRAS	R161M
Cholangiocarcinoma	CH-17-0049	KRAS	G12V	HCC	LI-03-0838	KRAS	T158I
Cholangiocarcinoma	CH-17-0060	KRAS	G12V	HCC	LI-03-0018	KRAS	T158S
Cholangiocarcinoma	CH-17-0047	KRAS	L159S	HCC	LI-03-0164	KRAS	Y157C
Cholangiocarcinoma	CH-17-0019	KRAS	175_175del	Head and Neck cancer	HN-13-0225	KRAS	L159S
Gallbladder cancer	GL-18-0006	KRAS	L159F	Head and Neck cancer	HN-13-0277	KRAS	S122F
Gallbladder cancer	GL-18-0009	KRAS	T158K	DLBCL	LY-24-0169	KRAS	L159F
Esophageal cancer	ES-06-0009	KRAS	G13D				

ARS-1620 in LU-01-0030 xenograft model



ARS-1620 in LU-01-0046 xenograft model





OUR COMMITMENT

Improving Health. Making a Difference.

For questions and requests, please email to info_onco@wuxiapptec.com



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