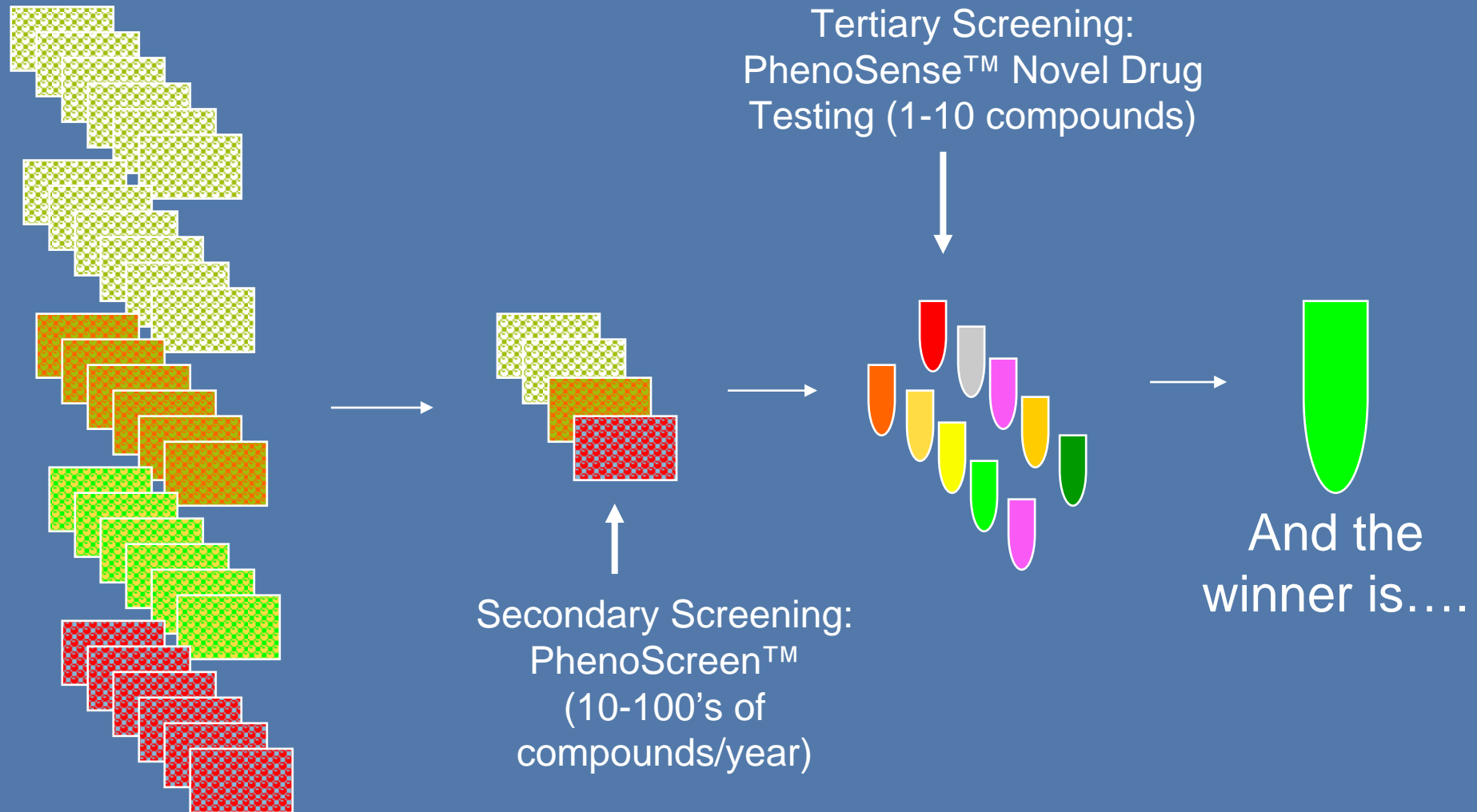


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Overview of *PhenoSense* Novel Drug Testing
and *PhenoScreen*

Overview of Preclinical Drug Development



Resistance Profiling for Novel HIV Drugs

PhenoSense™ HIV Novel Drug Testing

- “Gold Standard” full drug characterization
- Extensive characterization of lead-compounds
- Customized virus panels (5-200+ viruses)
- Set-up and QC for new drugs required
- PR/RT, integrase, and entry inhibitors

PhenoScreen™ HIV Novel Drug Screening

- Rapid testing of 10+ of compounds
- Standard virus panels and stocks* (from 5 to 20 viruses)
- Reduced drug set up work = lower cost
- Shorter TAT
- Available for entry and RT inhibitors

PhenoScreen™:

Higher Throughput Novel Drug Screening

**Developed in response to customer demand:
“Secondary screening”**

- Historically, many companies performed MT-4 or PBMC-based assays = Costly (people, time, lab space, data quality)
- Pharma recognizes the advantages of PhenoSense technology in drug screening (standard PhenoSense currently utilized for lead compound identification with smaller numbers of compounds)
- Phenotypic data is needed to make early Go and No-Go decisions on compounds
- Outsourcing this work to Monogram may be more cost-effective than keeping it in-house.

*PhenoScreen*TM:

Higher Throughput Novel Drug Screening

PhenoScreen Setup:

- One marketed drug is included in drug panel as “control”.
- Drug potency against a panel comprised of drug sensitive virus (NL4-3) plus a set panel of 5 – 20 library viruses (cannot change throughout contract)
- Approximate IC50 values
- Approximate Fold changes relative to reference
- Access to Monogram scientists for data interpretation (and Eric)
- Summary report with Monogram’s interpretation (for add’l. fee)

PhenoScreen™:

Higher Throughput Novel Drug Screening

Client Commitments:

- Minimum yearly commitment of 500 curves (serum: virus combinations @ \$100 per combination) = \$50,000 per year
- Minimum of 10 compounds per order (can include marketed drugs in same class to reach minimum)
- Compounds pre-weighed and dissolved in appropriate diluent at standardized concentrations
- Any available data on IC50, cytotoxicity, solubility, MW
- Any available data on special handling, carcinogenicity, etc.

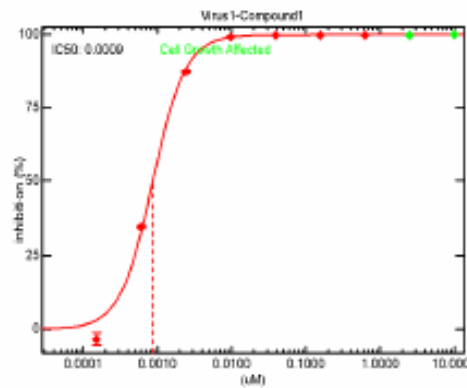
PhenoScreen™:

Higher Throughput Novel Drug Screening

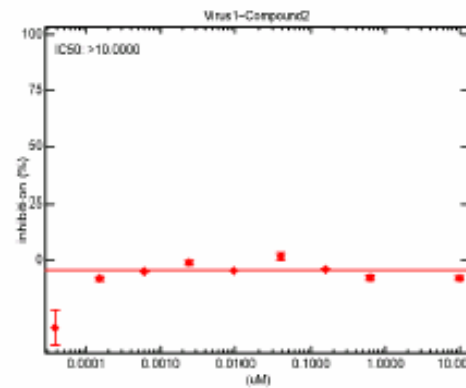
PhenoScreen results in:

- Higher throughput
 - Standard virus panels and stocks are used
 - More drugs and fewer viruses tested
 - Standard TAT = 14 days (7 day TAT possible for a premium)
 - Lead compounds can be identified, optimized prior to testing in PhenoSense Novel Drug testing assay (“Gold Standard”)
- Quality data for the Pharma sponsor
- Monogram can offer at a lower price than Standard PhenoSense novel drug characterization

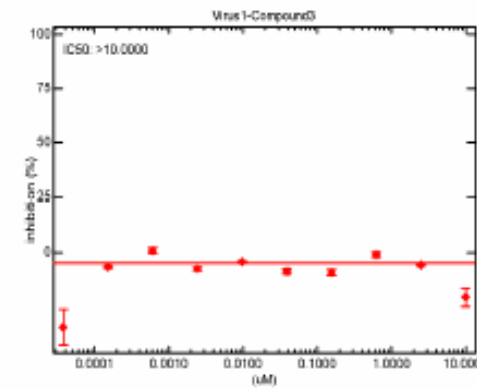
Virus Panel 1



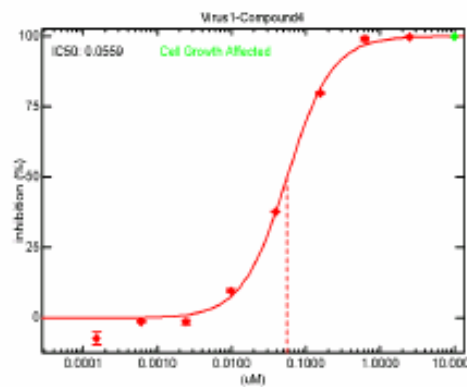
COMPOUND 1



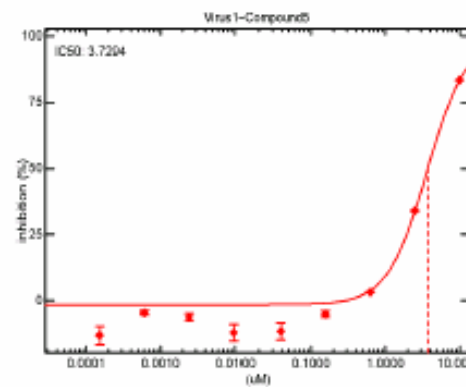
COMPOUND 2



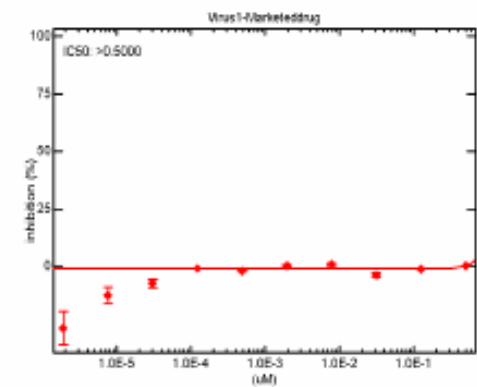
COMPOUND 3



COMPOUND 4



COMPOUND 5



MARKETED DRUG

PhenoScreen: Sample IC50 Data

biosciences monogram		IC50 Summary					PhenoScreen	
Client:	PhenoScreenClient					Project:	P98765	
Drug Unit	Compound1 (uM)	Compound2 (uM)	Compound3 (uM)	Compound4 (uM)	Compound5 (uM)	Marketeddrug (uM)		
Toxicity (# dilns)	2	0	0	1	0	0		
Virus								
SensitiveVirus	0.0003	0.0011	0.0027	0.0010	0.0005	0.0010		
ResistantVirus	0.0017	0.1530	0.7689	0.0373	0.0059	0.0158		
Virus1	0.0009	>10.0000	>10.0000	0.0559	3.7294	>0.5000		
Virus2	0.0098	5.1605	>10.0000	0.1545	1.3528	>0.5000		
Virus3	0.0125	>10.0000	>10.0000	1.6543	5.6081	>0.5000		
Virus4	0.0007	1.5295	5.4046	0.0543	0.0312	>0.5000		
Virus5	0.0059	>10.0000	>10.0000	0.2843	5.7959	0.3246		
Virus6	0.0014	0.0581	0.0533	0.0140	0.0002	>0.5000		
Virus7	0.0002	0.7678	1.7715	0.0148	0.0493	>0.5000		
Virus8	0.0005	0.1307	0.1920	0.0078	0.0012	0.1556		
Virus9	0.0002	0.1297	0.3110	0.0111	0.0027	0.2302		
Virus10	0.0003	1.2046	2.0627	0.0264	0.0071	0.1442		
Virus11	0.0003	0.0884	0.3022	0.0080	0.0033	0.1171		
Virus12	0.0002	0.0172	0.0584	0.0039	0.0006	0.0388		
Virus13	0.0534	0.2657	0.4441	0.4755	0.1526	0.0206		
Virus14	0.0032	>10.0000	>10.0000	0.3757	5.6535	0.0157		
Virus15	0.0002	0.3838	0.9173	0.0043	0.0283	0.0062		
Virus16	0.0014	0.0228	0.0710	0.0109	0.0077	0.0019		
Virus17	0.0032	2.5111	>10.0000	0.0735	0.3552	0.0078		
Virus18	0.0001	0.0594	0.4628	0.0075	0.0009	0.0027		
Virus19	0.0014	6.3646	>10.0000	0.3002	0.1417	>0.5000		
Virus20	0.0855	>10.0000	>10.0000	1.8324	>10.0000	>0.5000		

PhenoScreen: Sample Fold Change Data

biosciences monogram		Fold Change Summary					PhenoScreen		
Drug Unit	Compound1 FC(CNDO)	Compound2 FC(CNDO)	Compound3 FC(CNDO)	Compound4 FC(CNDO)	Compound5 FC(CNDO)	Marketeddrug FC(CNDO)	Marketeddrug FC(CNDO)	Marketeddrug FC(CNDO)	
Toxicity (# dilns)	2	0	0	1	0	0	0	0	
Virus									
SensitiveVirus	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
ResistantVirus	5.67	139.09	284.78	37.30	11.80	15.80	15.80	49.89	
Virus1	3.00	max	max	55.90	7458.80	max	max	max	
Virus2	32.67	4691.36	max	154.50	2705.60	max	max	max	
Virus3	41.67	max	max	1654.30	11216.20	max	max	max	
Virus4	2.33	1390.45	2001.70	54.30	62.40	max	max	max	
Virus5	19.67	max	max	284.30	11591.80	324.60	324.80	max	
Virus6	4.67	52.82	19.74	14.00	0.40	max	max	max	
Virus7	0.67	698.00	656.11	14.80	98.60	max	max	max	
Virus8	1.67	118.82	71.11	7.80	2.40	155.60	155.60	320.94	
Virus9	0.67	117.91	115.19	11.10	5.40	230.20	230.20	max	
Virus10	1.00	1095.09	763.96	26.40	14.20	144.20	144.20	max	
Virus11	1.00	80.36	111.93	8.00	6.60	117.10	117.10	max	
Virus12	0.67	15.64	21.63	3.90	1.20	38.80	38.80	228.05	
Virus13	178.00	241.55	164.48	475.50	305.20	20.60	20.70	max	
Virus14	10.67	max	max	375.70	11307.00	15.70	15.80	max	
Virus15	0.67	348.91	339.74	4.30	56.60	6.20	6.20	279.72	
Virus16	4.67	20.73	26.30	10.90	15.40	1.90	1.90	122.02	
Virus17	10.67	2282.82	max	73.50	710.40	7.80	7.80	max	
Virus18	0.33	54.00	171.41	7.50	1.80	2.70	2.70	max	
Virus19	4.67	5786.00	max	300.20	283.40	max	max	max	
Virus20	285.00	max	max	1832.40	max	max	max	max	

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