



DESIGNPHARMA

High-throughput discovery
of novel ligands of G-
protein coupled receptors
using the PRESTO-Salsa
platform

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Director of R&D
Design Pharmaceuticals



Emerging multinational drug discovery platform company



Founded in 2018, privately held



Headquarter in Cambridge, USA
Laboratories in Cambridge MA (US), Paris area (France), Shanghai (China – in creation)



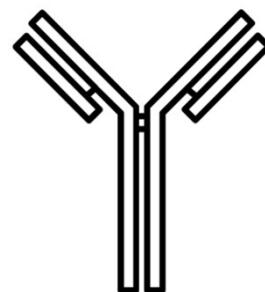
Proprietary drug discovery platform to discover hit candidates faster and at unprecedented scale





Our platform covers all drug modalities, with a focus on the benefits of natural drug-like molecules

Monoclonal antibodies



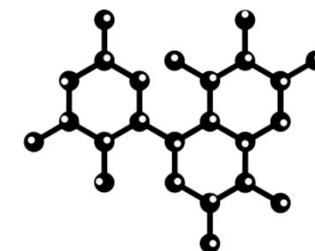
Not orally available
Not cell penetrant

Traditional small molecules



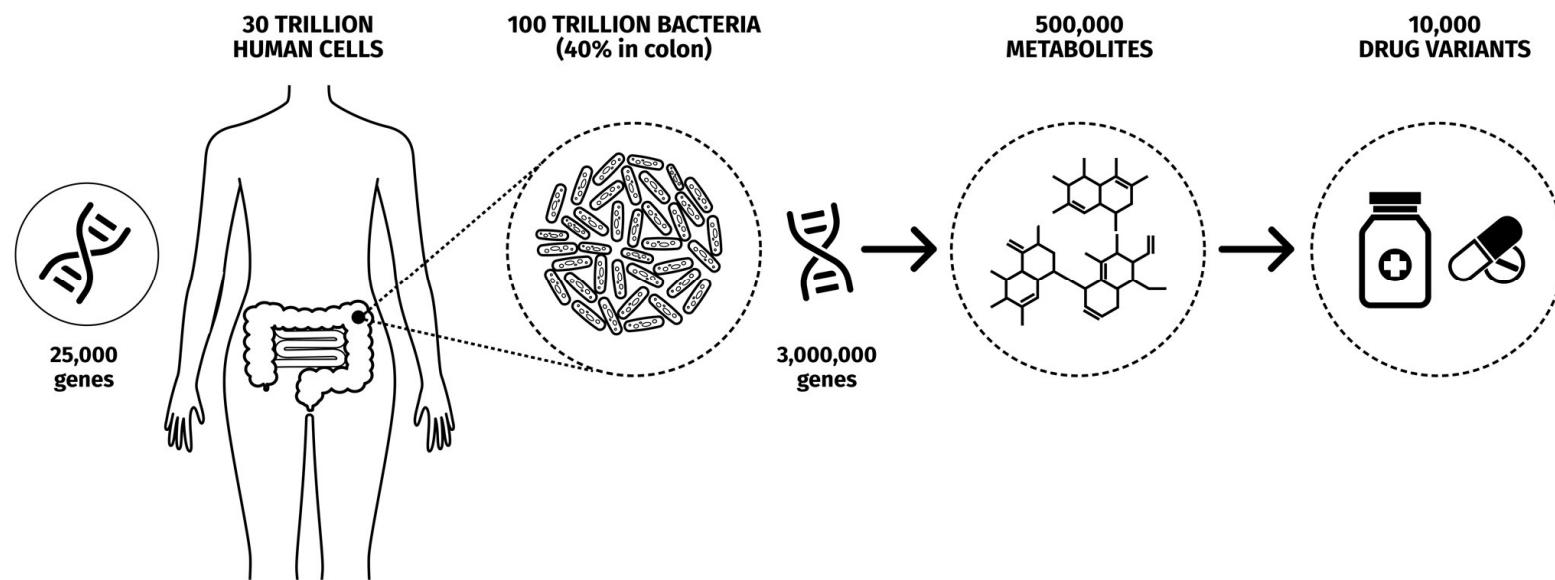
Orally available
Cell penetrant
Not ideal for many targets

Natural drug-like molecules

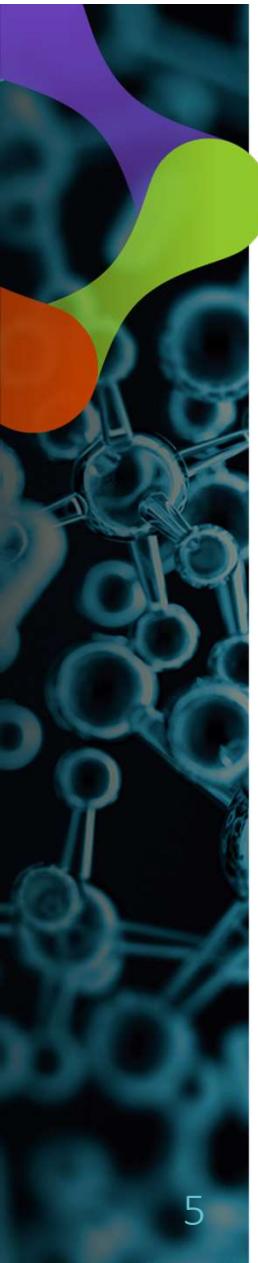


Orally available
Cell penetrant
Complex target binding possibilities

Accessing the database of nature's drug-like chemistry for therapeutics development

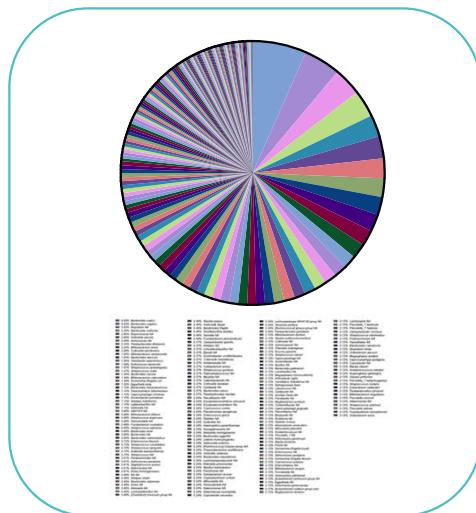


- ✓ Molecules with drug-like properties from millions of years of host-microbiota co-evolution
- ✓ Unprecedented speed & scale to unlock compounds for drug discovery & development
- ✓ We decipher the microbiota-host communication with unrivalled technologies



Design Pharma's unique access to new chemical space of nature's drug-like molecules

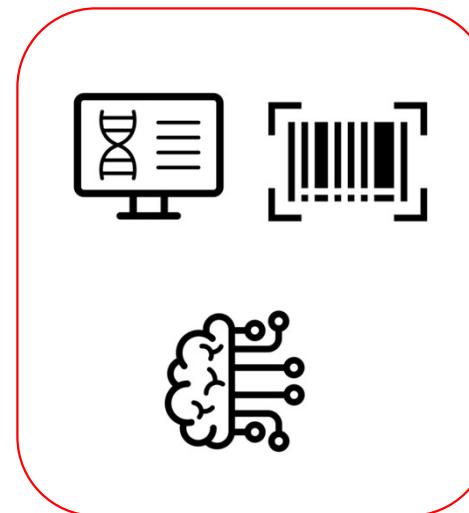
Novel Chemistry



Proprietary (human)
microbiota cell bank

Metagenomics (different
organism sources)

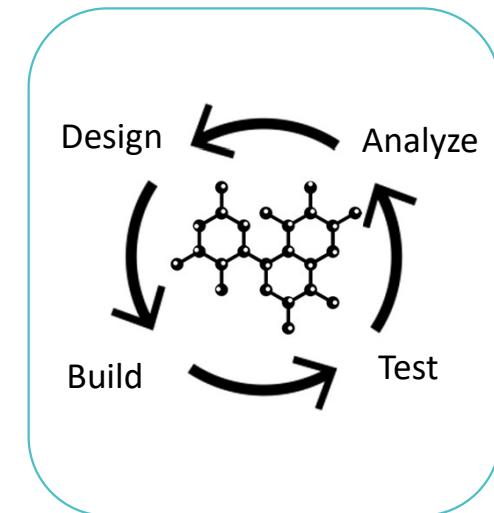
Target Focused Discovery



NGS-scale barcode cell-based
assays

Machine learning

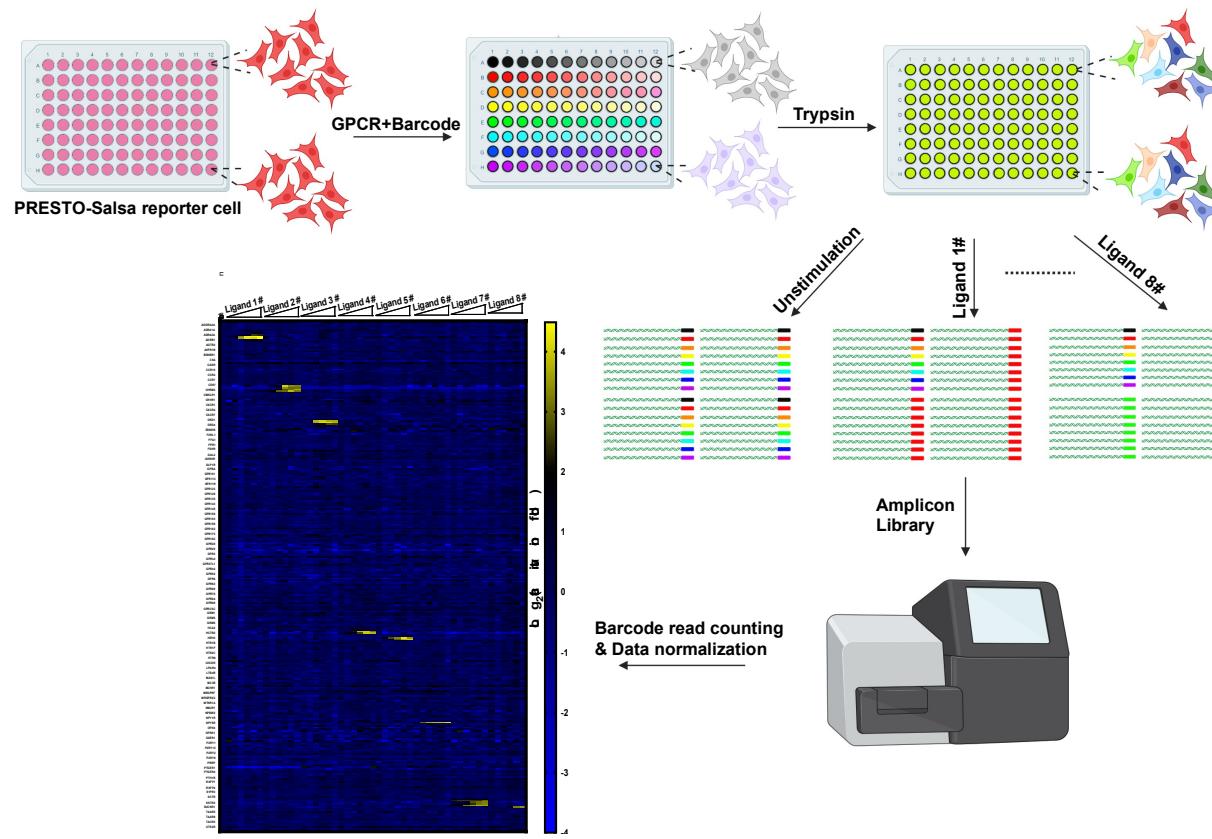
Cell-free Synthetic Biology

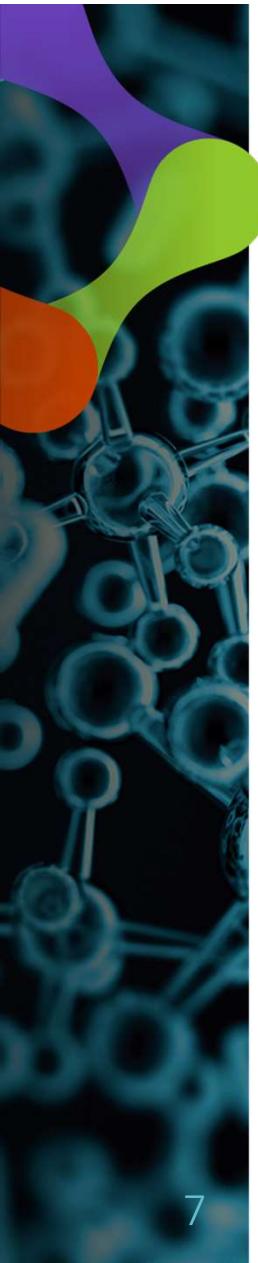


Fast compound synthesis & lead
compound optimization

PRESTO-Salsa : a highly multiplexed GPCR cell line assay

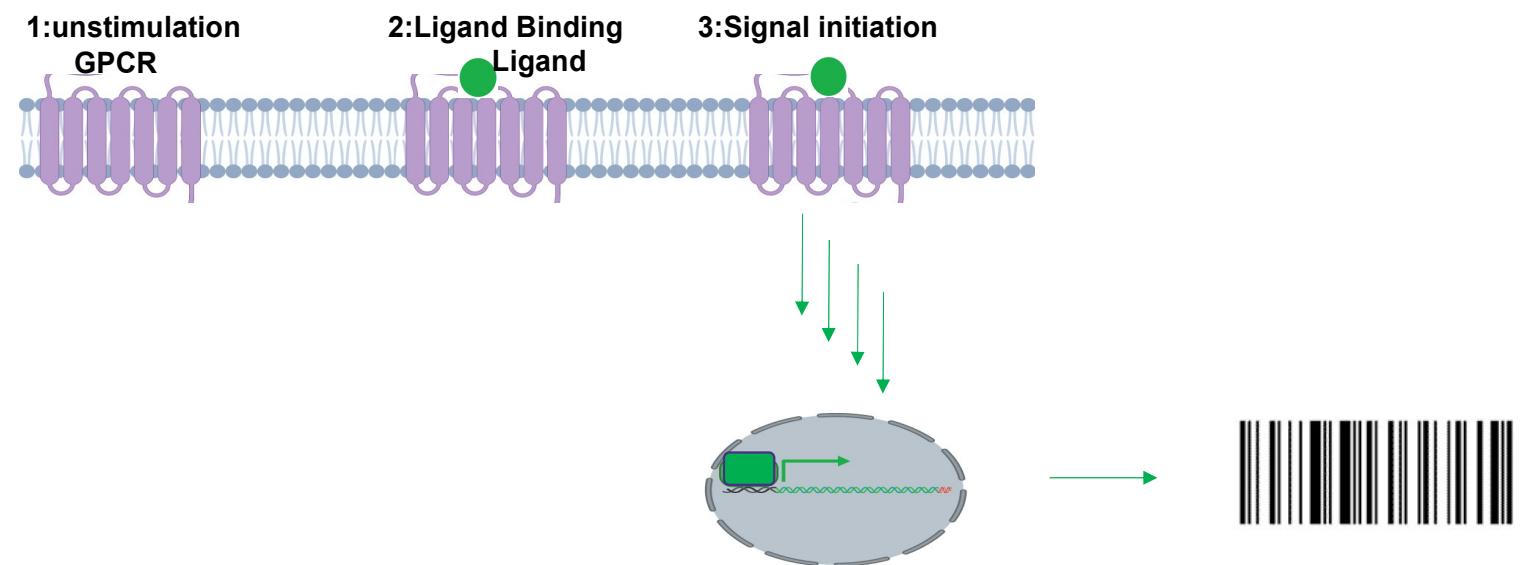
Rapid discovery of GPCR ligands with high specificity at scale





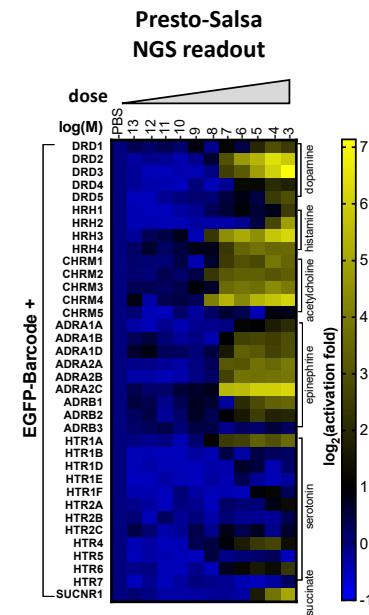
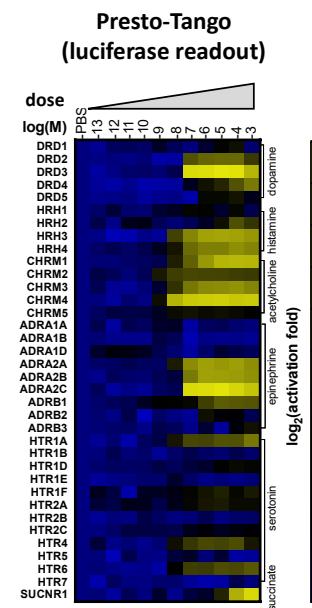
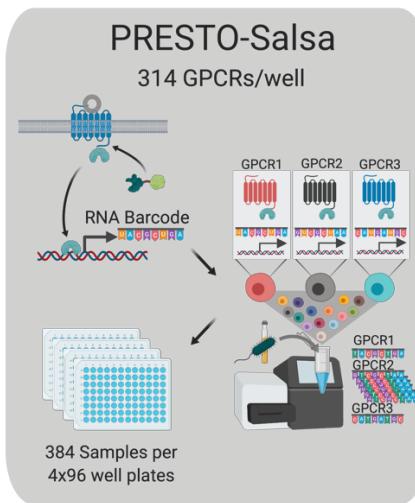
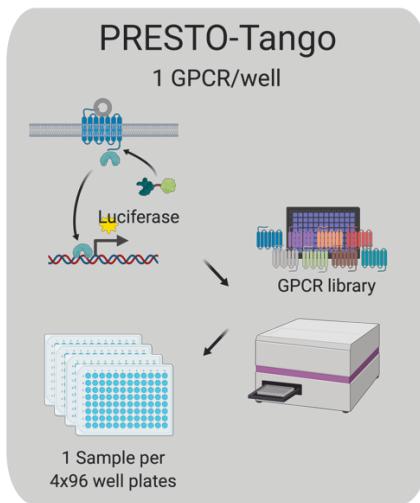
PRESTO-Salsa : a highly multiplexed GPCR cell line assay

The principle of the technology



PRESTO-Salsa : a highly multiplexed GPCR cell line assay

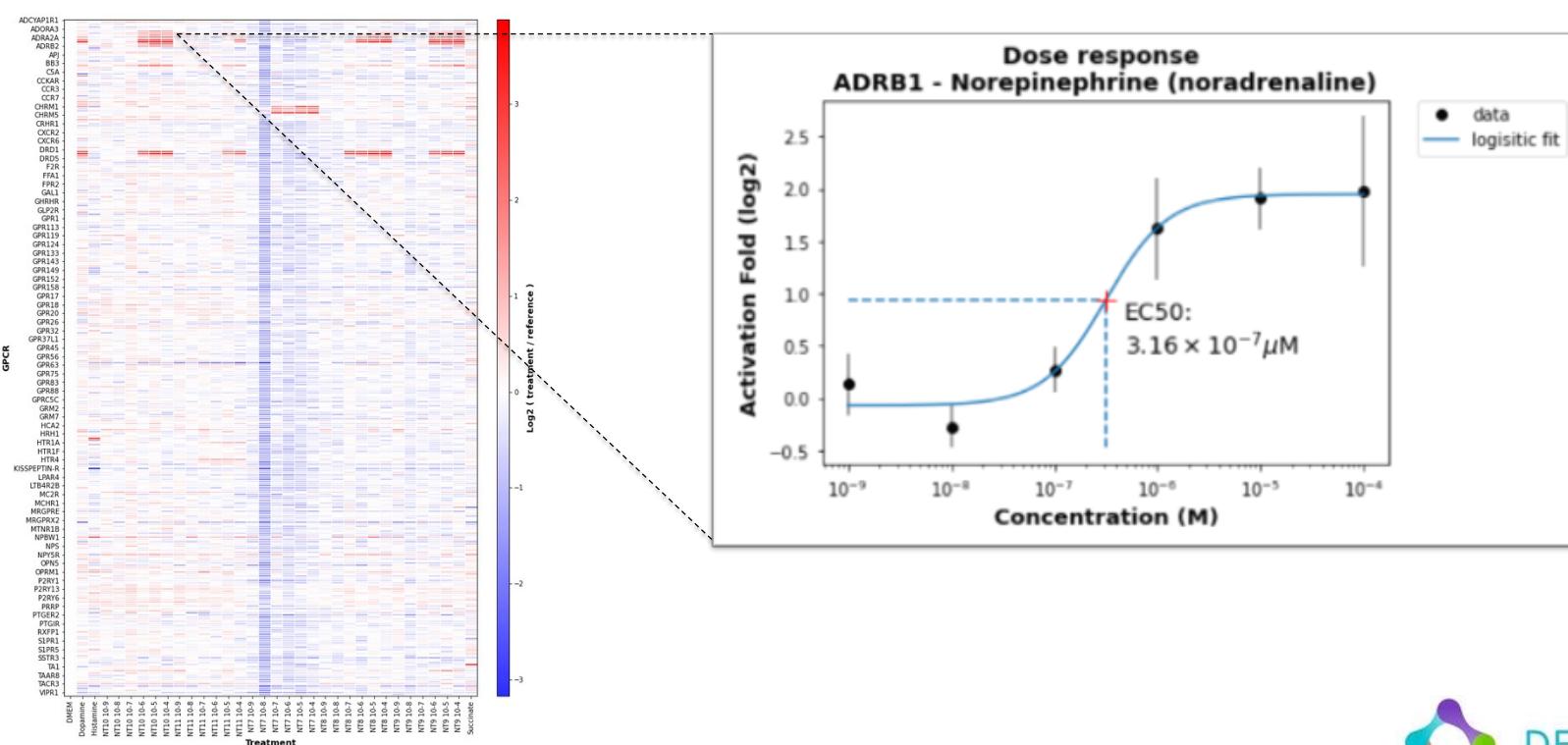
Design Pharma's multiplex GPCR platform shows high ligand specificity and dose-response detection



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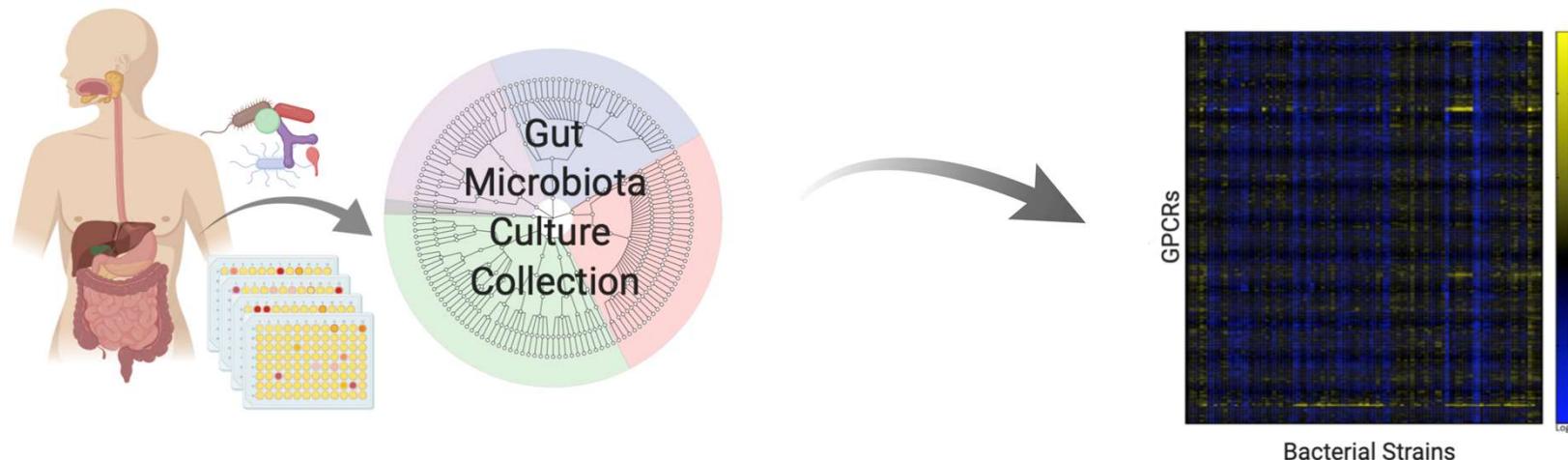
Case study – Highly multiplexed GPCR cell line assays

Design Pharma's multiplex GPCR platform shows high ligand specificity and dose-response detection



Case study for PRESTO-Salsa : a highly multiplexed GPCR cell line assay

Discovery of novel GPCR ligands from the human microbiome

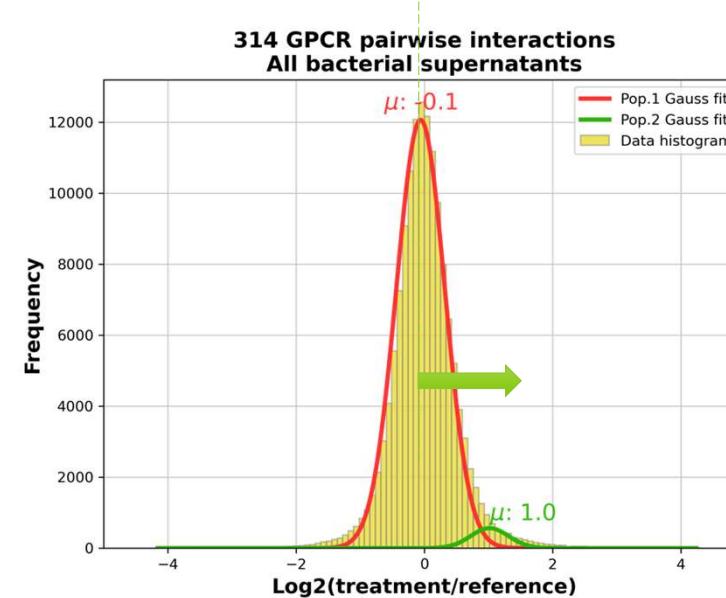


Case study for PRESTO-Salsa : a highly multiplexed GPCR cell line assay

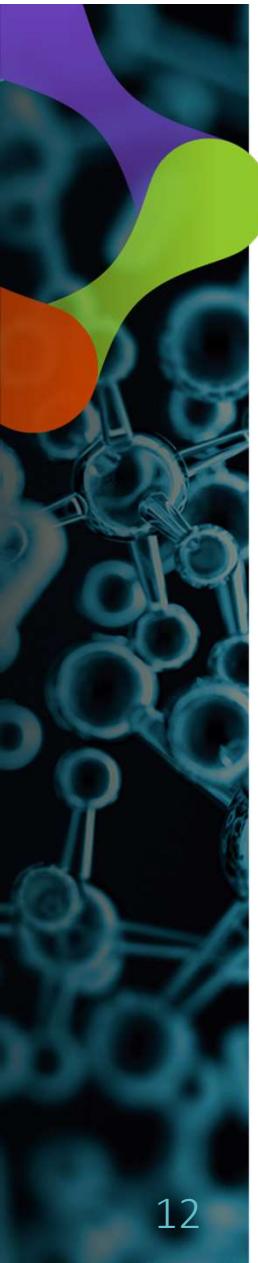
Extreme throughput screening of bacterial supernatants

Strain	Origin
Citrobacter freundii, Strain 4_7_47CFAA	Gut
Clostridium clostridioforme, Strain 2_1_49FAA	Gut
Clostridium clostridioforme, Strain WAL- 7855	Gut
Clostridium orbiscindens, Strain 1_3_50FAAA	Gut
Clostridium symbiosum, Strain WAL-14673	Gut
Gemella haemolysans, Strain M341	Lung
Staphylococcus caprae, Strain C87	Lung
Aggregatibacter aphrophilus, Oral Taxon 545, Strain F0387	Oral
Selenomonas noxia, Strain F0398	Oral
Propionibacterium acnes, Strain HL001PA1	Skin
Propionibacterium acnes, Strain HL002PA1	Skin
Propionibacterium acnes, Strain HL005PA1	Skin
Propionibacterium acnes, Strain HL005PA4	Skin
Propionibacterium acnes, Strain HL007PA1	Skin
Propionibacterium acnes, Strain HL013PA1	Skin
Propionibacterium acnes, Strain HL013PA2	Skin
Propionibacterium acnes, Strain HL025PA1	Skin
Propionibacterium acnes, Strain HL025PA2	Skin
Propionibacterium acnes, Strain HL027PA1	Skin
Propionibacterium acnes, Strain HL030PA1	Skin
Propionibacterium acnes, Strain HL036PA1	Skin
Propionibacterium acnes, Strain HL037PA1	Skin
Propionibacterium acnes, Strain HL038PA1	Skin
Propionibacterium acnes, Strain HL045PA1	Skin
Propionibacterium acnes, Strain HL050PA2	Skin
Propionibacterium acnes, Strain HL050PA3	Skin
Propionibacterium acnes, Strain HL053PA1	Skin
Propionibacterium acnes, Strain HL053PA2	Skin
Propionibacterium acnes, Strain HL056PA1	Skin
Propionibacterium acnes, Strain HL059PA1	Skin
Propionibacterium acnes, Strain HL059PA2	Skin
Staphylococcus epidermidis, Strain M23864:W2	Vagina
Bifidobacterium breve, Strain EX336960VC19	Vagina
Finegoldia magna, Strain SY01	Vagina
Lactobacillus gasseri, Strain EX336960VC01	Vagina
Lactobacillus gasseri, Strain EX336960VC02	Vagina
Lactobacillus gasseri, Strain EX336960VC03	Vagina
Lactobacillus gasseri, Strain EX336960VC06	Vagina
Lactobacillus gasseri, Strain EX336960VC07	Vagina
Lactobacillus gasseri, Strain EX336960VC13	Vagina
Lactobacillus gasseri, Strain EX336960VC15	Vagina
Lactobacillus jensenii, Strain EX849587VC03	Vagina
Lactobacillus jensenii, Strain EX849587VC06	Vagina
Lactobacillus vaginalis, Strain EX336960VC05	Vagina
Lactobacillus vaginalis, Strain EX336960VC11	Vagina
Lactobacillus vaginalis, Strain EX336960VC12	Vagina
Enterococcus faecium, Strain E417	Blood
Klebsiella oxytoca, Strain MIT 10-5243	Blood
Klebsiella oxytoca, Strain MIT 10-5246	Blood
Bacteroides fragilis, Strain CL07T00C01	Gut
Clostridiales sp., Strain HPP0074	Gut
Dermabacter sp., Strain HFH0086	Gut
Enterococcus faecalis, Strain TX2137	Gut
Enterococcus faecium, Strain ERV165	Gut
Enterococcus faecium, Strain TX1330	Gut

... 455 strains

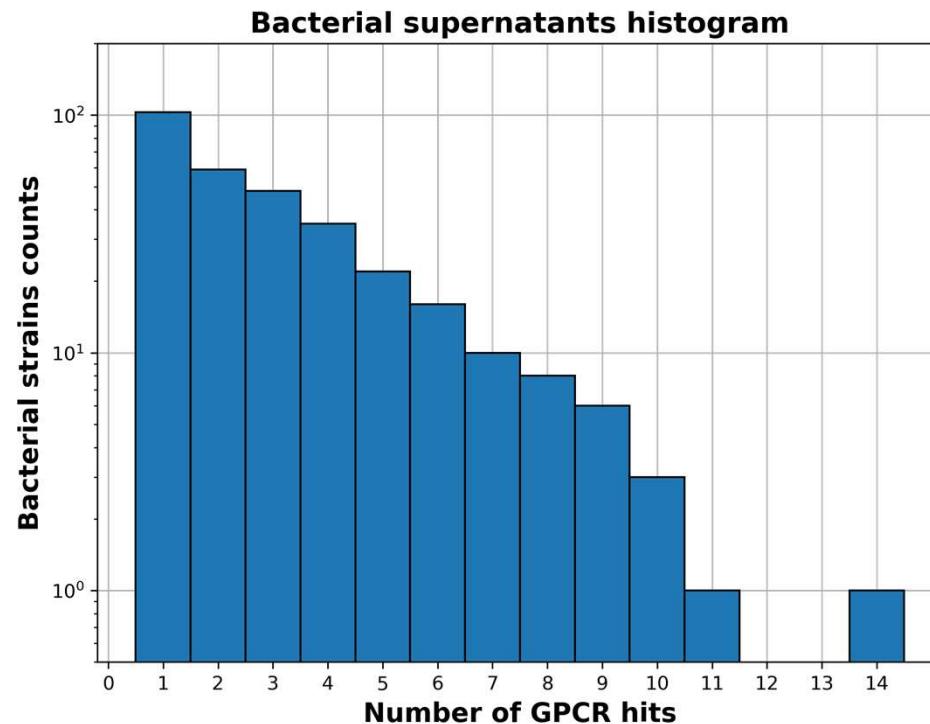


Total GPCR-bacterial supernatants interactions analyzed: 142.870



Case study – Highly multiplexed GPCR cell line assays

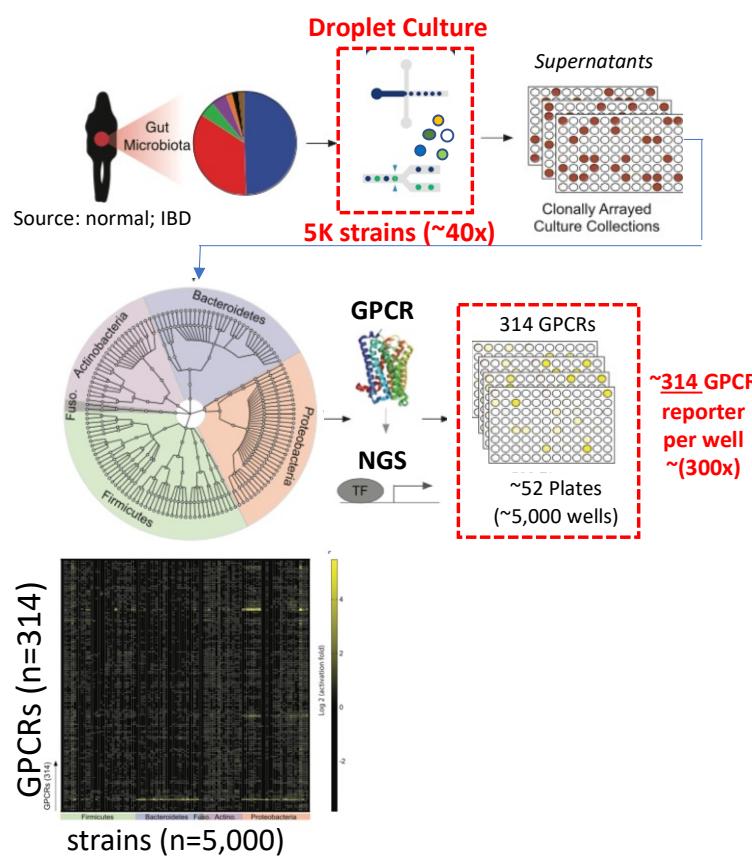
Bacterial supernatants differentially activate GPCRs



Many supernatants (in the hundreds) hit only one or few GPCRs. This illustrating the utility of searching for specific molecules of interest within bacterial metabolites.

Highly multiplexed GPCR cell line assays

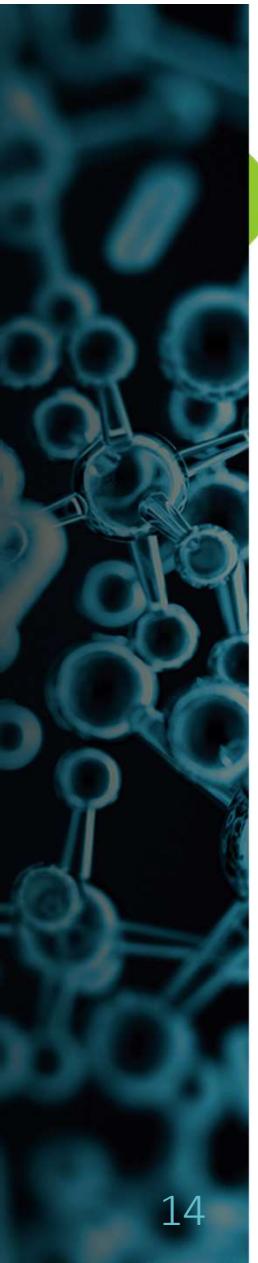
Deciphering microbiota-host GPCR communication at unprecedented speed and scale



Conditions	96 well plate 1 GPCR per well	384 well plate 1 GPCR per well	96 well 300 GPCR multiplex	384 well 300 GPCR multiplex
5000 bacteria	15,625	3,906	52	13
10000 bacteria	31,250	7,812	104	26
5000 bacteria 10 substrates x 1 media condition	156,250	39,060	520	130
5000 bacteria 10 substrates x 10 media condition	1,562,500	390,600	5200	1300

Standard Compound Screens

- 200,000 cmpd library in 384 well format x 300 GPCR PRESTO-Salsa = 520 plates
- 200,000 cmpd library in 384 well format x 300 GPCRs = 156,000 plates



Thank you for your attention

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We match small molecule modulators with human protein targets in disease pathways at scale

