

Release Notes for BAO version 2.8

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Release Date: April 28, 2023

About BAO

The BioAssay Ontology (BAO) has been developed to formally describe biological screening assays and their results including high-throughput screening (HTS) data; specifically in the domain of small molecule drug and probe development. BAO enables categorization of assays and results by based on several concepts that are important to interpret and analyze screening data with the goal to infer the mechanism of action of small molecules based on the known aggregate screening results from many assays.

Changes in BAO v 2.8

Deprecate BAO_0010223 (<https://github.com/BioAssayOntology/BAO/issues/65>)

Curated annotations for ADME set of bioassays cardinality restriction for

- bioassay type (181) (<https://github.com/BioAssayOntology/BAO/issues/72>)
 - 138 ADME (http://www.bioassayontology.org/bao#BAO_0000009)
 - 43 functional (http://www.bioassayontology.org/bao#BAO_0000010)
- bioassay format (93) (<https://github.com/BioAssayOntology/BAO/issues/70>)
 - 10 bioassays with more than one assay format
 - 1 biochemical format (http://www.bioassayontology.org/bao#BAO_0000217)
 - 52 cell based format (http://www.bioassayontology.org/bao#BAO_0000219)
 - 3 cytosol format (http://www.bioassayontology.org/bao#BAO_0000250)
 - 33 microsome format (http://www.bioassayontology.org/bao#BAO_0000251)
 - 3 plasma format (http://www.bioassayontology.org/bao#BAO_0020003)
 - 1 tissue-based format (http://www.bioassayontology.org/bao#BAO_0000221)
- endpoint (112)
 - 1 blood to plasma ratio (http://www.bioassayontology.org/bao#BAO_0080043)
 - 7 EC50 (http://www.bioassayontology.org/bao#BAO_0000188)
 - 7 EMax (http://www.bioassayontology.org/bao#BAO_0002883)
 - 7 fold change (http://www.bioassayontology.org/bao#BAO_0000193)
 - 5 fraction unbound (http://www.bioassayontology.org/bao#BAO_0080040)
 - 39 IC50 (http://www.bioassayontology.org/bao#BAO_0000190)
 - 17 Ki (http://www.bioassayontology.org/bao#BAO_0000192)
 - 2 Kinactivation (http://www.bioassayontology.org/bao#BAO_0001258)
 - 2 km (http://www.bioassayontology.org/bao#BAO_0000477)
 - 4 percent inhibition (http://www.bioassayontology.org/bao#BAO_0000201)
 - 14 ratio endpoint (http://www.bioassayontology.org/bao#BAO_0080042)
 - 5 T1/2(in vitro) (http://www.bioassayontology.org/bao#BAO_0002768)
 - 2 vmax (http://www.bioassayontology.org/bao#BAO_0000586)

Change control tables for ADME cardinality restrictions (SEED)

Table 1. Curated annotations for 181 bioassays ADME cardinality restriction for bioassay type

bioassay	BAO ID	property name	BAO ID	restriction	BAO ID	type
AOX reaction phenotyping	BAO_0010115	has bioassay type	BAO_0002854	only	BAO_0000009	ADME

BCRP inhibition assay	BAO_0010191	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
BCRP inhibition assay	BAO_0010191	has bioassay type	BAO_0002854	some	BAO_0000010	functional
BCRP substrate assay	BAO_0010208	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
BCRP substrate assay	BAO_0010208	has bioassay type	BAO_0002854	some	BAO_0000010	functional
biliary excretion assay	BAO_0010141	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
blood to plasma ratio assay	BAO_0010132	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
BSA binding assay	BAO_0010137	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
BSEP inhibition assay	BAO_0010190	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
BSEP inhibition assay	BAO_0010190	has bioassay type	BAO_0002854	some	BAO_0000010	functional
Caco-2 permeability assay	BAO_0010008	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
cell homogenate stability assay	BAO_0010112	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CES reaction phenotyping	BAO_0010119	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP chemical inhibition assay	BAO_0010124	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP induction assay	BAO_0010149	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP induction assay	BAO_0010149	has bioassay type	BAO_0002854	some	BAO_0000010	functional
CYP induction screen	BAO_0010147	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP inhibition assay	BAO_0010159	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP mAb inhibition assay	BAO_0010127	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP metabolite formation kinetics assay	BAO_0010125	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP reaction phenotyping assay	BAO_0010123	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
CYP time dependent inhibition IC50 assay	BAO_0010170	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP time-dependent inhibition assay	BAO_0010169	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP time dependent inhibition Ki/kinact assay	BAO_0010171	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP1A2 induction assay	BAO_0010150	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP1A2 induction assay	BAO_0010150	has bioassay type	BAO_0002854	some	BAO_0000010	functional
CYP1A2 inhibition assay	BAO_0010160	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP2B6 induction assay	BAO_0010151	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP2B6 induction assay	BAO_0010151	has bioassay type	BAO_0002854	some	BAO_0000010	functional
CYP2B6 inhibition assay	BAO_0010161	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP2C19 induction assay	BAO_0010152	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP2C19 induction assay	BAO_0010152	has bioassay type	BAO_0002854	some	BAO_0000010	functional

CYP2C19 inhibition assay	BAO_0010162	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP2C8 induction assay	BAO_0010153	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP2C8 induction assay	BAO_0010153	has bioassay type	BAO_0002854	some	BAO_0000010	functional
CYP2C8 inhibition assay	BAO_0010163	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP2C9 induction assay	BAO_0010154	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP2C9 induction assay	BAO_0010154	has bioassay type	BAO_0002854	some	BAO_0000010	functional
CYP2C9 inhibition assay	BAO_0010164	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP3A4 induction assay	BAO_0010155	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP3A4 induction assay	BAO_0010155	has bioassay type	BAO_0002854	some	BAO_0000010	functional
CYP3A4 inhibition assay	BAO_0010165	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
cytosol stability assay	BAO_0010096	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
definitive CYP IC50 assay	BAO_0010168	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
CYP cocktail inhibition assay	BAO_0010166	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
drug absorption assay	BAO_0010082	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
drug excretion assay	BAO_0010139	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
drug interaction assay	BAO_0002188	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
drug metabolism assay	BAO_0010090	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
efflux transporter inhibition assay	BAO_0010189	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
efflux transporter inhibition assay	BAO_0010189	has bioassay type	BAO_0002854	some	BAO_0000010	functional
efflux transporter substrate assay	BAO_0010205	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
efflux transporter substrate assay	BAO_0010205	has bioassay type	BAO_0002854	some	BAO_0000010	functional
enzymatic stability assay	BAO_0010113	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
enzyme reaction phenotyping	BAO_0010114	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
esterase chemical inhibition	BAO_0010120	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
esterase metabolite formation kinetics	BAO_0010121	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
Fc/FcRN induction assay	BAO_0010145	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
FMO reaction phenotyping	BAO_0010116	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
gastric fluid stability assay	BAO_0010103	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
hepatocyte co-culture low clearance assay	BAO_0010102	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
hepatocyte low clearance relay assay	BAO_0010101	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
hepatocyte relay with inhibitors	BAO_0010118	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
hepatocyte stability assay	BAO_0010100	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
hepatocyte uptake assay	BAO_0010220	has bioassay type	BAO_0002854	only	BAO_0000009	ADME

interstitial fluid stability assay	BAO_0010109	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
intestinal fluid stability assay	BAO_0010106	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
LLCPK1 monolayer permeability assay	BAO_0010088	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
MAO reaction phenotyping	BAO_0010117	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
mass balance assay	BAO_0010140	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
MATE1 inhibition assay	BAO_0010194	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MATE1 inhibition assay	BAO_0010194	has bioassay type	BAO_0002854	some	BAO_0000010	functional
MATE1 substrate assay	BAO_0010209	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MATE1 substrate assay	BAO_0010209	has bioassay type	BAO_0002854	some	BAO_0000010	functional
MATE2 inhibition assay	BAO_0010195	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MATE2 inhibition assay	BAO_0010195	has bioassay type	BAO_0002854	some	BAO_0000010	functional
MATE2 substrate assay	BAO_0010210	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MATE2 substrate assay	BAO_0010210	has bioassay type	BAO_0002854	some	BAO_0000010	functional
MDCK permeability assay	BAO_0010086	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MDCK permeability assay	BAO_0010086	has bioassay type	BAO_0002854	some	BAO_0000010	functional
MDCK-BCRP permeability assay	BAO_0010085	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MDCK-BCRP permeability assay	BAO_0010085	has bioassay type	BAO_0002854	some	BAO_0000010	functional
MDCKII monolayer permeability assay	BAO_0010089	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MDCKII monolayer permeability assay	BAO_0010089	has bioassay type	BAO_0002854	some	BAO_0000010	functional
media binding assay	BAO_0010136	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
metabolic stability assay	BAO_0010095	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
metabolite identification and profiling assay	BAO_0010091	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
microsomal binding assay	BAO_0010138	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
microsomal stability assay	BAO_0010006	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
milk excretion assay	BAO_0010142	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
monoamine oxidase inhibition	BAO_0010158	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MRP2 inhibition assay	BAO_0010192	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MRP2 inhibition assay	BAO_0010192	has bioassay type	BAO_0002854	some	BAO_0000010	functional
MRP2 substrate assay	BAO_0010207	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
MRP2 substrate assay	BAO_0010207	has bioassay type	BAO_0002854	some	BAO_0000010	functional
non-specific protein binding assay	BAO_0002531	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
OAT1 inhibition assay	BAO_0010197	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OAT1 inhibition assay	BAO_0010197	has bioassay type	BAO_0002854	some	BAO_0000010	functional

OAT1 substrate assay	BAO_0010212	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OAT1 substrate assay	BAO_0010212	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OAT2 inhibition assay	BAO_0010198	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OAT2 inhibition assay	BAO_0010198	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OAT2 substrate assay	BAO_0010213	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OAT2 substrate assay	BAO_0010213	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OAT3 inhibition assay	BAO_0010199	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OAT3 inhibition assay	BAO_0010199	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OAT3 substrate assay	BAO_0010214	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OAT3 substrate assay	BAO_0010214	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OATP1B1 inhibition assay	BAO_0010200	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OATP1B1 inhibition assay	BAO_0010200	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OATP1B1 substrate assay	BAO_0010215	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OATP1B1 substrate assay	BAO_0010215	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OATP1B3 inhibition assay	BAO_0010201	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OATP1B3 inhibition assay	BAO_0010201	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OATP1B3 substrate assay	BAO_0010216	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OATP1B3 substrate assay	BAO_0010216	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OATP2B1 substrate assay	BAO_0010219	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OATP2B1 substrate assay	BAO_0010219	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OCT1 inhibition assay	BAO_0010202	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OCT1 inhibition assay	BAO_0010202	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OCT1 substrate assay	BAO_0010217	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OCT1 substrate assay	BAO_0010217	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OCT2 inhibition assay	BAO_0010203	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OCT2 inhibition assay	BAO_0010203	has bioassay type	BAO_0002854	some	BAO_0000010	functional
OCT2 substrate assay	BAO_0010218	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
OCT2 substrate assay	BAO_0010218	has bioassay type	BAO_0002854	some	BAO_0000010	functional
p-gp induction assay	BAO_0010187	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
P-gp inhibition assay	BAO_0010193	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
P-gp inhibition assay	BAO_0010193	has bioassay type	BAO_0002854	some	BAO_0000010	functional
P-gp substrate assay	BAO_0010206	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
P-gp substrate assay	BAO_0010206	has bioassay type	BAO_0002854	some	BAO_0000010	functional
permeability assay	BAO_0010083	has bioassay type	BAO_0002854	only	BAO_0000009	ADME

placental transfer assay	BAO_0010134	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
plasma protein binding assay	BAO_0010135	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
plasma stability assay	BAO_0010007	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
plated human hepatocytes assay	BAO_0010222	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
receptor induction assay	BAO_0010144	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
recombinant CYP reaction phenotyping	BAO_0010126	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
recombinant esterases	BAO_0010122	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
recombinant UGT reaction phenotyping	BAO_0010131	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
relative induction score	BAO_0010156	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
renal excretion assay	BAO_0010143	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
RRCK permeability assay	BAO_0010087	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
RRCK permeability assay	BAO_0010087	has bioassay type	BAO_0002854	only	BAO_0000010	functional
S9 stability assay	BAO_0010097	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
sandwich cultured human hepatocyte assay	BAO_0010221	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
simulated gastric fluid stability assay	BAO_0010104	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
simulated gastric fluid stability assay (with enzymes)	BAO_0010105	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
simulated interstitial fluid stability assay	BAO_0010110	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
simulated intestinal fluid stability assay	BAO_0010108	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
simulated intestinal fluid stability assay (with enzymes)	BAO_0010107	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
tissue binding assay	BAO_0010133	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
tissue homogenate stability assay	BAO_0010111	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
transporter assay	BAO_0003008	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
transporter induction assay	BAO_0010186	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
transporter inhibition assay	BAO_0010188	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
transporter inhibition assay	BAO_0010188	has bioassay type	BAO_0002854	some	BAO_0000010	functional
transporter substrate assay	BAO_0010204	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
transporter substrate assay	BAO_0010204	has bioassay type	BAO_0002854	some	BAO_0000010	functional
UGT chemical inhibition assay	BAO_0010129	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT induction assay	BAO_0010148	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT inhibition assay	BAO_0010173	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT metabolite formation kinetics assay	BAO_0010130	has bioassay type	BAO_0002854	some	BAO_0000009	ADME

UGT1A1 with BSA assay	BAO_0010174	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT1A1 without BSA assay	BAO_0010175	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT1A4 with BSA assay	BAO_0010176	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT1A4 without BSA assay	BAO_0010177	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT1A6 with BSA assay	BAO_0010178	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT1A6 without BSA assay	BAO_0010179	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT1A9 with BSA assay	BAO_0010180	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT1A9 without BSA assay	BAO_0010181	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT2B15 with BSA assay	BAO_0010182	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT2B15 without BSA assay	BAO_0010183	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT2B7 with BSA assay	BAO_0010184	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
UGT2B7 without BSA assay	BAO_0010185	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
uptake transporter inhibition assay	BAO_0010196	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
uptake transporter inhibition assay	BAO_0010196	has bioassay type	BAO_0002854	some	BAO_0000010	functional
uptake transporter substrate assay	BAO_0010211	has bioassay type	BAO_0002854	some	BAO_0000009	ADME
uptake transporter substrate assay	BAO_0010211	has bioassay type	BAO_0002854	some	BAO_0000010	functional
Ussing chamber permeability assay	BAO_0010084	has bioassay type	BAO_0002854	only	BAO_0000009	ADME
whole blood stability assay	BAO_0010098	has bioassay type	BAO_0002854	only	BAO_0000009	ADME

Table 2. Curated annotations for 93 bioassays ADME cardinality restriction for bioassay format

bioassay	BAO ID	property name	BAO ID	restriction	BAO ID	format
BCRP inhibition assay	BAO_0010191	has assay format	BAO_0000205	some	BAO_0000219	cell based format
BCRP substrate assay	BAO_0010208	has assay format	BAO_0000205	some	BAO_0000219	cell based format
blood to plasma ratio assay	BAO_0010132	has assay format	BAO_0000205	some	BAO_0020003	plasma format
BSA binding assay	BAO_0010137	has assay format	BAO_0000205	some	BAO_0000217	biochemical format
BSEP inhibition assay	BAO_0010190	has assay format	BAO_0000205	some	BAO_0000219	cell based format
Caco-2 permeability assay	BAO_0010008	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP chemical inhibition assay	BAO_0010124	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP induction assay	BAO_0010149	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP inhibition assay	BAO_0010159	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP metabolite formation kinetics assay	BAO_0010125	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP reaction phenotyping assay	BAO_0010123	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP reaction phenotyping assay	BAO_0010123	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP reaction phenotyping assay	BAO_0010123	has assay format	BAO_0000205	some	BAO_0000250	cytosol format

CYP time dependent inhibition IC50 assay	BAO_0010170	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP time dependent inhibition Ki/kinact assay	BAO_0010171	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP time-dependent inhibition assay	BAO_0010169	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP1A2 induction assay	BAO_0010150	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP1A2 inhibition assay	BAO_0010160	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP2B6 induction assay	BAO_0010151	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP2B6 inhibition assay	BAO_0010161	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP2C19 induction assay	BAO_0010152	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP2C19 inhibition assay	BAO_0010162	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP2C8 induction assay	BAO_0010153	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP2C8 inhibition assay	BAO_0010163	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP2C9 induction assay	BAO_0010154	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP2C9 inhibition assay	BAO_0010164	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP3A4 induction assay	BAO_0010155	has assay format	BAO_0000205	some	BAO_0000219	cell based format
CYP3A4 inhibition assay	BAO_0010165	has assay format	BAO_0000205	some	BAO_0000251	microsome format
cytosol stability assay	BAO_0010096	has assay format	BAO_0000205	only	BAO_0000250	cytosol format
definitive CYP IC50 assay	BAO_0010168	has assay format	BAO_0000205	some	BAO_0000251	microsome format
CYP cocktail inhibition assay	BAO_0010166	has assay format	BAO_0000205	some	BAO_0000251	microsome format
efflux transporter inhibition assay	BAO_0010189	has assay format	BAO_0000205	some	BAO_0000219	cell based format
efflux transporter substrate assay	BAO_0010205	has assay format	BAO_0000205	some	BAO_0000219	cell based format
hepatocyte relay with inhibitors	BAO_0010118	has assay format	BAO_0000205	some	BAO_0000219	cell based format
hepatocyte stability assay	BAO_0010100	has assay format	BAO_0000205	some	BAO_0000219	cell based format
LLCPK1 monolayer permeability assay	BAO_0010088	has assay format	BAO_0000205	some	BAO_0000219	cell based format
MAO reaction phenotyping	BAO_0010117	has assay format	BAO_0000205	some	BAO_0000219	cell based format
MAO reaction phenotyping	BAO_0010117	has assay format	BAO_0000205	some	BAO_0000251	microsome format
MAO reaction phenotyping	BAO_0010117	has assay format	BAO_0000205	some	BAO_0000250	cytosol format
MATE1 inhibition assay	BAO_0010194	has assay format	BAO_0000205	some	BAO_0000219	cell based format
MATE1 substrate assay	BAO_0010209	has assay format	BAO_0000205	some	BAO_0000219	cell based format
MATE2 inhibition assay	BAO_0010195	has assay format	BAO_0000205	some	BAO_0000219	cell based format
MATE2 substrate assay	BAO_0010210	has assay format	BAO_0000205	some	BAO_0000219	cell based format
MDCK permeability assay	BAO_0010086	has assay format	BAO_0000205	some	BAO_0000219	cell based format

MDCK-BCRP permeability assay	BAO_0010085	has assay format	BAO_0000205	some	BAO_0000219	cell based format
MDCKII monolayer permeability assay	BAO_0010089	has assay format	BAO_0000205	some	BAO_0000219	cell based format
microsomal binding assay	BAO_0010138	has assay format	BAO_0000205	some	BAO_0000251	microsome format
microsomal stability assay	BAO_0010006	has assay format	BAO_0000205	some	BAO_0000251	microsome format
monoamine oxidase inhibition	BAO_0010158	has assay format	BAO_0000205	some	BAO_0000251	microsome format
MRP2 inhibition assay	BAO_0010192	has assay format	BAO_0000205	some	BAO_0000219	cell based format
MRP2 substrate assay	BAO_0010207	has assay format	BAO_0000205	some	BAO_0000219	cell based format
non-specific protein binding assay	BAO_0002531	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OAT1 inhibition assay	BAO_0010197	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OAT1 substrate assay	BAO_0010212	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OAT2 inhibition assay	BAO_0010198	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OAT2 substrate assay	BAO_0010213	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OAT3 inhibition assay	BAO_0010199	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OAT3 substrate assay	BAO_0010214	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OATP1B1 inhibition assay	BAO_0010200	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OATP1B1 substrate assay	BAO_0010215	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OATP1B3 inhibition assay	BAO_0010201	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OATP1B3 substrate assay	BAO_0010216	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OATP2B1 substrate assay	BAO_0010219	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OCT1 inhibition assay	BAO_0010202	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OCT1 substrate assay	BAO_0010217	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OCT2 inhibition assay	BAO_0010203	has assay format	BAO_0000205	some	BAO_0000219	cell based format
OCT2 substrate assay	BAO_0010218	has assay format	BAO_0000205	some	BAO_0000219	cell based format
P-gp inhibition assay	BAO_0010193	has assay format	BAO_0000205	some	BAO_0000219	cell based format
P-gp substrate assay	BAO_0010206	has assay format	BAO_0000205	some	BAO_0000219	cell based format
plasma protein binding assay	BAO_0010135	has assay format	BAO_0000205	some	BAO_0020003	plasma format
plasma stability assay	BAO_0010007	has assay format	BAO_0000205	some	BAO_0020003	plasma format
recombinant UGT reaction phenotyping	BAO_0010131	has assay format	BAO_0000205	some	BAO_0000251	microsome format
RRCK permeability assay	BAO_0010087	has assay format	BAO_0000205	some	BAO_0000219	cell based format
tissue binding assay	BAO_0010133	has assay format	BAO_0000205	some	BAO_0000221	tissue-based format
tissue binding assay	BAO_0010133	has assay format	BAO_0000205	some	BAO_0000219	cell based format
transporter inhibition assay	BAO_0010188	has assay format	BAO_0000205	some	BAO_0000219	cell based format
transporter substrate assay	BAO_0010204	has assay format	BAO_0000205	some	BAO_0000219	cell based format

UGT chemical inhibition assay	BAO_0010129	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT inhibition assay	BAO_0010173	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT1A1 with BSA assay	BAO_0010174	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT1A1 without BSA assay	BAO_0010175	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT1A4 with BSA assay	BAO_0010176	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT1A4 without BSA assay	BAO_0010177	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT1A6 with BSA assay	BAO_0010178	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT1A6 without BSA assay	BAO_0010179	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT1A9 with BSA assay	BAO_0010180	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT1A9 without BSA assay	BAO_0010181	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT2B15 with BSA assay	BAO_0010182	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT2B15 without BSA assay	BAO_0010183	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT2B7 with BSA assay	BAO_0010184	has assay format	BAO_0000205	some	BAO_0000251	microsome format
UGT2B7 without BSA assay	BAO_0010185	has assay format	BAO_0000205	some	BAO_0000251	microsome format
uptake transporter inhibition assay	BAO_0010196	has assay format	BAO_0000205	some	BAO_0000219	cell based format
uptake transporter substrate assay	BAO_0010211	has assay format	BAO_0000205	some	BAO_0000219	cell based format

Table 3. Curated annotations for 112 bioassays ADME cardinality restriction for endpoint

bioassay	BAO ID	property_name	BAO ID	restriction	BAO ID	format
blood to plasma ratio assay	BAO_0010132	has endpoint	BAO_0000208	only	BAO_0080043	blood to plasma ratio
CYP induction assay	BAO_0010149	has endpoint	BAO_0000208	some	BAO_0000188	EC50
CYP1A2 induction assay	BAO_0010150	has endpoint	BAO_0000208	some	BAO_0000188	EC50
CYP2B6 induction assay	BAO_0010151	has endpoint	BAO_0000208	some	BAO_0000188	EC50
CYP2C19 induction assay	BAO_0010152	has endpoint	BAO_0000208	some	BAO_0000188	EC50
CYP2C8 induction assay	BAO_0010153	has endpoint	BAO_0000208	some	BAO_0000188	EC50
CYP2C9 induction assay	BAO_0010154	has endpoint	BAO_0000208	some	BAO_0000188	EC50
CYP3A4 induction assay	BAO_0010155	has endpoint	BAO_0000208	some	BAO_0000188	EC50
CYP induction assay	BAO_0010149	has endpoint	BAO_0000208	some	BAO_0002883	ECMax
CYP1A2 induction assay	BAO_0010150	has endpoint	BAO_0000208	some	BAO_0002883	ECMax
CYP2B6 induction assay	BAO_0010151	has endpoint	BAO_0000208	some	BAO_0002883	ECMax
CYP2C19 induction assay	BAO_0010152	has endpoint	BAO_0000208	some	BAO_0002883	ECMax
CYP2C8 induction assay	BAO_0010153	has endpoint	BAO_0000208	some	BAO_0002883	ECMax
CYP2C9 induction assay	BAO_0010154	has endpoint	BAO_0000208	some	BAO_0002883	ECMax
CYP3A4 induction assay	BAO_0010155	has endpoint	BAO_0000208	some	BAO_0002883	ECMax
CYP induction assay	BAO_0010149	has endpoint	BAO_0000208	some	BAO_0000193	fold change

CYP1A2 induction assay	BAO_0010150	has endpoint	BAO_0000208	some	BAO_0000193	fold change
CYP2B6 induction assay	BAO_0010151	has endpoint	BAO_0000208	some	BAO_0000193	fold change
CYP2C19 induction assay	BAO_0010152	has endpoint	BAO_0000208	some	BAO_0000193	fold change
CYP2C8 induction assay	BAO_0010153	has endpoint	BAO_0000208	some	BAO_0000193	fold change
CYP2C9 induction assay	BAO_0010154	has endpoint	BAO_0000208	some	BAO_0000193	fold change
CYP3A4 induction assay	BAO_0010155	has endpoint	BAO_0000208	some	BAO_0000193	fold change
BSA binding assay	BAO_0010137	has endpoint	BAO_0000208	only	BAO_0080040	fraction unbound
microsomal binding assay	BAO_0010138	has endpoint	BAO_0000208	some	BAO_0080040	fraction unbound
non-specific protein binding assay	BAO_0002531	has endpoint	BAO_0000208	some	BAO_0080040	fraction unbound
plasma protein binding assay	BAO_0010135	has endpoint	BAO_0000208	some	BAO_0080040	fraction unbound
tissue binding assay	BAO_0010133	has endpoint	BAO_0000208	some	BAO_0080040	fraction unbound
BCRP inhibition assay	BAO_0010191	has endpoint	BAO_0000208	some	BAO_0000190	IC50
BSEP inhibition assay	BAO_0010190	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP inhibition assay	BAO_0010159	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP time dependent inhibition IC50 assay	BAO_0010170	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP time-dependent inhibition assay	BAO_0010169	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP1A2 inhibition assay	BAO_0010160	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP2B6 inhibition assay	BAO_0010161	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP2C19 inhibition assay	BAO_0010162	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP2C8 inhibition assay	BAO_0010163	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP2C9 inhibition assay	BAO_0010164	has endpoint	BAO_0000208	some	BAO_0000190	IC50
CYP3A4 inhibition assay	BAO_0010165	has endpoint	BAO_0000208	some	BAO_0000190	IC50
definitive CYP IC50 assay	BAO_0010168	has endpoint	BAO_0000208	only	BAO_0000190	IC50
MATE1 inhibition assay	BAO_0010194	has endpoint	BAO_0000208	some	BAO_0000190	IC50
MATE2 inhibition assay	BAO_0010195	has endpoint	BAO_0000208	some	BAO_0000190	IC50
monoamine oxidase inhibition	BAO_0010158	has endpoint	BAO_0000208	some	BAO_0000190	IC50
MRP2 inhibition assay	BAO_0010192	has endpoint	BAO_0000208	some	BAO_0000190	IC50
OAT1 inhibition assay	BAO_0010197	has endpoint	BAO_0000208	some	BAO_0000190	IC50
OAT2 inhibition assay	BAO_0010198	has endpoint	BAO_0000208	some	BAO_0000190	IC50
OAT3 inhibition assay	BAO_0010199	has endpoint	BAO_0000208	some	BAO_0000190	IC50
OATP1B1 inhibition assay	BAO_0010200	has endpoint	BAO_0000208	some	BAO_0000190	IC50
OATP1B3 inhibition assay	BAO_0010201	has endpoint	BAO_0000208	some	BAO_0000190	IC50

OCT1 inhibition assay	BAO_0010202	has endpoint	BAO_0000208	some	BAO_0000190	IC50
OCT2 inhibition assay	BAO_0010203	has endpoint	BAO_0000208	some	BAO_0000190	IC50
P-gp inhibition assay	BAO_0010193	has endpoint	BAO_0000208	some	BAO_0000190	IC50
P-gp inhibition assay	BAO_0010193	has endpoint	BAO_0000208	some	BAO_0000190	IC50
transporter inhibition assay	BAO_0010188	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT inhibition assay	BAO_0010173	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT1A1 with BSA assay	BAO_0010174	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT1A1 without BSA assay	BAO_0010175	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT1A4 with BSA assay	BAO_0010176	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT1A4 without BSA assay	BAO_0010177	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT1A6 with BSA assay	BAO_0010178	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT1A6 without BSA assay	BAO_0010179	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT1A9 with BSA assay	BAO_0010180	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT1A9 without BSA assay	BAO_0010181	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT2B15 with BSA assay	BAO_0010182	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT2B15 without BSA assay	BAO_0010183	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT2B7 with BSA assay	BAO_0010184	has endpoint	BAO_0000208	some	BAO_0000190	IC50
UGT2B7 without BSA assay	BAO_0010185	has endpoint	BAO_0000208	some	BAO_0000190	IC50
BCRP inhibition assay	BAO_0010191	has endpoint	BAO_0000208	some	BAO_0000192	Ki
BSEP inhibition assay	BAO_0010190	has endpoint	BAO_0000208	some	BAO_0000192	Ki
CYP time dependent inhibition Ki/kinact assay	BAO_0010171	has endpoint	BAO_0000208	some	BAO_0000192	Ki
CYP time-dependent inhibition assay	BAO_0010169	has endpoint	BAO_0000208	some	BAO_0000192	Ki
MATE1 inhibition assay	BAO_0010194	has endpoint	BAO_0000208	some	BAO_0000192	Ki
MATE2 inhibition assay	BAO_0010195	has endpoint	BAO_0000208	some	BAO_0000192	Ki
MRP2 inhibition assay	BAO_0010192	has endpoint	BAO_0000208	some	BAO_0000192	Ki
OAT1 inhibition assay	BAO_0010197	has endpoint	BAO_0000208	some	BAO_0000192	Ki
OAT2 inhibition assay	BAO_0010198	has endpoint	BAO_0000208	some	BAO_0000192	Ki
OAT3 inhibition assay	BAO_0010199	has endpoint	BAO_0000208	some	BAO_0000192	Ki
OATP1B1 inhibition assay	BAO_0010200	has endpoint	BAO_0000208	some	BAO_0000192	Ki
OATP1B3 inhibition assay	BAO_0010201	has endpoint	BAO_0000208	some	BAO_0000192	Ki
OCT1 inhibition assay	BAO_0010202	has endpoint	BAO_0000208	some	BAO_0000192	Ki
OCT2 inhibition assay	BAO_0010203	has endpoint	BAO_0000208	some	BAO_0000192	Ki

P-gp inhibition assay	BAO_0010193	has endpoint	BAO_0000208	some	BAO_0000192	Ki
P-gp inhibition assay	BAO_0010193	has endpoint	BAO_0000208	some	BAO_0000192	Ki
transporter inhibition assay	BAO_0010188	has endpoint	BAO_0000208	some	BAO_0000192	Ki
CYP time dependent inhibition Ki/kinact assay	BAO_0010171	has endpoint	BAO_0000208	some	BAO_0001258	Kinactivation
CYP time-dependent inhibition assay	BAO_0010169	has endpoint	BAO_0000208	some	BAO_0001258	Kinactivation
hepatocyte stability assay	BAO_0010100	has endpoint	BAO_0000208	some	BAO_0000477	km
microsomal stability assay	BAO_0010006	has endpoint	BAO_0000208	some	BAO_0000477	km
CYP chemical inhibition assay	BAO_0010124	has endpoint	BAO_0000208	only	BAO_0000201	percent inhibition
CYP metabolite formation kinetics assay	BAO_0010125	has endpoint	BAO_0000208	only	BAO_0000201	percent inhibition
CYP reaction phenotyping assay	BAO_0010123	has endpoint	BAO_0000208	only	BAO_0000201	percent inhibition
MAO reaction phenotyping	BAO_0010117	has endpoint	BAO_0000208	only	BAO_0000201	percent inhibition
BCRP substrate assay	BAO_0010208	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
MATE1 substrate assay	BAO_0010209	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
MATE2 substrate assay	BAO_0010210	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
MRP2 substrate assay	BAO_0010207	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
OAT1 substrate assay	BAO_0010212	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
OAT2 substrate assay	BAO_0010213	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
OAT3 substrate assay	BAO_0010214	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
OATP1B1 substrate assay	BAO_0010215	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
OATP1B3 substrate assay	BAO_0010216	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
OATP2B1 substrate assay	BAO_0010219	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
OCT1 substrate assay	BAO_0010217	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
OCT2 substrate assay	BAO_0010218	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
P-gp substrate assay	BAO_0010206	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
transporter substrate assay	BAO_0010204	has endpoint	BAO_0000208	some	BAO_0080042	ratio endpoint
cytosol stability assay	BAO_0010096	has endpoint	BAO_0000208	only	BAO_0002768	T1/2(in vitro)
hepatocyte stability assay	BAO_0010100	has endpoint	BAO_0000208	some	BAO_0002768	T1/2(in vitro)
microsomal stability assay	BAO_0010006	has endpoint	BAO_0000208	some	BAO_0002768	T1/2(in vitro)
plasma stability assay	BAO_0010007	has endpoint	BAO_0000208	some	BAO_0002768	T1/2(in vitro)
S9 stability assay	BAO_0010097	has endpoint	BAO_0000208	some	BAO_0002768	T1/2(in vitro)
hepatocyte stability assay	BAO_0010100	has endpoint	BAO_0000208	some	BAO_0000586	vmax
microsomal stability assay	BAO_0010006	has endpoint	BAO_0000208	some	BAO_0000586	vmax

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