In [1]:
```
from genefab import get_datasets, GLDS
```

Dataset search:

In [2]:
```
datasets = get_datasets(
    ptype="flight", organism="mus", factor="radiation", assay="transcript",
    maxcount=20
)
```

In [3]:
```
datasets
```

Out[3]:
```
[GLDS-87 (number of assays: 1; factors: Spaceflight, Absorbed Radiati
on Dose),
 GLDS-173 (number of assays: 1; factors: Space Flight, Absorbed Radia
tion Dose),
 GLDS-25 (number of assays: 1; factors: Space Flight, Absorbed Radiat
ion Dose),
 GLDS-116 (number of assays: 2; factors: Microgravity, Absorbed Radia
tion Dose),
 GLDS-21 (number of assays: 1; factors: Gravitation, Absorbed Radiati
on Dose),
 GLDS-50 (number of assays: 1; factors: Space Flight, Absorbed Radiat
ion Dose),
 GLDS-135 (number of assays: 1; factors: Microgravity, Absorbed Radia
tion Dose),
 GLDS-4 (number of assays: 1; factors: MESH:Gravitation, absorbed rad
iation dose),
 GLDS-111 (number of assays: 1; factors: Microgravity, Absorbed Radia
tion Dose)]
```

Filtering search results for assays with derived array data:

In [4]:
```
for dataset in datasets:
    for assay in dataset.assays:
        if assay.has_arrays and assay.available_derived_file_types:
            print(assay.parent.accession, assay.name)
```

```
GLDS-116 a_sts-135_skin_transcription_profiling_DNA_microarray-txt
GLDS-50 a_BoneMac_GeneChip_assay-txt
GLDS-135 a_gse94381_transcription_profiling_DNA_microarray-txt
```

Requesting a dataset directly:

In [5]:
```
glds = GLDS("GLDS-42")
assay = glds.assays[0]
assay.name
```

Out[5]:
```
'a_E-GEOD-32949_GeneChip_assay-txt'
```

In [6]:
```
assay.fields
```

Out[6]:
```
{'Sample Name': {'a100000samplename'},
 'Extract Name': {'a100001extractname'},
 'Material Type': {'a100002materialtype'},
 'Protocol REF': {'a100005protocolref',
  'a100010protocolref',
  'a100013protocolref',
  'a100014protocolref',
  'a100017protocolref'},
 'Labeled Extract Name': {'a100006labeledextractname'},
 'Label': {'a100007label'},
 'Hybridization Assay Name': {'a100011hybridizationassayname'},
 'Array Design REF': {'a100012arraydesignref'},
 'Array Data File': {'a100015arraydatafile'},
 'Comment:  ArrayExpress FTP file': {'a100016commentarrayexpressftpfi
le'},
 'Normalization Name': {'a100018normalizationname'},
 'Derived Array Data File': {'a100019derivedarraydatafile'},
 'Comment:  Derived ArrayExpress FTP file': {'a100020commentderivedar
rayexpressftpfile'}}
```

Getting the combined matrix for the assay:

In [7]:
```
matrix = assay.get_combined_matrix()
matrix[::5000]
```

Out[7]:

	ID_REF	VALUE	ABS_CALL	DETECTION P-VALUE	Sample Name
0	AFFX-BioB-5_at	385.51300	P	0.001593	GSM815905 extract 1
5000	189216_at	40.07840	A	0.366211	GSM815905 extract 1
10000	184223_at	132.49500	A	0.219482	GSM815905 extract 1
15000	179220_s_at	49.42860	A	0.129639	GSM815905 extract 1
20000	174219_at	241.49500	P	0.030273	GSM815905 extract 1
25000	191859_at	210.43100	P	0.023926	GSM815904 extract 1
30000	186831_s_at	270.50400	P	0.000244	GSM815904 extract 1
35000	181862_at	5.77048	A	0.696289	GSM815904 extract 1
40000	176828_s_at	532.64200	P	0.000732	GSM815904 extract 1
45000	171858_x_at	214.57800	P	0.046143	GSM815904 extract 1
50000	189471_at	539.19400	P	0.008057	GSM815903 extract 1
55000	184478_at	61.41010	A	0.246094	GSM815903 extract 1
60000	179443_s_at	10.22280	A	0.753906	GSM815903 extract 1
65000	174474_at	1332.14000	P	0.000244	GSM815903 extract 1
70000	192114_s_at	3855.12000	P	0.000244	GSM815902 extract 1
75000	187086_at	186.97700	P	0.037598	GSM815902 extract 1
80000	182118_s_at	103.42500	A	0.334473	GSM815902 extract 1
85000	177083_at	3.22085	A	0.985840	GSM815902 extract 1
90000	172073_x_at	9.60776	A	0.888428	GSM815902 extract 1
95000	189694_at	153.34100	P	0.000732	GSM815901 extract 1
100000	184732_at	31.38190	A	0.274170	GSM815901 extract 1
105000	179697_at	56.63130	A	0.334473	GSM815901 extract 1
110000	174730_at	1877.49000	P	0.000244	GSM815901 extract 1
115000	192341_s_at	599.46700	P	0.000244	GSM815900 extract 1
120000	187341_s_at	994.73900	P	0.000244	GSM815900 extract 1
125000	182337_at	26.31630	A	0.500000	GSM815900 extract 1
130000	177344_at	158.76100	P	0.010742	GSM815900 extract 1
135000	172365_x_at	1.93883	A	0.943848	GSM815900 extract 1