```
In [1]: import json
    gut_samples = [['chic_1', "mgm4440283.3"],
        ['chic_2', "mgm4440284.3"],
        ['chic_3', "mgm4440285.3"],
        ['chic_4', "mgm4440286.3"],
        ['cow_1', "mgm4441679.3"],
        ['cow_2', "mgm4441680.3"],
        ['mus_1', "mgm4440463.3"],
        ['mus_2', "mgm4440464.3"],
        ['fish_1', "mgm4441695.3"],
        ['fish_2', "mgm4441696.3"]]
```

```
In [2]: chic_1 = gut_samples[0][1]
    chic_1_data = ! wget -q -0 - "http://api.metagenomics.anl.gov/metagenome/$chic_1"
    chic_1_obj = json.loads(chic_1_data[0])
    print chic_1_obj['name']
    print chic_1_obj['id']
    print chic_1_obj['metadata']['sample']
```

Chicken Cecum A mgm4440283.3

{u'data': {u'biome': u'animal-associated habitat', u'samp_mat_process': u'DNA extraction', u'material': u'animal-associated habitat', u'geodetic_system': u'wgs_84', u'samp_collect_device': u'Fourteen days post challenge, birds from two pens (A&B) were euthanized and ceca collected for further analysis. Fresh cecal samples from two (C. jejuni-inoculated and C. jejuni-uninoculated) 28-day old chickens were analyzed. Cecal contents were collected using aseptic techniques. Samples were stored at −80\xb0C until DNA extraction.', u'country': u'United States of America', u'env_package': u'host-associated', u'feature': u'animal-associated habitat', u'longitude': u'-88.2073', u'isol_growth_condt': u'18698407', u'location': u'Urbana, IL', u'latitude': u'40.1106', u'collection_timezone': u'UTC', u'continent': u'north america'}, u'name': u'mgs11882', u'id': u'mgs11882'}

```
In [3]: gut_ids = "&".join( map(lambda x: "id="+x[1], gut_samples) )
   gut_data = ! wget -q -O - "http://api.metagenomics.anl.gov/matrix/function?$gut_ids"
   gut_objs = json.loads(gut_data[0])
```

1 of 3 8/16/12 2:17 PM

```
In [4]: print gut_objs['format']
               print gut_objs['columns']
               gut objs['rows'][:10]
                Biological Observation Matrix 1.0
                \label{eq:continuity} \mbox{ $[\{u'id':\ u'mgm4440283.3',\ u'metadata':\ None\},\ \{u'id':\ u'mgm4440284.3',\ u'metadata':\ u'mgm4440284.3',\ u'mgm444
                u'metadata': None}, {u'id': u'mgm4440285.3', u'metadata': None}, {u'id':
                u'mgm4440286.3', u'metadata': None}, {u'id': u'mgm4440463.3', u'metadata': None},
                \{u'id': u'mgm4440464.3', u'metadata': None\}, \{u'id': u'mgm4441679.3', u'metadata': none\}
                None}, {u'id': u'mgm4441680.3', u'metadata': None}, {u'id': u'mgm4441682.3',
                u'metadata': None}, {u'id': u'mgm4441695.3', u'metadata': None}, {u'id':
                u'mgm4441696.3', u'metadata': None}]
Out[4]: [{u'id': u'SS00001',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S_rRNA_modification_within_P_site_of_ribosome',
                       u'BH2577 unknown conserved protein in B. subtilis']}},
                  {u'id': u'SS00002',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S_rRNA_modification_within_P_site_of_ribosome',
                       u'Cell division protein FtsI [Peptidoglycan synthetase] (EC 2.4.1.129)']}},
                  {u'id': u'SS00004',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S rRNA modification within P site of ribosome',
                       u'Cell division protein MraZ']}},
                  {u'id': u'SS00005',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S rRNA modification within P site of ribosome',
                       u'Penicillin-binding protein 2B']}},
                  {u'id': u'SS00006',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S rRNA modification within P site of ribosome',
                       u'Penicillin-binding protein 2 (PBP-2)']}},
                  {u'id': u'SS00007',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S rRNA modification within P site of ribosome',
                       u'Penicillin-binding protein 3']}},
                  {u'id': u'SS00008',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S_rRNA_modification_within_P_site_of_ribosome',
                       u'rRNA small subunit methyltransferase H']}},
                  {u'id': u'SS00009',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S rRNA modification within P site of ribosome',
                       u'rRNA small subunit methyltransferase I']}},
                  {u'id': u'SS00010',
                    u'metadata': {u'ontology': [u'RNA Metabolism',
                       u'RNA processing and modification',
                       u'16S_rRNA_modification_within_P_site_of_ribosome',
                       u'Stage V sporulation protein D (Sporulation-specific penicillin-binding
                protein)']}},
                  {u'id': u'SS00036',
                    u'metadata': {u'ontology': [u'Carbohydrates',
```

2 of 3 8/16/12 2:17 PM

```
In [5]: print gut_objs['matrix_type']
    print gut_objs['shape']
    print gut_objs['data'][:10]

sparse
    [8473, 11]
    [[0, 10, 1], [1, 0, 74], [1, 1, 37], [1, 2, 10], [1, 3, 3], [1, 4, 6], [1, 5, 6],
    [1, 6, 22], [1, 7, 7], [1, 8, 14]]
In [5]:
```

3 of 3