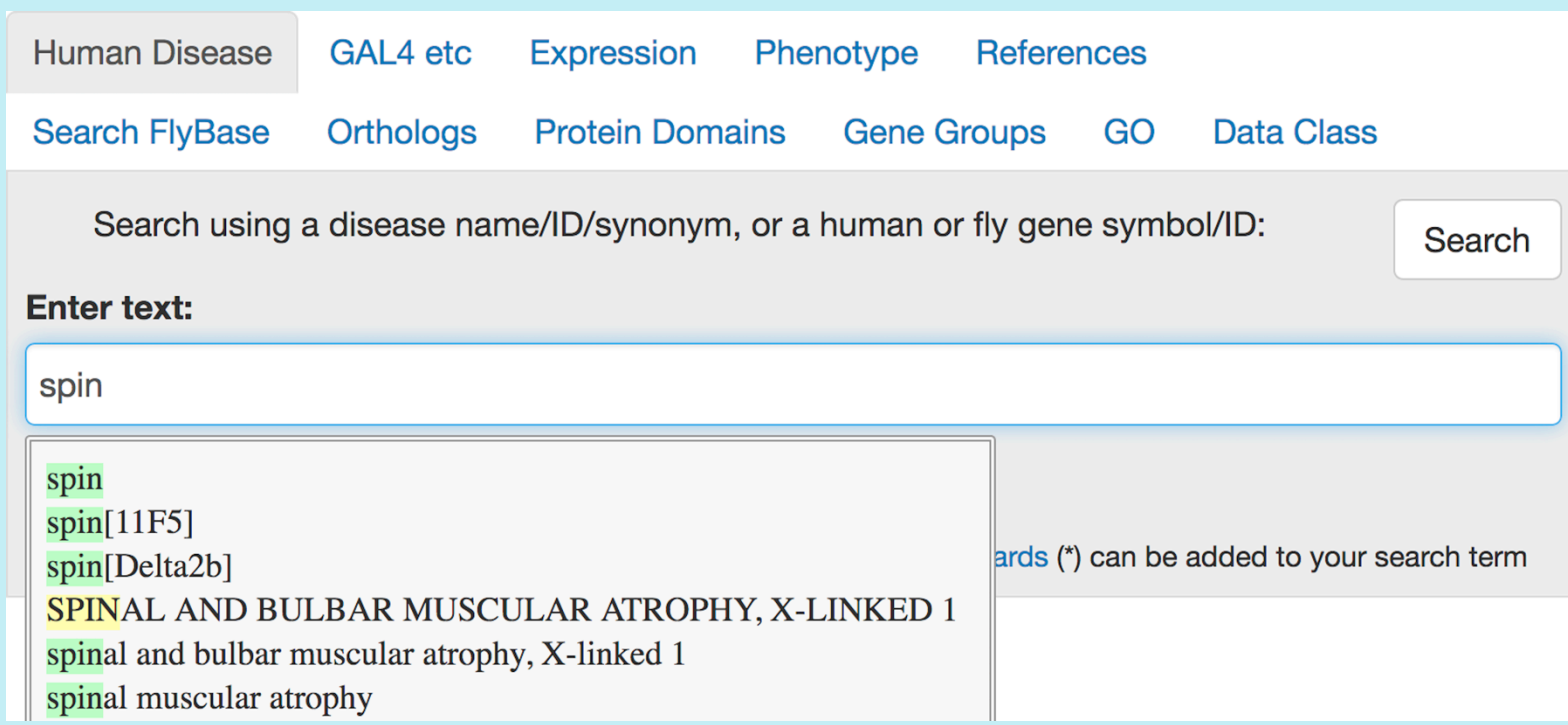


Finding Human Disease Models in FlyBase

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The Human Disease QuickSearch Tab

FlyBase has updated the Human Disease QuickSearch tab to allow searches for Human Disease Model Reports, Disease Ontology terms, disease-associated genes, and alleles used to model disease.



The original **Human Disease** tab allowed only searches for Disease Ontology (DO) terms, using only DO terms or DOIDs. In the updated Human Disease tab, it is possible to search all FlyBase human disease model data using almost any disease-related search term, including disease synonyms; for example, the search string "Lou Gehrig Disease" will return amyotrophic lateral sclerosis.

You can search by disease using:

- Disease Ontology (DO) term or DOID
- Human Disease Model name or ID
- OMIM phenotype term or ID
- disease synonym

You can search by human disease-associated gene using:

- HGNC symbol or ID
- OMIM genotype symbol or ID

You can search by *Drosophila melanogaster* gene using:

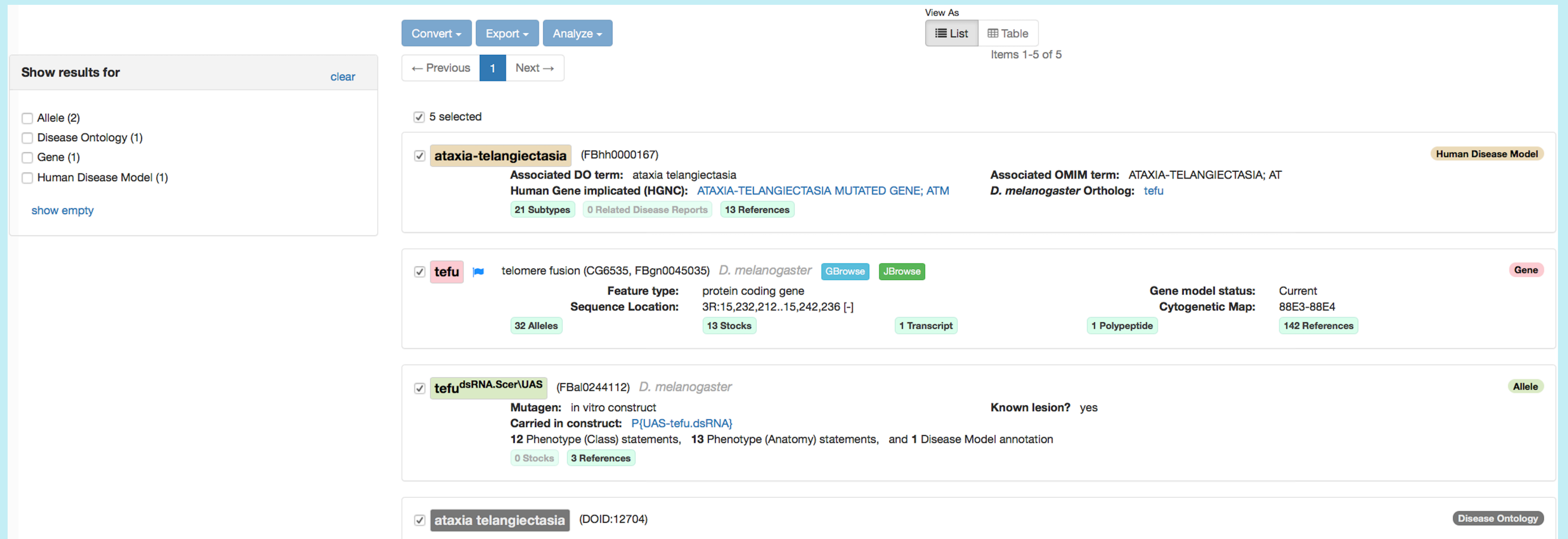
- FlyBase gene symbol, name, or FBgn identifier.

Autocomplete for the **Human Disease** tab is exceptionally robust, and works for multiple input classes at once; as shown in the example above, the string "spin" simultaneously triggers autocomplete of gene symbols, allele symbols, OMIM diseases terms, DO terms, and Human Disease Model names.

Autocomplete works for:

- Disease Ontology terms and DOIDs
- Human Disease Model names and IDs
- OMIM phenotype and genotype terms and IDs
- HGNC gene symbols and IDs
- FlyBase gene symbols, names, and IDs
- FlyBase allele symbols and IDs

Human Disease Hit-lists: Now With More Data Classes



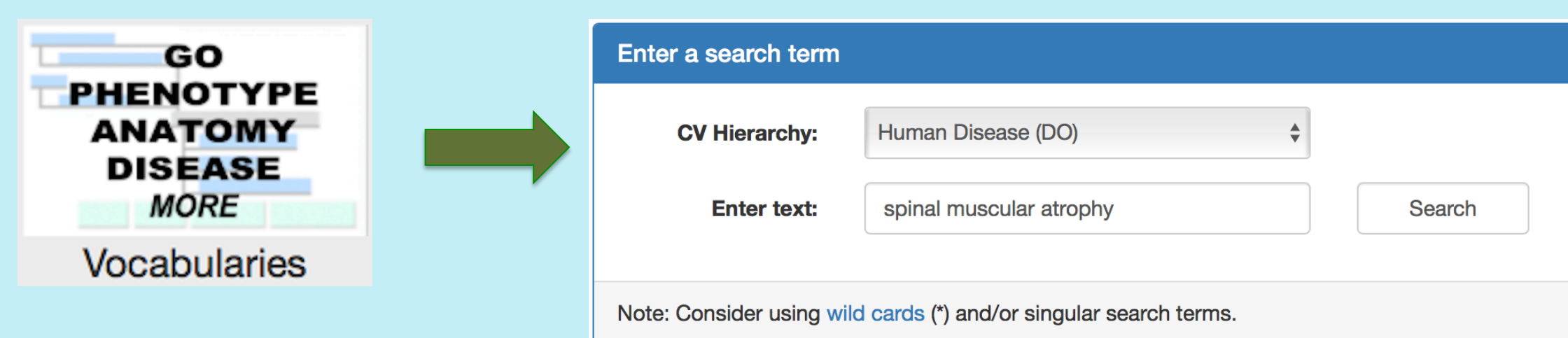
The Human Disease hit-list now features four classes of data: Human Disease Models, Disease Ontology terms, genes, and alleles. This hit-list resulted from the search "ataxia telangiectasia", for which the hits are the Human Disease Model *ataxia-telangiectasia*, the *Drosophila melanogaster* gene *tefu* associated with that model, the DO term ataxia telangiectasia, and the allele *tefu^{dsRNA.Scer/UAS}*, which is annotated with that DO term.

Like all FlyBase faceted hit-lists, a user can choose to display a subset of data classes. Filtering the hit-list to a single data class allows you to further convert the results to another data class, export to a file or to another FlyBase tool, analyze the results in a data class specific manner, or display the hit-list as a table.

Human Disease Model Results								
<input checked="" type="checkbox"/>	Name --	DO Term --	OMIM ID --	<i>D. melanogaster</i> gene	Human Genes Implicated (HGNC) --	# Subtypes --	# of Related Disease Terms --	# Refs --
<input checked="" type="checkbox"/>	amyotrophic lateral sclerosis 1	amyotrophic lateral sclerosis type 1	105400	Sod1	SUPEROXIDE DISMUTASE 1; SOD1	24	0	36
<input checked="" type="checkbox"/>	amyotrophic lateral sclerosis 8	amyotrophic lateral sclerosis type 8	608627	Vap33	VESICLE-ASSOCIATED MEMBRANE PROTEIN-ASSOCIATED PROTEIN B; VAPB	24	1	22
<input checked="" type="checkbox"/>	amyotrophic lateral sclerosis 17	amyotrophic lateral sclerosis type 17	614696		CHMP FAMILY, MEMBER 2B; CHMP2B	24	1	6
<input checked="" type="checkbox"/>	amyotrophic lateral sclerosis 6	amyotrophic lateral sclerosis type 6	608030	caz	FUSED IN SARCOMA; FUS	24	2	51
<input checked="" type="checkbox"/>	amyotrophic lateral sclerosis 18	amyotrophic lateral sclerosis type 18	614808	chic	PROFILIN 1; PFN1	24	1	7
<input checked="" type="checkbox"/>	amyotrophic lateral sclerosis 2	amyotrophic lateral sclerosis type 2	205100	Als2	ALSIN	24	0	5

This hit-list, resulting from the search "amyotrophic lateral sclerosis", has been filtered to display only Human Disease Models. The table view for this data class highlights the relationships between Human Disease Models, DO terms, and OMIM phenotypes, and displays the associated human disease gene and its orthologous *Drosophila melanogaster* gene.

Using the Vocabularies Tool to Find Disease Model Information

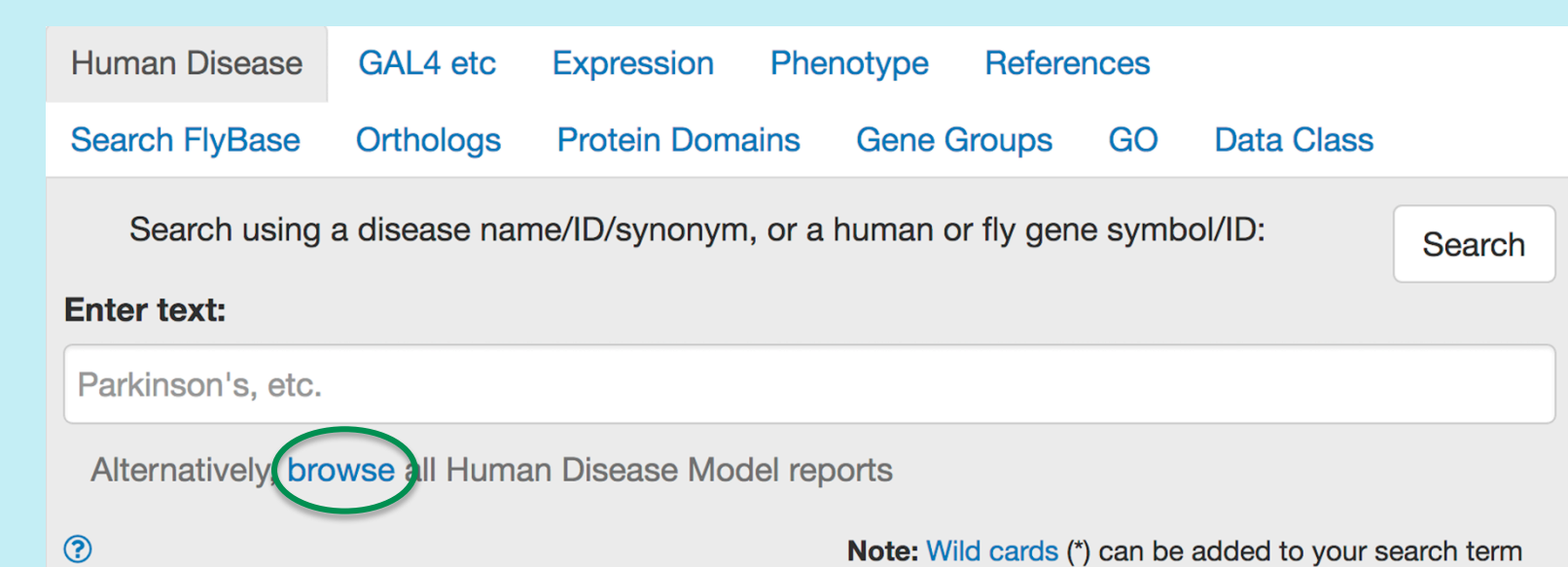


The **Vocabularies** tool can be accessed using the button on the FlyBase home page, or from the Tools drop-down menu in the FlyBase toolbar. Select the **Human Disease (DO)** CV Hierarchy and enter a search term; autocomplete is enabled for DO terms.

General Information		
Term	spinal muscular atrophy	ID (Ontology) DOID:12377 (Human Disease)
Definition	"A motor neuron disease that is a degenerative neuromuscular disease characterized by lower motor neuron degeneration associated with progressive muscle weakness and atrophy."	
Comment		
Annotations		
Records annotated with this exact term		
Data Class	Field	Records
Alleles (FBa)	HUMAN_DISEASE_MODELS	4
Human Diseases (FBhh)	DOID	1
Records annotated with this term OR any of its CHILDREN TERMS		
Genes	Human Diseases	Alleles
20	7	43
Results list data from multiple species. Please use QueryBuilder to retrieve species-specific data.		
Exact full annotation statements including this term, and relevant records		
Spanning Tree (Parents/Children) Only view relationship: is_a Search All Vocabularies for a New Term Go		
<pre> neurodegenerative_disease _ motor_neuron_disease _ spinal_muscular_atrophy 70 rec. _ anterior_horn_cell_disease _ autosomal_recessive_distal_spinal_muscular_atrophy 1 _ autosomal_recessive_distal_spinal_muscular_atrophy 2 _ Kennedy's_disease 41 rec. _ survival_motor_neuron_spinal_muscular_atrophy 26 rec. _ adult_spinal_muscular_atrophy 1 rec. _ intermediate_spinal_muscular_atrophy 5 rec. _ juvenile_spinal_muscular_atrophy 2 rec. _ Werdnig-Hoffmann_disease 2 rec. </pre>		

The Disease Ontology term report provides further access to disease model data. The spanning tree allows the user to browse the DO hierarchy, which displays both less specific parental disease categories, and more specific child disease terms. The buttons above the spanning tree lead to hit-lists of genes associated with, Human Disease Model Reports linked to, and alleles annotated with the DO term or its children.

The Human Disease Model Report Index



The **Human Disease Model Report List** is accessed via a link on the **Human Disease QuickSearch** tab.

FlyBase Human Disease Model Report List

- 3-methylglutaconic aciduria
- 46,XX gonadal dysgenesis (postulated), NUP107-related
- acute myeloid leukemia
 - acute myeloid leukemia, RUNX1-RUNX1T1 fusion
- advanced sleep phase syndrome
 - familial advanced sleep phase syndrome 2
- age-dependent ectopic fat accumulation, HDAC6-related
- Alexander disease
- alcohol use disorder, susceptibility to
 - alcohol, response to, EGFR/ERK signaling pathway
 - alcohol, response to, P13K/AKT signaling pathway
 - alcohol, response to, insulin signaling pathway

The **Human Disease Model Report List** consists of links to those reports. Many disease model reports are redundantly listed, so that this resource also serves as an index, allowing a user to browse to a disease from multiple points. Diseases may be listed as a specific subtype of a disease, by mechanistic cause, by symptomatic group, or as part of a major disease classification.

- spinocerebellar ataxia
 - congenital ataxia syndromes, CACNA1A-related
 - dentatorubro-pallidolysian atrophy
 - spinocerebellar ataxia 1
 - spinocerebellar ataxia 2
- polyglutamine diseases
 - dentatorubro-pallidolysian atrophy
 - Huntington disease
 - Machado-Joseph disease
 - spinal and bulbar muscular atrophy, X-linked 1
- deafness, autosomal recessive
 - deafness, autosomal recessive 2
 - dentatorubro-pallidolysian atrophy
 - DeSanto-Shinawi syndrome
 - diabetes mellitus, insulin-dependent

In the example above, **dentatorubro-pallidolysian atrophy** is a subtype of **spinocerebellar ataxia**, is one of several **polyglutamine diseases**, and is listed alphabetically by name.

Major disease classifications under which a user might find a disease model of interest include epilepsy, cancer, cardiac dysfunction, kidney disease, and muscular dystrophy, among others.