FlyBase: A Valuable Source of Molecular Interaction Data

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Abstract

The knowledge of a molecule’s binding partners can provide insights into that molecule’s function and/or its involvement in a particular biological process. FlyBase curation of molecular interactions is primarily focused on capturing protein-protein, RNA-protein and miRNA-mRNA interactions from low-throughput studies, in which interactions are typically supported by multiple independent forms of evidence. By concentrating on low-throughput studies of Drosophila gene products, the FlyBase molecular interactions dataset complements that of interaction databases and consortia that tend to focus on high-throughput studies.

Drosophila Dataset Comparison

<table>
<thead>
<tr>
<th></th>
<th>FlyBase</th>
<th>IMEx</th>
<th>BioGRID</th>
</tr>
</thead>
<tbody>
<tr>
<td>total interaction experiments</td>
<td>43,593</td>
<td>50,234</td>
<td>38,900</td>
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<tr>
<td>interspecies</td>
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<td>508</td>
<td>208</td>
</tr>
<tr>
<td>protein-protein</td>
<td>40,900</td>
<td>50,102</td>
<td>na*</td>
</tr>
<tr>
<td>protein-RNA</td>
<td>2085</td>
<td>8</td>
<td>na*</td>
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<tr>
<td>RNA-RNA</td>
<td>608</td>
<td>0</td>
<td>na*</td>
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<tr>
<td>protein-DNA</td>
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<td>104</td>
<td>na*</td>
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<tr>
<td>protein-small molecule</td>
<td>0</td>
<td>18</td>
<td>na*</td>
</tr>
<tr>
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<td>512</td>
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<tr>
<td>unique gene pairs</td>
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<td>39628</td>
<td>36801</td>
</tr>
</tbody>
</table>

*data not available

FlyBase also presents interaction data in tabular form where individual interaction experiments are condensed into unique gene pairs, or interacting groups. For each gene pair, assays used to detect interactions and references are listed.

Clicking on a particular interacting group or gene pair opens a new page with more detailed information. The interacting group page displays a network diagram that includes products of both genes and common interactors are highlighted in purple.

FlyBase shares the interaction data it curates with other databases like BioGRID, MIST, DroID and the Alliance of Genome Resources. Linkouts to these databases from FlyBase allow users to quickly explore large and diverse datasets.

The complete corpus of FlyBase interaction data is available for download under the ‘Downloads’ menu.

Conclusion

FlyBase curates interaction data that complements that captured by other databases making FlyBase a valuable source of Drosophila interaction data.

FlyBase curated interaction data can be viewed in the “Interactions” section of every FlyBase gene page. The data is summarized as a network diagram where circles represent protein interactors and triangles represent RNA making it possible to distinguish protein-protein, protein-RNA and RNA-RNA interactions at a glance. Network diagrams are generated by EsyN (http://www.esyn.org).

FlyBase Interactions Display

External Data

FlyBase Interactions Display

Publications Curated

Unique Gene Pairs

FlyBase Interactions Display

FlyBase
29498
FlyBase & BioGRID
11691
FlyBase & IMEx
3689
FlyBase & BioGRID
36801
FlyBase & IMEx
351