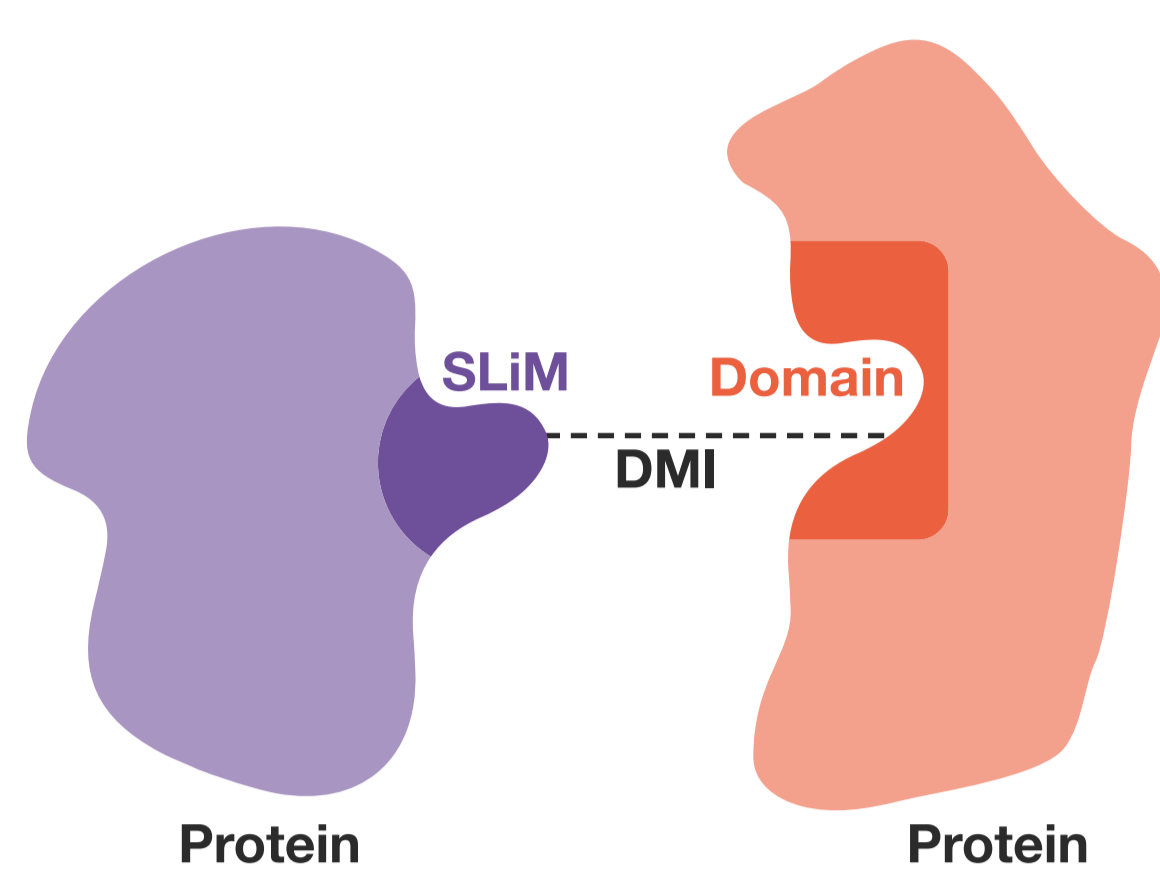


SLiMEnrich: computational assessment of protein-protein interaction data as a source of domain-motif interactions

INTRODUCTION

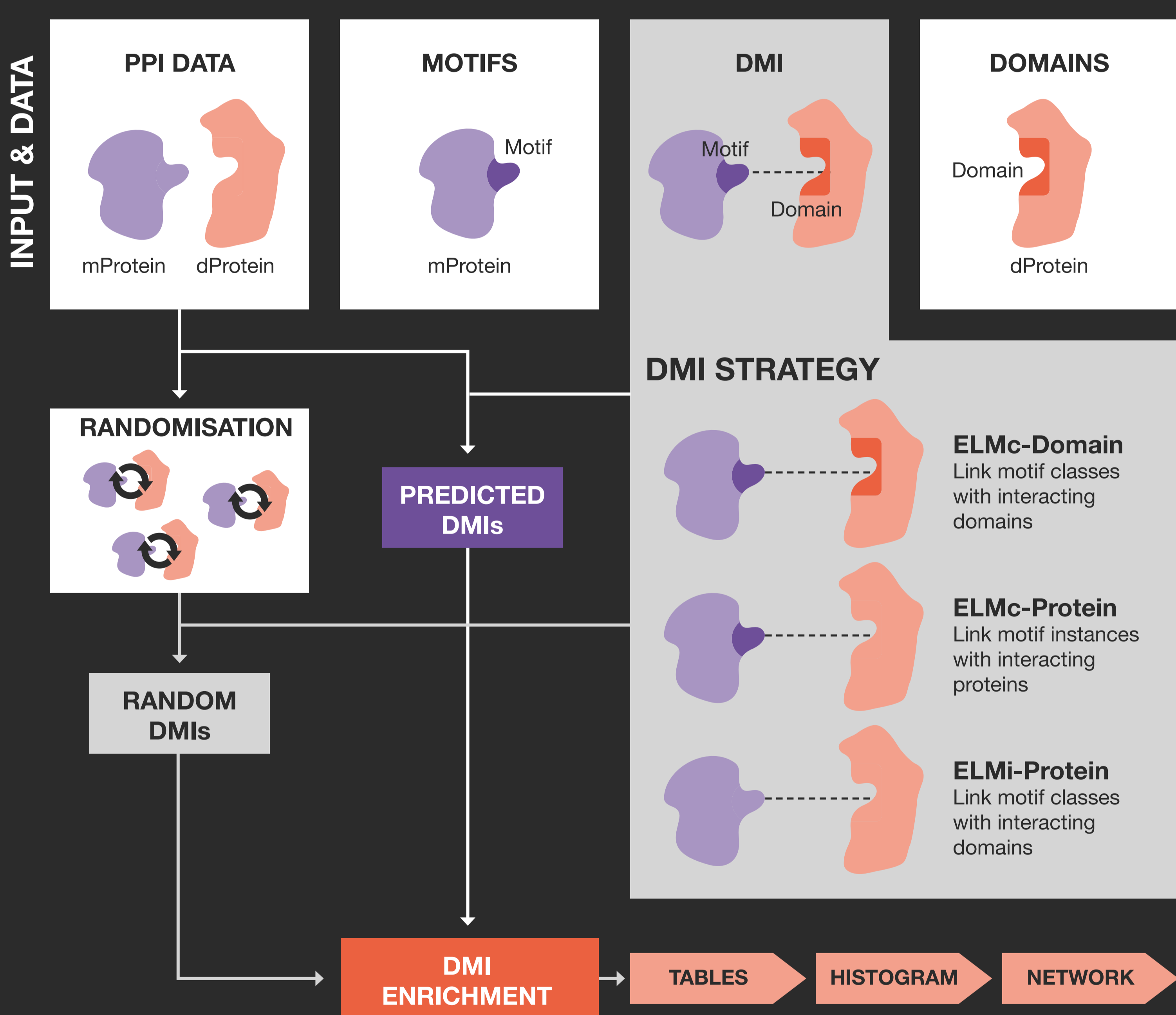
Many important cellular processes involve **protein-protein interactions (PPIs)** mediated by a **Short Linear Motif (SLiM)** in one protein interacting with a **globular domain** in another. Despite their significance, these domain-motif interactions (DMIs) are typically low affinity, which makes them challenging to identify by classical experimental approaches, such as affinity pulldown mass spectrometry (AP-MS) and yeast two-hybrid (Y2H).



DMIs are thought to be underrepresented in PPI networks as a result. A number of computational methods now exist to predict SLiMs and/or DMIs from experimental interaction data but it is yet to be established how effective different PPI detection methods are for capturing these low affinity SLiM-mediated interactions.

SLiMEnrich

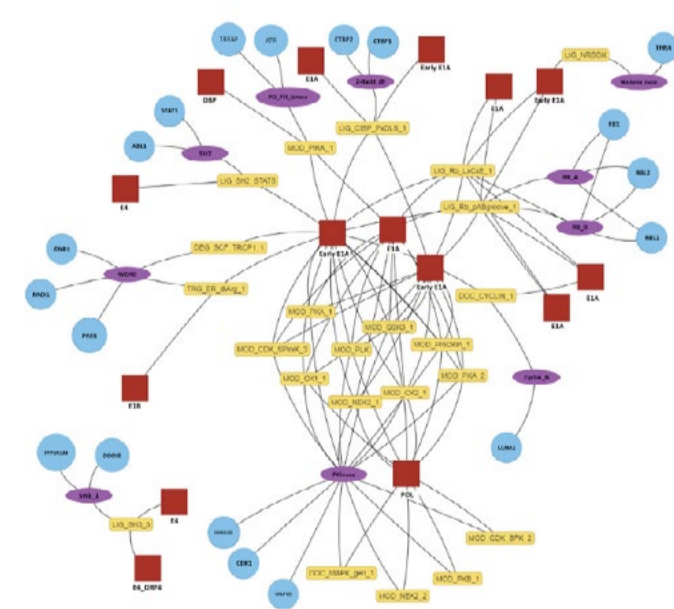
Here, we introduce a new computational pipeline (**SLiMEnrich**) to assess how well a given source of PPI data captures DMIs and thus, by inference, how useful that data should be for SLiM discovery.



SLiMEnrich interrogates a PPI network for pairs of interacting proteins in which the first protein is known or predicted to interact with the second protein via a DMI. Permutation tests compare the number of known/predicted DMIs to the expected distribution if the two sets of proteins are randomly associated. This provides an estimate of **DMI enrichment within the data** and the **false positive rate for individual DMIs**.

CASE STUDY

As a case study, we detect significant DMI enrichment in a high-throughput Y2H human PPI study. **SLiMEnrich analysis supports Y2H data as a source of DMIs**, but highlights the high false positive rates associated with naïve DMI prediction.



WHERE TO GET SLiMEnrich

SLiMEnrich is available as an R Shiny app. The code is open source and available via a GNU GPL v3 license at: <https://github.com/slimsuite/SLiMEnrich>. A web server implementation is available at: <http://shiny.slimsuite.unsw.edu.au/SLiMEnrich/>.