

# The Minimum Information about a Molecular Interaction Causal Statement (MI2CAST): a guideline for the management of molecular causal interactions

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In Systems Biology, regulatory process networks are built to reflect how components in cell fate decision systems are interconnected and behave. A considerable amount of knowledge provided by different public resources is available in the form of large biological networks depicting e.g. metabolic reactions, signaling cascades and gene regulatory events. We aim at using this information by disassembling those networks into their most basic regulatory network motifs, called “causal statements”. A causal statement is describing a directed interaction where a source entity (regulator) has an influence over the quantity or the activity of a target entity (regulatee). By looking at the core interactions occurring among entities, the understanding of the mechanisms they enable in biological regulations could be improved, and conversely, by specifying the elements of regulatory reactions in sufficient detail new signaling networks accommodating alternative cellular behaviour may be composed easily from its network constituents. Once causality is observed, the next challenge is to represent and archive it so that it can be shared, reused and reconstituted in causal networks by computers and humans alike. At present, various representations of causal relationships between biological components are used in a variety of resources. However, they capture different aspects of contextual details about causal interactions. We propose the minimum information about a molecular interaction causal statement (MI2CAST) to formalize the information that ideally should be captured when representing causal interactions through an unambiguous data description. This reporting guideline should be considered as a checklist that can be followed in curation processes and to consult when building curation templates that accommodate capturing the essential contextual information about a causal relationship. The aim is to ensure clarity, uniformity and reusability of the data across resources.