



Short Communication

Short Note on Synthetic Biology Open Language (SBOL)

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Abstract

(SBOL) The **Synthetic Biology Open Language** is a proposed data standard for exchanging synthetic biology designs between software packages. It has been under development by the SBOL Developers Group since 2008. SBOL Visual was conceived and presented as an RFC in 2010, inspired by the need to represent designs in software user interfaces. SBOL Visual 1.0.0 was published as an RFC in 2013, providing a cleaner symbol set and more formalized symbol definitions via the Sequence Ontology .

Keywords

Synthetic Biology; Gene; Symbol; Language

Aim

The main aim is to develop the standard in a way that is open and democratic in order to include as many interests as possible and to avoid domination by a single company. It is an open standard for the representation of *in silico* biological designs and also provides a data format composed of genetic vocabulary terms called SBOL Data. It also provides schematic glyphs to graphically depict genetic designs called SBOL Visual.

Synthetic Biology Open Language standardises data used by synthetic biology practitioners, from users to software developers and also wet lab biologists. SBOL visual development is executed by the SBOL Developers Group and the SBOL Visual Group through discussions on the group mailing list, in virtual meetings, and at biannual in-person workshops. Synthetic biology builds upon the techniques and successes of molecular biology, genetics, and metabolic engineering by applying engineering principles to the design of biological systems.

The field still faces high rates of failure, including long development times, substantial challenges, and poor reproducibility. One method to avoid these problems is to improve the exchange of information about designed systems between laboratories.

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The synthetic biology open language (SBOL) has been developed as a standard to support the specification and exchange of biological design information in synthetic biology, filling a need not satisfied by other pre-existing standards. In order for the synthetic biology designs to scale up in complexity, researchers will need to make greater use of parts repositories, specialized design tools. Seamless inter-tool communication would, for example, they allow the separation of genetic network design from network simulation, and the separation of both from synthesis and codon optimization.

The wide adoption of a design standard would allow the growing number of software tools to more directly support an integrated design workflow involving synthetic biologists from both research and commercial institutions. Furthermore, a 'standard exchange format' for synthetic biology designs would dramatically improve the ability to reproduce published results. Currently, it is extremely difficult to extract workable designs from literature because designs are usually described using error-prone English prose and imprecise. All too often, critical information is accidentally omitted or implicitly assumed, and critical data, such as the final, exact DNA sequences, are simply not available.

Applications

- SBOL software tools is used to design genetic constructs and biological systems.
- SBOL is used to support enables lossless data conversion when moving between tools.
- Synthetic Biology Open Language also allows you to describe more complex design information than traditional sequence representation of a genetic circuit.

Software tools

Many software tools support SBOL Visual, including SBOL APIs, SBOL helper tools and end user software supporting SBOL.

SBOL Visual are supported by many software tools. The SBOL visual glyphs are supported in a variety of formats and are freely available for download.

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