Научный текст

- Статья в научном журнале
- Диссертация
- Диплом
- Курсовая работа
- Мини-обзор генома бактерии

Для чего пишется научный текст?

Какие варианты!

Вы не поверите: научный текст пишется для читателей

- Кто читатели мини-обзора?
  - Преподаватели, аспиранты и студенты, проверяющие вашу работу.
    - Они скорее всего ничего не знают про вашу бактерию или архею
    - Из текста им хочется узнать что-то новое и интересное (оценят)
- Для этого
  - мини-обзор, должен быть связным сплошным текстом, как рассказ; а не нагромождением фраз
  - Главное – текст должен быть понятен для постороннего читателя
  - Таблицы и рисунки помогают читателю понять текст.

Есть некоторые стандарты написания научного текста

Стандарты помогают

авторам написать научный текст

читателю понять написанное

Этим научный текст отличается от художественного

Отличие чисто формальное.

Как и художественный текст научный текст (статья, курсовая, мини-обзор) бывает

КРАСИВЫЙ или

БЕЗОБРАЗНЫЙ

Структура научного текста

РАЗДЕЛ по порядку	Обязателен в мини-обзоре ↓	
Название (Title)	ДА	**Отражает содержание текста**
Авторы (Authors)	ДА	Без комментариев. **Плагиат запрещён**. **Если используете чужой текст, рисунок или таблицу, то обязательна ссылка на источник**
Аннотация или Резюме (Abstract)		**Предельно короткое описание предмета изучения и того, что сделано**. Читатель прочитав резюме должен понять интересен ли ему текст или нет.
Введение (Introduction)	ДА	**Содержит информацию об объекте изучения со ссылками на литературные источники**. В конце введения пишется **что исследуется в работе.**
Материалы и методы (Materials and Methods)	ДА	**Краткое указание источников данных, использованных в работе**; достаточное для того, чтобы читатель мог эти данные найти сам. Указать **каким методом получен какой результат** - чтобы не писать это в результатах
Результаты	ДА	**Разбиваются на разделы.** Каждый раздел должен быть выделен в тексте, иметь понятное название и содержать один или несколько связанных между собой результатов. Методы получения результата в Результатах не описываются. Методам место в секции Материалы и методы.
Обсуждение (Discussion)		**Обсуждение результатов обязательно**, но может быть включено в раздел РЕЗУЛЬТАТЫ
Сопроводительные материалы (Supplementary materials)	ДА	Содержат ссылки на материалы, необходимые для понимания результатов, но **не включённые в основной текст (например, из-за большого объёма)**
Литература (References)	ДА	**Нумерованный список источников информации**
Выводы или Заключение		
Благодарности		

Пример mini review

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10672435/

Пример демонстрирует оформление мини-обзора.

В вашем мини-обзоре результатов будет меньше, зато будет раздел материалы и методы

Moonlighting Proteins: Diverse Functions Found in Fungi

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Abstract: Moonlighting proteins combine multiple functions in one polypeptide chain. An increasing number of moonlighting proteins are being found in diverse fungal taxa that vary in morphology, life cycle, and ecological niche. In this mini-review we discuss examples of moonlighting proteins in fungi that illustrate their roles in transcription and DNA metabolism, translation and RNA metabolism, protein folding, and regulation of protein function, and their interaction with other cell types and host proteins.

Keywords: moonlighting protein; multifunctional; RNA binding proteins; multiprotein complex; enzymes; transcription factor

1. Introduction

In the million years since fungi split from other eukaryotes, they evolved a wide diversity of taxa with a variety of morphologies and sometimes complex life cycles, adapted to numerous ecological niches. They also developed diverse mechanisms of nutrient acquisition, including secreting digestive enzymes, symbiosis, or even parasitism. All these developments required the evolution of new protein functions. Moonlighting proteins have arisen throughout the evolutionary tree as a means of enabling a vast increase in protein functions, as well as a mechanism to coordinate many functions. A moonlighting protein is a single polypeptide chain with two or more physiologically relevant biochemical or biophysical functions [1]. Moonlighting proteins can have a second function by interacting with another protein, DNA, or RNA, or with different ligands or cofactors; by joining a multiprotein complex; or by being expressed in a different cell type. They can also have different functions at different times in development or stages of differentiation; in different locations within the cell, for example, in the cytoplasm or nucleus; or when secreted or bound to the cell surface.

As shown in the examples below and in Table 1, moonlighting proteins have been found in a variety of fungal taxa [2]. Not surprisingly, additional functions were often first found in model organisms that are used in genetic or biochemical studies including *Saccharomyces cerevisiae* (budding yeast), *Neurospora crassa* (filamentus fungi, mold), *Schizosaccharomyces pombe* (fission yeast), and *Emericella nidulans* (*Aspergillus nidulans*). A few examples were identified in *Komagataella pastoris* (formerly known as *Pichia pastoris*), a budding and spore-forming yeast that is widely used as a model organism and also as an expression system for protein production in research and biotech industries. Other moonlighting proteins were found in studies of fungi that play roles in health and disease or are used in industry or food production—*Paracoccidioides brasiliensis* is a dimorphic fungus that can cause paracoccidioidomycosis, *Histoplasma capsulatum* causes histoplasmosis, *Cryptococcus neoformans* can cause a pneumonia-like disease or meningitis in people with weakened immune systems, and *Sporothrix schenckii* causes sporotrichosis, a subcutaneous mycosis. In addition, several *Candida* species are a normal part of human gut flora, but can also act as opportunistic pathogens. *Kluyveromyces lactis* (formerly *Saccharomyces lactis*)

Оформление таблицы

Table 1. Moonlighting Proteins Mentioned in the Text.

Protein Name	One Function	Another Function	Reference Nu
Interacting with DNA or affecting DNA metabolism			
Emericella nidulans			
I-AniI	mRNA maturase	Homing endonuclease	[3,4]
Kluyveromyces lactis			
Galactokinase	Galactokinase	Transcriptional activator	[5,6]
Tuber melanosporum			
Ask1	Component of DASH complex	Binds DNA, transcriptional regulator	[7]
Phosphoadenosine phosphosulfate reductase	Thioredoxin	Transcription factor	[8]
Saccharomyces cerevisiae			
Acetohydroxyacid reductoisomerase	Acetohydroxyacid reductoisomerase	Maintains mitochondrial DNA stability	[9]
Arg5,6	N-acetyl-gamma phosphate reductase/acetyl glutamate kinase	Regulator of transcription	[10]
Arg82	Kinase	Stabilizes transcription factors ARG80 and MCM1	[11]

Ссылки на литературу

Оформление рисунка

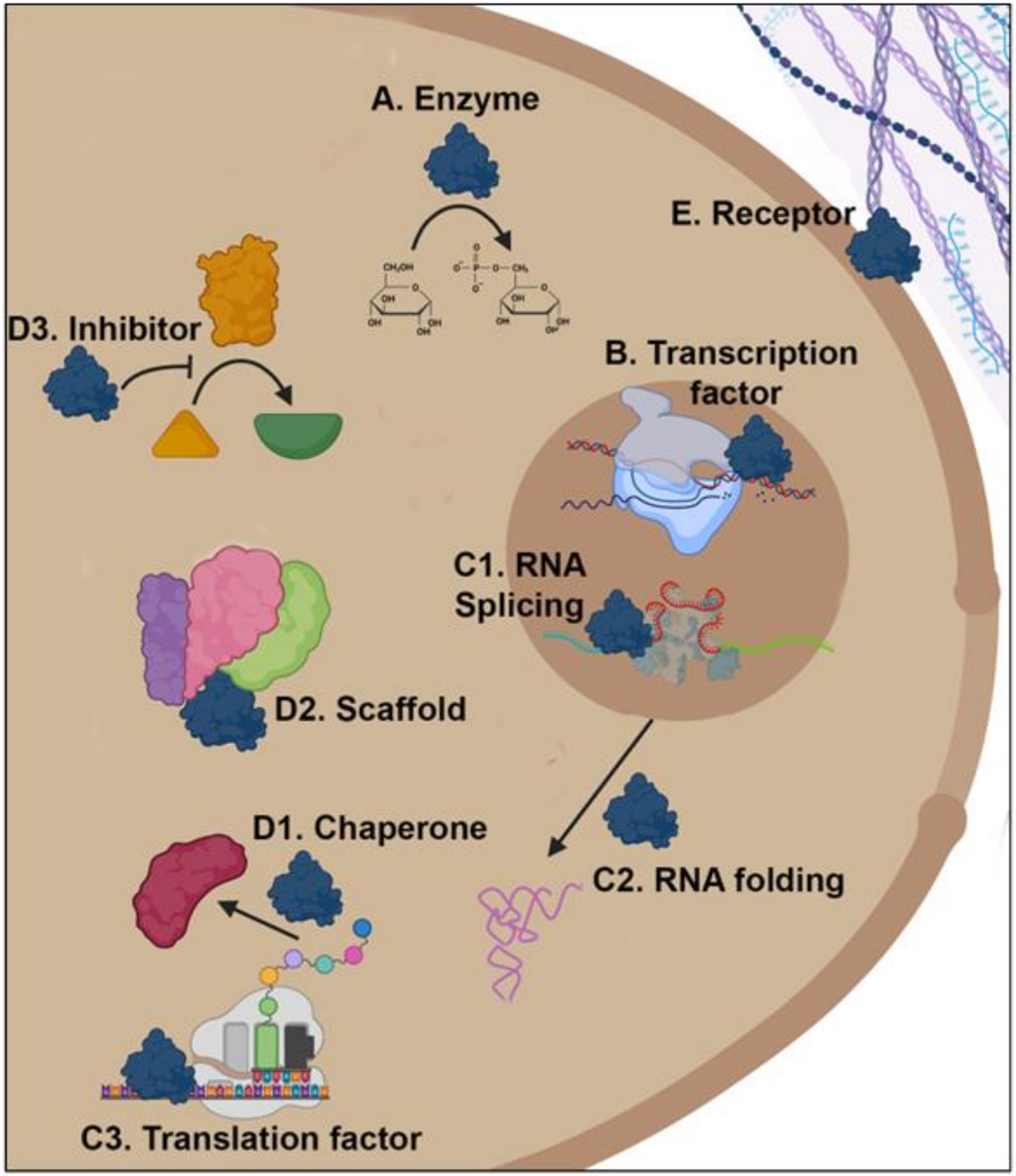

Figure 1. Examples of multiple functions of fungal moonlighting proteins. A moonlighting protein (dark blue) can have a function as an enzyme in the cytoplasm (A). It could have an additional function as a DNA binding transcription factor in the nucleus (brown circle, B). By binding to RNA

2. Examples of Moonlighting Proteins in Fungi

2.1. Affecting Transcription, DNA Metabolism, or DNA Maintenance

A variety of fungal enzymes have been found to have a second function in regulating transcription or in DNA metabolism (Table 1). Enzymes in carbohydrate, nitrogen, and sulfur metabolism, as well as kinases and chaperones, have been found to regulate transcription either by binding directly to DNA or by binding to and regulating transcription factors. *S. cerevisiae* hexokinase (Hxk2) and a homologue in *K. lactis*, galactokinase, phosphorylate hexoses in glycolysis and other pathways in carbohydrate metabolism. High cellular glucose concentrations cause Hxk2 to move to the nucleus where it interacts directly with

3. Discussion

The fungal moonlighting proteins described above include a large variety of proteins and combinations of functions. Some combinations of functions enable cells to sense and respond to changes in the environment; for example, proteins involved in redox reactions might sense changes in the redox state of the cell and then switch to a new function. Proteins involved in carbohydrate or nitrogen metabolism are often important sensors for the cellular levels of these nutrients. In general, moonlighting proteins can also enable coordinated regulation or crosstalk between biochemical pathways and cellular processes, such as energy producing pathways and transcription or translation. In other cases, the two functions might not be connected but might just be a case of a new function arising and the cell making use of proteins that are already available.

While we cannot always determine which function was the original function of the protein family, many moonlighting proteins belong to ancient protein families, notably enzymes in glycolysis, the citric acid cycle, and protein synthesis, including ribosomal proteins. Evolution of a new function does not always require large changes in the amino acid sequence or protein structure [92]. In fact, a binding site for plasminogen can be just a few amino acid changes in a protein surface loop or C-terminus. Many of these proteins have orthologues that are moonlighting in other organisms [2]. Interestingly, in some cases the more ancient, catalytic function is the same and a second function is different, a kind of "semi-orthologue."

4. Conclusions

Moonlighting proteins in fungi have a variety of functions and combinations of functions. In recent years, the use of proteomics methods to identify cell surface localized proteins or proteins that bind to DNA or RNA has contributed to the identification of dozens of additional moonlighting, or potentially moonlighting, proteins. The examples described above are likely to be only the tip of the iceberg, with additional functions of many more proteins still to be identified. There is still much to learn about the mechanisms of their functions and their cellular roles, with potential impacts in medicine, agriculture, and synthetic biology.

References

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ВОПРОСЫ?