# Article information:

Ice Inhibition for Cryopreservation: Materials, Strategies, and Challenges - Chang - 2021 - Advanced Science - Wiley Online Library  
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# Article summary:

1. Cryopreservation is a crucial technique for long-term storage of biological materials, such as organs, tissues, and cells, by using very low temperatures. It allows for the preservation of normal structure and function integrity after thawing and has various biomedical applications.

2. The formation, growth, and recrystallization of ice crystals are major limitations in cryopreservation and cause damage to cryopreserved samples. Anti-icing materials and strategies, including cryoprotectants, antifreeze proteins, synthetic polymers, nanomaterials, hydrogels, trehalose delivery, cell encapsulation, and bioinspired structure design can effectively regulate and suppress ice crystals to reduce damage and improve cryopreservation efficiency.

3. External physical field technologies used during the cooling and thawing processes can also inhibit ice crystal formation. However, there are still challenges in the field of ice inhibition for high-efficiency cryopreservation that need to be addressed in future research.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

对于上述文章，我无法提供详细的批判性分析，因为只提供了文章的摘要部分，并没有提供完整的正文内容。

# Topics for further research:

* 批判性分析
* 文章的摘要部分
* 完整的正文内容
* 文章主题
* 文章内容
* 文章分析

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