# Article information:

Designing Hydrogels for 3D Cell Culture Using Dynamic Covalent Crosslinking - Rizwan - 2021 - Advanced Healthcare Materials - Wiley Online Library
<https://onlinelibrary.wiley.com/doi/full/10.1002/adhm.202100234>

# Article summary:

1. 3D cell culture is essential for accurately modeling in vivo cell behavior: The article highlights the importance of 3D cell culture in mimicking the native microenvironment and accurately modeling cell behavior. It explains that cells cultured in 2D surfaces may exhibit different characteristics compared to those cultured in 3D systems resembling their native microenvironment.

2. Dynamic covalent crosslinking enables the design of hydrogels with similar viscoelastic behavior to human tissues: The article discusses dynamic covalent chemistry (DCC) based crosslinking as an exciting method for designing hydrogels with viscoelastic properties similar to human tissues. DCC allows for reversible chemical bonds that can break and reform, making it suitable for matrix remodeling in 3D cell culture systems.

3. Various types of dynamic covalent bonds have been tailored for compatibility with 3D cell culture: The article mentions specific examples of dynamic covalent bonds, such as boronate ester, hydrazone, Diels-Alder, oxime, and thiol-disulfide exchange, which have been modified to be compatible with 3D cell culture. These bonds offer opportunities for achieving dynamic mechanical behaviors similar to the native extracellular matrix environment.

# 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:

对于这篇文章的批判性分析，以下是一些可能的问题和观点：

1. 偏见及其来源：文章似乎偏向于支持使用动态共价交联设计水凝胶进行3D细胞培养。然而，作者没有提供其他方法或技术的平衡讨论，也没有探讨动态共价交联存在的潜在问题或限制。

2. 片面报道：文章主要关注了动态共价交联在模拟细胞外基质环境方面的优势，但未提及其他可能影响细胞行为和功能的因素，如细胞-细胞相互作用、生物化学刺激等。

3. 无根据的主张：文章声称使用动态共价交联可以改善细胞培养模型的准确性，但未提供足够的证据来支持这一主张。缺乏实验证据或比较研究来证明使用动态共价交联与传统方法相比是否确实能更好地模拟体内环境。

4. 缺失的考虑点：文章未涉及可能与动态共价交联相关的风险或副作用。例如，是否存在对细胞生长和功能有不良影响的副产物？是否存在潜在毒性或免疫反应的风险？这些因素对于评估动态共价交联作为细胞培养方法的可行性和安全性至关重要。

5. 所提出主张的缺失证据：文章中提到了一些使用动态共价交联的具体例子，但未提供这些方法在实际应用中的效果或优势的详细数据。没有提供相关研究结果或实验数据来支持所述主张。

6. 未探索的反驳：文章未涉及可能存在的其他观点或争议。例如，是否有人认为传统的静态交联方法仍然是有效和可靠的细胞培养方法？是否有其他技术或材料可以达到类似的效果？

7. 宣传内容：文章似乎更像是对动态共价交联技术进行宣传，而不是客观地讨论其优点和局限性。作者没有提供足够平衡和全面的信息来帮助读者形成自己的意见。

总之，这篇文章在讨论动态共价交联设计水凝胶进行3D细胞培养方面存在一些偏见和片面报道。它缺乏对其他方法、潜在风险和限制以及相关证据的平衡讨论。读者需要谨慎对待这篇文章中提出的主张，并自行进行更全面的研究和评估。

# Topics for further research:

* 其他细胞培养方法的比较研究
* 细胞-细胞相互作用的影响
* 生物化学刺激对细胞行为和功能的影响
* 动态共价交联的副作用和风险
* 动态共价交联方法的实际应用效果和优势数据
* 传统静态交联方法的有效性和可靠性

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