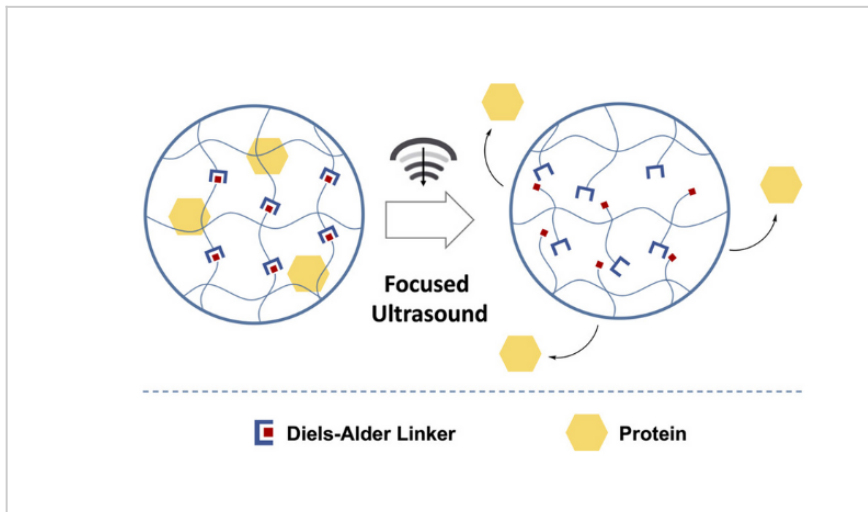


# Ultrasound Responsive Hydrogels for Controlled Drug Delivery

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The loaded hydrogels stimulated with focused ultrasound.

## Technology Summary

Focused ultrasound has been demonstrated as a safe external stimulus that allows for deep tissue penetration while being nonionizing and noninvasive. This drug delivery system utilizes Dies-Alder linkers to cross-link hydrogels and produce responsive hydrogels. The Dies-Alder linkers provide enhanced stability and provide spatiotemporally controlled release. When subjected to the pressure waves the Dies-Alder reaction restructures the hydrogel and releases the drug, solidifying the system's ability for focused ultrasound excitation with controlled drug release.

## Application & Market Utility

Controlled drug release offers enhanced results in repairing bone and tissue. Conventional methods lack control of release and suffer uncontrolled polymer degradation. An external stimulus such as light or heat can assist in polymer degradation and therapeutic release but often lead to off-target ionizing and burning. This polymer-based drug delivery system degrades and releases therapeutics when stimulated with focused ultrasound to limit off-target effects while controlling the rate of therapeutic release. This system provides many applications for tissue engineering and cancer treatment.

## Next Steps

Future steps include pharmacokinetic and pharmacodynamic studies of ultrasound controlled drug release with an appropriate therapeutic, such as protein therapeutics, antibiotics, cancer drugs and narcotics.

### TECHNOLOGY READINESS LEVEL

4

#### Seeking

Investment | Licensing | Research

#### Keywords

- Ultrasound
- Diels-Alder Linker
- Hydrogel
- Controlled Release
- Drug Delivery

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