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Deuteration of Rec1-Resilin and its hydrogel for biomedical applications

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Rec1-resilin is a highly hydrophilic protein that exudes a vast range of multi-responsiveness, well known for its superelasticity. Self-assembly of Rec1-resilin has been studied in vitro, however, it is difficult to understand the interaction and molecular organisation of the protein with varying biological environments due to the presence of complex systems. Therefore, it is critical to synthesise Rec1-resilin in deuterated form, which would enable a unique neutron scattering length density for neutron scattering experiments. With a view to understand the self-assembly and co-assembly of Rec1-resilin and tailor its responsiveness, we successfully synthesised deuterated Rec1-resilin using a modified protocol. Utilising this modified protocol, we hope to develop modular versions of Rec1-resilin with hydrophobic segment to explore its unique properties from its conformational structure, binding and organisation with complementary and contrasting neutron scattering techniques with intentions to develop biomimetic gels for adhesion and repair of tissue. Ultimately, this will show the impact of deuteration on the protein through a comparison of the structure and organisation of the deuterated and unlabelled modular versions of Rec1-resilin in different environments, which will not only provide a fundamental understanding of phase behaviour but also lead to utilisation of isotopically-labelled modular Rec1-resilin protein and its hydrogels for biomedical applications.

Level of Expertise

Student

Presenter Gender

Man

Pronouns

Which facility did you use for your research

National Deuteration Facility

Students Only - Are you interested in AINSE student funding

Yes

Do you wish to take part in the Student Poster Slam

No

Condition of submission

Yes

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