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Structure Determination and Interactions of Protein Desmoplakin C-terminal by Nuclear Magnetic Resonance Spectrometry and Small Angle X-Ray Scattering

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The tertiary structure and interactions with intermediate filament proteins of the desmoplakin C-terminal, a cytolinker protein related to severe skin diseases and fatal cardiovascular failures, has been determined by the use of two complementary techniques: Nuclear Magnetic Resonance (NMR) and Small Angle X-Ray Scattering (SAXS). NMR spectroscopy provided the atomic structure detail and interactions dynamics information of the desmoplakin linker domain, while SAXS was used to solve the global shape and orientation of the B-linker-C desmoplakin multi-domain. By resolving the ambiguities of the orientations of the individual domains with SAXS it was possible to discriminate between similar structural conformations obtained by NMR. Through the use of these two techniques, we gauged the architecture of the desmoplakin plakin repeat domains B and C in a construct including the linker domain, with the latter offering a pair of basic residues that recognise acidic residues on helical intermediate filament proteins that enhances the desmoplakin binding activity with these proteins.

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