

Publication

Atomic structure of vimentin coil 2

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Intermediate filaments (IFs) are essential cytoskeletal components in metazoan cells. They assemble from elementary dimers that are built around the central alpha-helical coiled-coil rod domain representing the IF 'signature'. The rod consists of two similarly-sized parts, coil 1 and coil 2, connected by a non-alpha-helical linker L12. Coil 2 is absolutely conserved in length across all IF types and was initially predicted to consist of a short coiled-coil segment 2A based on a heptad pattern of hydrophobic residues, another linker L2 and a coiled-coil segment 2B. Here we present the crystal structure of human vimentin fragment including residues 261-335 i.e. approximately the first half of coil 2. The N-terminal part of this fragment reveals a parallel alpha-helical bundle characterized by 3.5 consecutive hendecad repeats. It is immediately followed by a regular left-handed coiled coil. The distinct non-helical linker L2 is therefore not observed. Together with the previously determined crystal structure of the major part of segment 2B (Strelkov et al., 2001), we can now build a complete atomic model of the 21nm long vimentin coil 2 dimer being a relatively rigid rod.

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