Towards an atomic structure of intermediate filaments. S.V. Strelkov1, H. Herrmann2, N. Geisler3, R. Zimbelmann2, A. Lustig1, U. Aebi and P. Burkhard1, 1 M.E. Müller Institut, Biozentrum der Universität Basel, 4056 Basel, Switzerland, 2 German Cancer Research Center, Heidelberg, 3 Max Planck Institute for Biophysical Chemistry, Göttingen, Germany.

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10nm-wide intermediate filaments (IFs) represent an essential component of the cytoskeleton in most eukaryotic cells. The elementary unit of the IF structure is an elongated dimer with its major central part being a parallel α-helical coiled coil. The filament formation proceeds via a specific multistage association of the dimers. We set a goal of determining the atomic structure of human IF protein vimentin using X-ray crystallography. The wild-type protein is not suitable for crystallisation because of its elongated shape and intrinsic tendency to assemble into filaments. To overcome this problem, we have produced and characterised more than 20 partially overlapping vimentin fragments with lengths ranging between 39 and 330 residues. Diffraction quality crystals were obtained for five fragments. The structures of the Z2B and Cys2 fragments could be solved to 1.9 and 2.3Å resolution, respectively. Both fragments belong to the segment 2B of the coiled coil while the second one also reveals a coiled-coil stutter. The 1.4Å structure of the C1A fragment corresponding to the highly conserved N-terminal region of the vimentin rod features a monomeric α-helix. We expect that determining crystal structures of further fragments will gradually allow us to compile a molecular model for the full-length vimentin dimer. This approach will be eventually extended to establishing the architecture of complete filaments at atomic resolution.