コラーゲンモデルペプチド(Pro-Pro-Gly)₁₀・(Pro-HydPro-Gly)₁₀の結晶学的研究

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Collagen constitute the major structural proteins in the extracellular matrix providing mechanical strength and structural integrity to the various connective tissues in the body. Collagen is a right-handed super helix consisting of three left-handed helical strands running in parallel. Each strand consists of a general (X-Y-Gly) repeat with X and Y mostly occupied by imino acids. The crystal structure of collagen model peptide, (Pro-Pro-Gly)₁₀ was solved by the method of fibre diffraction analysis, which showed the left-handed 7/2-helical structure consisting of three peptide chains with right-handed 7/1-helix (Okuyama model). Single crystal analysis of the triple helical molecules namely (Pro-Pro-Gly)₁₀ and (Pro-HydPro-Gly)₁₀ has been attempted with an aim to clarify the overall structure and the kinds of interaction between the chains.

Crystals of collagen-model peptides, (Pro-Pro-Gly)₁₀ and (Pro-HydPro-Gly)₁₀ were grown by hanging drop method. Diffraction quality crystals of (Pro-Pro-Gly)₁₀ were got from drop consisting of 4mg/ml (Pro-Pro-Gly)₁₀, 7.9% acetic acid and 8% PEG 400, while the reservoir contained 16% PEG 400, maintained at 11°C. X-ray diffraction data were collected by 4-circle diffractometer and analysed by the method usually used for protein single crystals. Crystals of (Pro-HydPro-Gly)₁₀ were obtained from drop consisting of 4.5 mg/ml (Pro-HydPro-Gly)₁₀, 10% acetic acid and 11% PEG 200, while the reservoir contained 22% PEG 200, maintained at 11°C. Diffraction data for is yet to be collected.

The crystals of (Pro-Pro-Gly)₁₀ belonged to an orthorhombic system with space group $P2_12_12_1$ and the cell parameters were found to be $a=26.87$, $b=26.34$ and $c=100.99$ Å. A total of 11282 unique reflections were measured up to a resolution of 1.5 Å. (Pro-Pro-Gly)₁₀ is being solved by the molecular replacement method with Okuyama model as the probe structure. The molecule has been oriented and translated in the unit cell and the refinement of the structure is in progress. We hope to present the structural analysis in detail.

The crystals of (Pro-HydPro-Gly)₁₀ belonged to a monoclinic system with space group $P2_1$ and the cell parameters were found to be $a=14.04$, $b=26.60$, $c=100.30$ Å, $\beta=106.89^\circ$.