Bovine rhodopsin p22121 crystal

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http://homepage.mac.com/whitby/

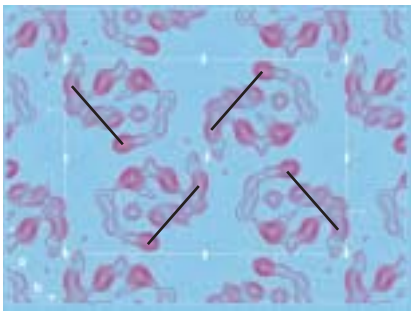
http://web.me.com/whitby/Octahedron/Welcome.html

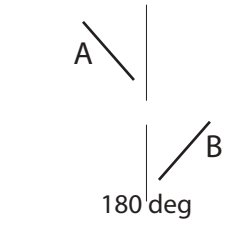
References

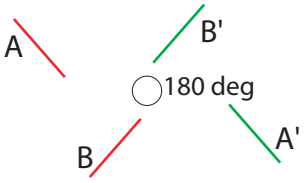
1. Krebs, A., Villa, C., Edwards, P.C., & Schertler, G.F. (1998). Characterisation of an improved two-dimensional p22121 crystal from bovine rhodopsin. J Mol Biol, 282 (5), 991-1003.
2. Octahedron1stEd.pdf
3. rhdopsn.pdf
4. 32chain.pdf
5. http://www2.mrc-lmb.cam.ac.uk/groups/GS/Poster/posterimages/fig4.gif

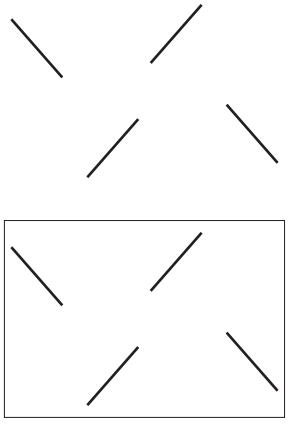
Introduction

The projection density map of the p22121 crystal of bovine rhodopsin [Ref. 1] provides an orientation for the identical octahedra which make up the atoms of the protein molecules.



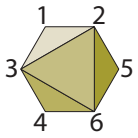


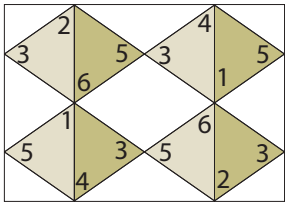


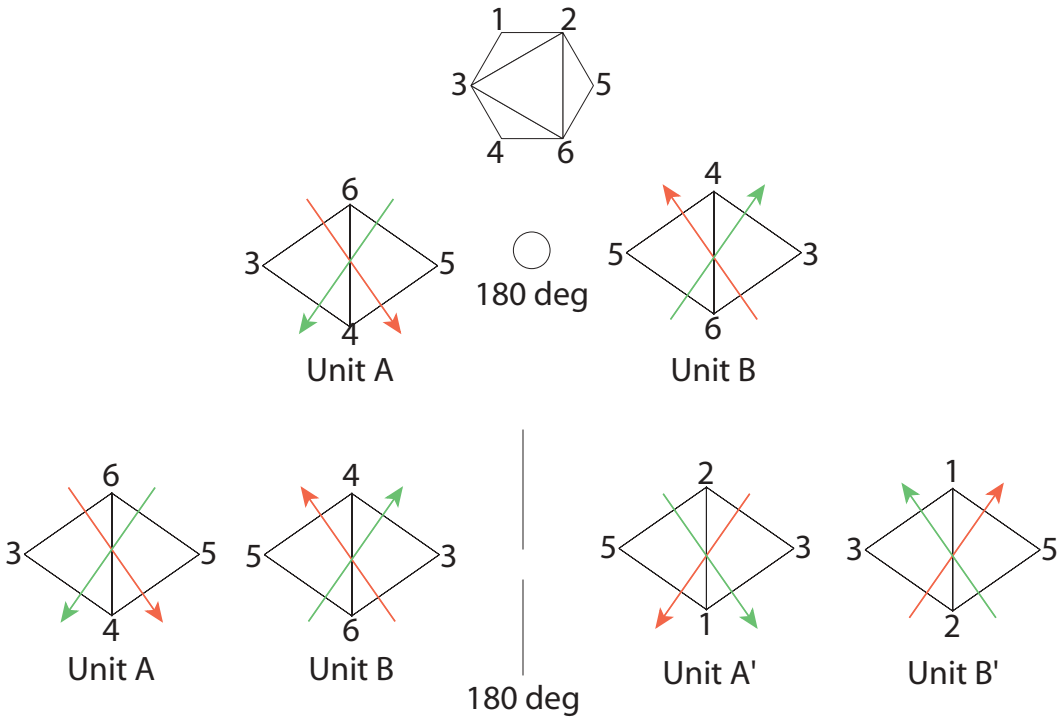


Bovine rhodopsin crystal

The <projection density map of bovine rhodopsin p22121 crystals to 5 A> [Refs. 1 & 5] is shown with permission at the top left of the figure. Lines have been used to connect the same pair of features on each of the four molecular projections of the delineated unit cell. The relationships between the orientations of the molecules are shown in the two rotational diagrams just below the density map. At the bottom left, the group of lines is shown first separately and then within the rectangular confines of the unit cell. The ratio of the length to the width of this rectangle is approximately $\sqrt{2}$. This ratio is the same as the ratio of the vertexial diameter of an octahedron to its edgial diameter. The rotational relationships between the molecules together with the diameter ratio of the unit cell suggests that each of the identical octahedra which compose the atoms of the molecules is oriented as shown in the four edgial views enclosed within the unit cell rectangle at bottom right. A facial view of a regular octahedron with its vertexes labeled for reference is shown just above it. Each edgial view represents the orientation of one of the four molecules. The one on the upper left is molecule *A*, below it is molecule *B*, and the two to the right are molecules *B*' and *A*'. Each of the views here is perpendicular to the plane of the crystal.







Bovine rhodopsin crystal–alpha-helical axes

The figure shows the relationships between the alpha helical axes of identical units whose relative orientations are identical to the molecules of the bovine rhodopsin crystal. The view here is parallel to the crystalline plane and at right angles to that of the previous figure. The axes of those alpha helixes which are not parallel to the crystal plane are represented by the green and red arrows. Each of these axes makes an angle of $\operatorname{atan}\sqrt{2}$ with the plane of the crystal.

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