Crystal Structure Analysis of Valyl-tRNA Synthetase in a complex with $tRNA^{Val}$ (II)

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***T. thermophilus* valyl-tRNA synthetase complexed with tRNA**

Valyl-tRNA synthetase (ValRS) specifically attaches L-valine to $tRNA^{Val}$. ValRS misacylates minimally-distinct L-Thr, but hydrolytically edits its own misproducts upon binding with $tRNA^{Val}$. To elucidate the mechanism of editing activation by tRNA, we crystallized ternary complex of*T. thermophilus* ValRS, $tRNA^{Val}$, and Val-AMP analogue($P4_22_12$ with $a=b$=410Å and c=82.8Å). We have already collected the native data up to 2.8Å resolution with completeness of 95.1% and R_{merge} of 10.2%. To solve the phase problem by multiple isomorphous replacement, we have searched about 20 heavy-atom derivatives. Among them, we found that K2PtCl4 derivative gave a clear Patterson peak in the in-labo experiment by the use of Raxis-IV. So, in this beam time, we collected the data of the platinum derivative. We collected the diffraction data with oscillation angle of 0.3° (camera distance=500 mm at Raxis-IV). Within the beam time, we collected 200 frames (60°) with exposure time of 4 min. The highest resolution of the diffraction data was 2.5 Å. We could process the derivative data up to 2.8 Å resolution with completeness of 88.8% and R_{merge} of 8.4%. The isomorphous difference from the native data is 11%, and the Patterson map gave clear peaks (Fig. 1). Phase calculation is now in progress.

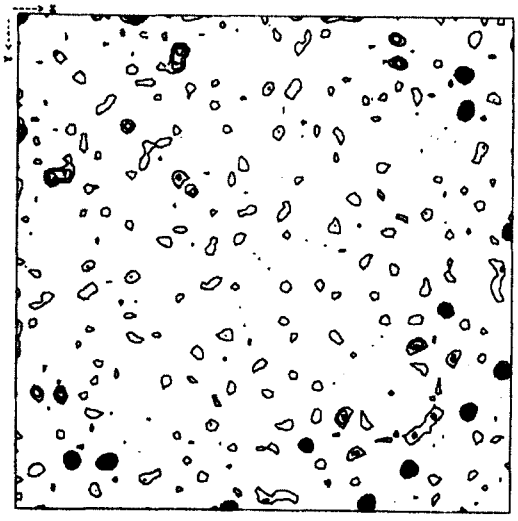

Fig. 1 Patterson map of K2PtCl4 derivative of the ValRS ternary complex