

**Experiment title:**Threonyl-tRNA synthetase from *E.coli* cocrystallized with its cognate tRNA**Experiment number:**

LS-949

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Report:

Threonyl-tRNA synthetase (ThrRS) is a class-II aminoacyl tRNA synthetase. The *E. coli* enzyme has been cocrystallized with its cognate tRNA and with the substrate ATP, which is necessary for the first step of the aminoacylation to proceed. Apart from its capacity to aminoacylate the isoacceptor tRNA^{Thr}s, the *E. coli* ThrRS has an interesting and very unusual property : it is able to bind its own messenger RNA, instead of the tRNA, and in this way to regulate its own synthesis.

Until recently, among different crystal forms successively encountered for this complex, only one was diffracting to a resolution better than 3 Å, but this was characterized by a very large *c* parameter (485 Å). Apart from the difficulties in separating the diffraction spots and processing the data, this made any work with a laboratory source impossible, and thus hampered the search of heavy-atom derivatives. Fortunately a more convenient crystal form was later obtained, which diffracts to 2.8 Å, and has cell parameters of *a* = 163 Å, *c* = 128 Å (space group P3₁21 or P3₂21)

A diffraction data set was collected on this new crystal form. The data were processed with denzo. They are complete to 98 %, with an R-factor of 7 %.

Attempts are presently made to phase by the MIR method, but there seem to be problems of isomorphism. MAD measurements could be a way of overcoming this difficulty.