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## Essentiality of conserved amino acid residues in $\beta$ -lactamase

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## Stellingen

Behorend bij het proefschrift

### Essentiality of conserved amino acid residues in $\beta$ -lactamase

1. Conserved residues of the first shell form a catalytic center of an enzyme, conserved residues of the second shell establish a functional core of the protein and the third-shell residues ensure the overall fold.

*Chapter 2*

2. The functional enzyme, especially around the active site, consists of a complex and extensive web of interactions.

*Chapter 2*

3. The N214-D233-D246 triad in BlaC is responsible for the positioning of active site residue Thr216 and Arg220 and substitutions in this motif increase dynamics and lead to displacements of these substrate-binding residues.

*Chapter 3*

4. Some highly conserved residues are not essential for function in all protein family members.

*Chapter 5*

5. Acquiring new traits is evolutionary easier than perfecting the existing ones.

6. Robustness and evolvability may appear to be contradictory traits, but evolvability is heavily dependent on robustness.

7. Both evolutionary robustness and evolvability benefit from limiting the number of essential residues

8. Studying protein evolution is like solving a 5000-piece puzzle without knowing the end result: you spend most of the time searching for a piece, and it feels incredibly satisfying to put it in place, even though it only makes a tiny progress.

9. Weird is just an alternative concept of normal.

10. Everyday struggles make science more exciting.