

DOCTORAL CANDIDATE: Ingvild Gudim
DEGREE: Philosophiae Doctor
FACULTY: Faculty of Mathematics and Natural Sciences
DEPARTMENT: Institute for biosciences
AREA OF EXPERTISE: Biochemistry
SUPERVISORS: Hans-Petter Hersleth, Morten Sørлие, Marta Hammerstad
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DISSERTATION TITLE: *Characterisation of flavodoxins and ferredoxin/flavodoxin reductases from Bacillus cereus and their interactions*

In this doctoral work, Ingvild Gudim and co-workers have studied a network of proteins that transfer electrons to each other. They have shown that even if these proteins are structurally similar and have the same function, they still transfer electrons with hugely different efficiencies. This knowledge is valuable in industrial biotechnology, where proteins are often used to catalyse reactions, and finding the most efficient protein for this is important.

This particular protein network is used in bacteria to activate an indispensable protein – ribonucleotide reductase – the only protein that produces DNA building blocks. This protein exists in both bacteria and humans, but in slightly different forms. Gudim and colleagues have established that some of the proteins in the network activate ribonucleotide reductase, whereas others don't. This could be used in drug development – if the bacterial form can be deactivated without inhibiting the human form one has a novel antimicrobial drug.

Finally, upon solving the three dimensional structure of one of the proteins in the network, Gudim and co-workers made a surprising find. They discovered that an important amino acid in the protein was very flexible, and that this flexibility is important in the regulation of the properties of the protein. This was first proposed over 20 years ago, but no one has managed to prove it until now.