

GBM Lecture + Masterpreisverleihung

Dienstag, 08. Dezember 2020, 13.00 Uhr

via Zoom (Meeting-ID: 872 2888 2170; Passwort: 694822)



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Photoactivatable Inteins and Nanobodies: New Tools for Protein Control

Inteins remove themselves out of a precursor protein in a process termed protein splicing. The flanking sequences, termed exteins, are ligated to give the mature host protein. Furthermore, in protein trans-splicing, the intein domain is split into two fragments and the extein sequences are ligated from two separate precursor proteins. The unique structural changes associated with protein splicing and protein trans-splicing have inspired the development of many protein tools ranging from protein purification, protein biotechnology and protein chemical modification to synthetic biology.

We have identified several new split inteins and further customized them by protein engineering approaches, in particular for applications in protein chemical modification^[1] and light-control of protein splicing^[2] (Figure 1). In this talk, I will underline the rationales behind the design of photoactivatable inteins and discuss potential applications.

On a similar note, we rendered nanobodies (single-domain antibody fragments) photoactivatable to have light controlled binding.^[3] Design and applications of the so-called photobodies will be briefly presented.

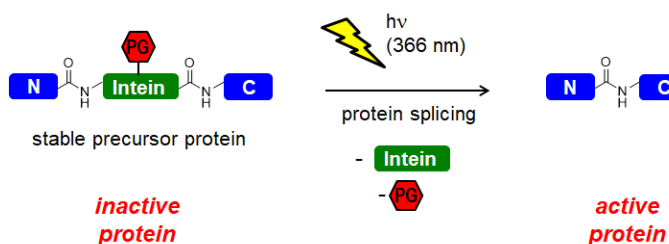


Figure 1. Scheme of photoactivated protein splicing. PG = photo-labile protecting group.

References

- [1] a) I. V. Thiel, G. Volkmann, S. Pietrovski, H. D. Mootz, *Angew Chem Int Ed Engl* **2014**, *53*, 1306-1310; b) M. Bhagwati, T. M. E. Terhorst, F. Fusser, S. Hoffmann, T. Pasch, S. Pietrovski, H. D. Mootz, *Proc Natl Acad Sci U S A* **2019**, *116*, 22164-22172; c) M. Bhagwati, S. Hoffmann, K. S. Höffgen, J. Piehler, K. Busch, H. D. Mootz, *Angew Chem Int Ed Engl* **2020**, *59*, 21007-21015.
- [2] a) J. K. Böcker, K. Friedel, J. C. Matern, A. L. Bachmann, H. D. Mootz, *Angew Chem Int Ed Engl* **2015**, *54*, 2116-2120; b) J. K. Böcker, W. Dörner, H. D. Mootz, *Biol Chem* **2019**, *400*, 417-427; c) J. K. Böcker, W. Dörner, H. D. Mootz, *Chem Commun (Camb)* **2019**, *55*, 1287-1290.
- [3] a) B. Jedlitzke, Z. Yilmaz, W. Dörner, H. D. Mootz, *Angew Chem Int Ed Engl* **2020**, *59*, 1506-1510; b) B. Jedlitzke, H. D. Mootz, *ChemPhotoChem* **2020**, <https://doi.org/10.1002/cptc.202000163>.

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