P09

Dpb4 acts in two different protein complexes to promote resection of DNA double-strand breaks and checkpoint activation

Erika Casari[1], Elisa Gobbini[1], Marco Gnugnoli[1], Marco Mangiagalli[1], Michela Clerici[1], Maria Pia Longhese[1]

E-mail: erika.casari@unimib.it

[1] Department of Biotechnology and Biosciences, University of Milano-Bicocca, Milan, 20126, Italy

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Abstract: Budding yeast Dpb4 (POLE3/CHRAC17 in mammals) is a highly conserved histone fold protein that is shared by two protein complexes: the chromatin remodeler ISW2/hCHRAC[1] and the DNA polymerase ε (Pol ε) holoenzyme[2]. In *Saccharomyces cerevisiae*, Dpb4 forms histone-like dimers with Dls1 in the ISW2 complex and with Dpb3 in the Pol ε complex. We will present data that Dpb4 plays two functions in sensing and processing DNA double-strand breaks (DSBs). Dpb4 promotes histone removal and DSB resection by interacting with Dls1 to facilitate the association of the Isw2 ATPase to DSBs. Furthermore, it promotes checkpoint activation by interacting with Dpb3 to facilitate the association of the checkpoint protein Rad9 to DSBs. Persistence of both Isw2 and Rad9 at DSBs is enhanced by the A62S mutation that is located in the Dpb4 histone fold domain and increases Dpb4 association at DSBs. Thus, Dpb4 exerts two distinct functions at DSBs depending on its interactors.

References

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