

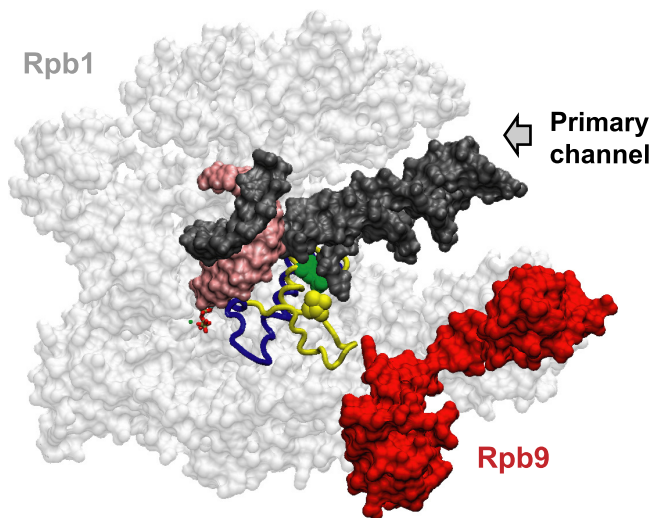
Papers of the Week

pol II: Now Twice as Faithful ♦

♦ See referenced article, *J. Biol. Chem.* 2009, **284**, 19601–19612

Rpb9 Subunit Controls Transcription Fidelity by Delaying NTP Sequestration in RNA Polymerase II

In both DNA transcription and replication, maintaining enzyme fidelity is perhaps the most crucial concern. The fidelity of RNA polymerase II (pol II), for example, has been shown to be mediated by the trigger loop (TL), a mobile structural element within the large Rpb1 subunit, during nucleotide isomerization. There is some evidence to suggest, though, that the peripheral and non-essential Rpb9 subunit may also be involved in transcription fidelity. In this Paper of the Week, Celine Walmacq and colleagues provide even more evidence by establishing a genetic interaction between Rpb9 and the TL. They demonstrate that Rpb9-deficient pol II results in a significant decrease in fidelity *in vitro*, whereas deletion of the *RPB9* gene in yeast shows synthetic lethality when combined with the low fidelity *rpb1-E1103G* mutation. Further analysis revealed that *RPB9* deletion promotes the sequestration of NTPs in the polymerase active center prior to the formation of phosphodiester bonds, leading Walmacq and colleagues to suggest that the Rpb9 subunit controls transcription fidelity by delaying the closure of the TL on the incoming NTP.



Structure of *Saccharomyces cerevisiae* pol II showing how *RPB9* might stabilize the open conformation of the trigger loop (yellow, closed is blue) to help ensure proper transcription fidelity (the DNA backbone and RNA are shown in dark gray and pink, respectively).

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