

GENETICS

# UNDO BUTTON

11.02.2007

â€œDay 7 of Just Science Weekâ€œ

Wouldn't it be nice to have also a CTRL+Z action in the laboratory? For example when you have confused pellet and supernatant during pipetting? Biology at least seems to have some kind of undo action – see a series of nice papers in [Cell Research](#). It's not about [demethylation of the parental genome](#), it's about stopping and rebuilding the zygotic transcription program during the first meiotic division (that creates the haploid set of chromosomes that will be passed to the progeny).

At present there are 3 hypothesis around, how transcription is being silenced – simply by the speed up of the cell cycle, by active inhibitory (transcription) factors, or the passive deficiency of critical factors. Sun et al. now show that there is a genome-wide dissociation of chromatin factors leading to a naive state in preparing the new life cycle. Critical transcription factors and regulators remain separated for a prolonged time period and become reassociated only after pronuclear formation. It is still unclear if the second or third hypothesis fits best this process as the absence of even 1 essential transcription factor can inactivate transcription. Deletion of TBP for example will inactivate both PolII and PolIII; TBP is found to dissociate among other factors.

Only a couple of structural proteins remain bound persistently (HP1alpha, HP1beta, TOPIIalpha and Ach4, with acetylated histone 4 as a positive control. Of course methyl-binding proteins, topoisomerases, and other heterochromatin binding stuff is required for normal chromatin structure where it would be nice to know which of these remain bound during this reprogramming step. So, this looks more like a reinstalling the OS than a simple undo action.

Thanks and good bye to all guest readers of the science week.

