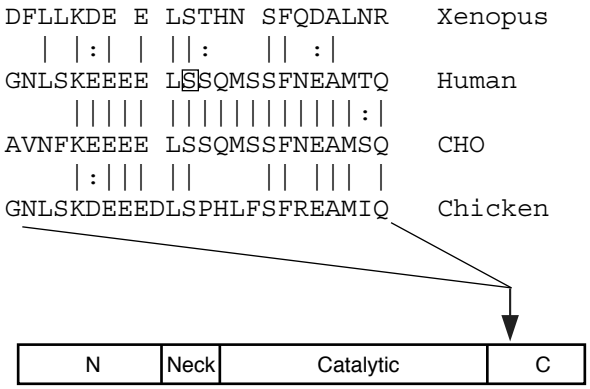
**Supplementary Figure Legends**

**Fig. S1. Conservation of the S628 phosphorylation site.** Sequences around the S628 phosphorylated amino acid (boxed in the human sequence) are shown. Identical (l) and similar (:) amino acids between species are indicated. Although the sequence around S628 is well conserved among vertebrate species, the extended sequences are not well conserved. Also shown is a linear representation of MCAK indicating the positions of functional domains (adapted from mapping studies described in Ems-McClung et al., 2007).

**Fig. S2. Time-dependent accumulation of degradation-impaired forms of MCAK.** Transfected cells were analyzed by Western blots using antibodies to FLAG or to MCAK (for the GFP-tagged MCAK) at varying times after removing tetracycline to induce the expression of the indicated cDNAs. An antibody to actin was included as a loading control. WT, wild-type FLAG-MCAK; DD, S628D/S629D mutant of FLAG-MCAK; AA, S628A/S629A mutant of FLAG-MCAK; GFP-WT, wild-type MCAK containing GFP at the N-terminus. Note that the WT and DD expressing cells maintain consistent levels of MCAK over time whereas the degradation defective forms AA and GFP-WT accumulate with time.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GNLSKEEEE LSSQMSSFNEAMTQ Human
AVNFKEEEE LSSQMSSFNEAMSQ CHO
GNLSKDEEEDLSPHLFSFREAMIQ Chicken
N
Neck
Catalytic
C

Figure S1

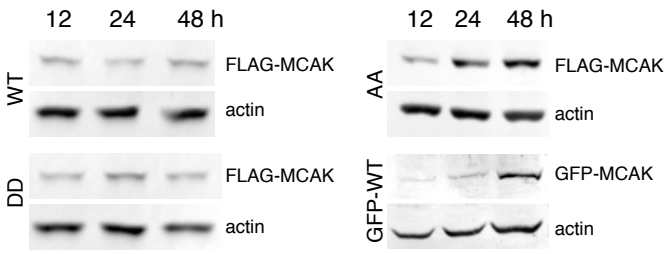
12
24
48 h
WT
FLAG-MCAK
actin
DD
FLAG-MCAK
actin
12
24
48 h
AA
FLAG-MCAK
actin
GFP-WT
GFP-MCAK
actin

Figure S2