



Fig. S7. Examination of tyrosyl phosphatase activity of PP2A associated with PTPA-mediated activation. (A) Increase of phosphatase activity toward pNPP, a chemical mimic of phospho-Tyr, associated with activation of PP2A(Mn)i-PTPA by increasing concentration of Mg<sup>2+</sup> and Mn<sup>2+</sup> in the presence and absence of ATP. PP2Ac was purified in the presence of Mn<sup>2+</sup> prior to inactivation by PPI. The ability of Mg<sup>2+</sup> to increase tyrosyl phosphatase activity depends on the presence of ATP, while Mn<sup>2+</sup> could increase this activity independent of ATP. The metal ion-specific ATP-dependence for increase of tyrosyl phosphatase activity is similar to activation of phosphoserine/threonine phosphatase activity (Figure 4C). (B) Summary of enzyme kinetics of PP2A-PTPA activated by low and high concentrations of Mg<sup>2+</sup>/ATP or Mn<sup>2+</sup>/ATP. PP2Ai-PTPA was generated as in Figure 4C. Briefly, the PP2Ac in the PP2Ai-PTPA had been exchanged for Zn<sup>2+</sup> before inactivation by PPI. The enzyme activated by Mg<sup>2+</sup>/ATP gave

different level of specificity depending on the concentration of  $Mg^{2+}/ATP$ . The complex activated by  $Mn^{2+}/ATP$  gave lower specificity regardless of free metal concentration. Experiments were performed in triplicate and repeated three times; representative results are shown in mean  $\pm$  SEM.