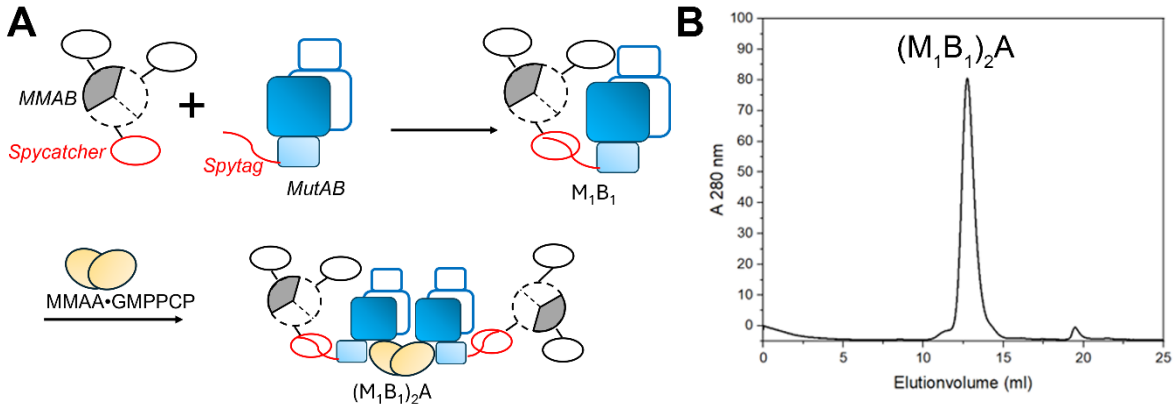

Figure 1: Formation of a covalent adduct between MutAB and MMAB and complex with MMAA. (**A**) MutAB containing the Spy-tag at the C-terminus of the large subunit forms a covalent iso-peptide bond with the spycatcher domain fused to the N-terminus of MMAB resulting in an M_1B_1 complex. Addition of MMAA-GMPPCP results in formation of a $(M_1B_1)_2A$ complex. (**B**) Analytical gel filtration chromatogram of the purified $(M_1B_1)_2A$ complex.

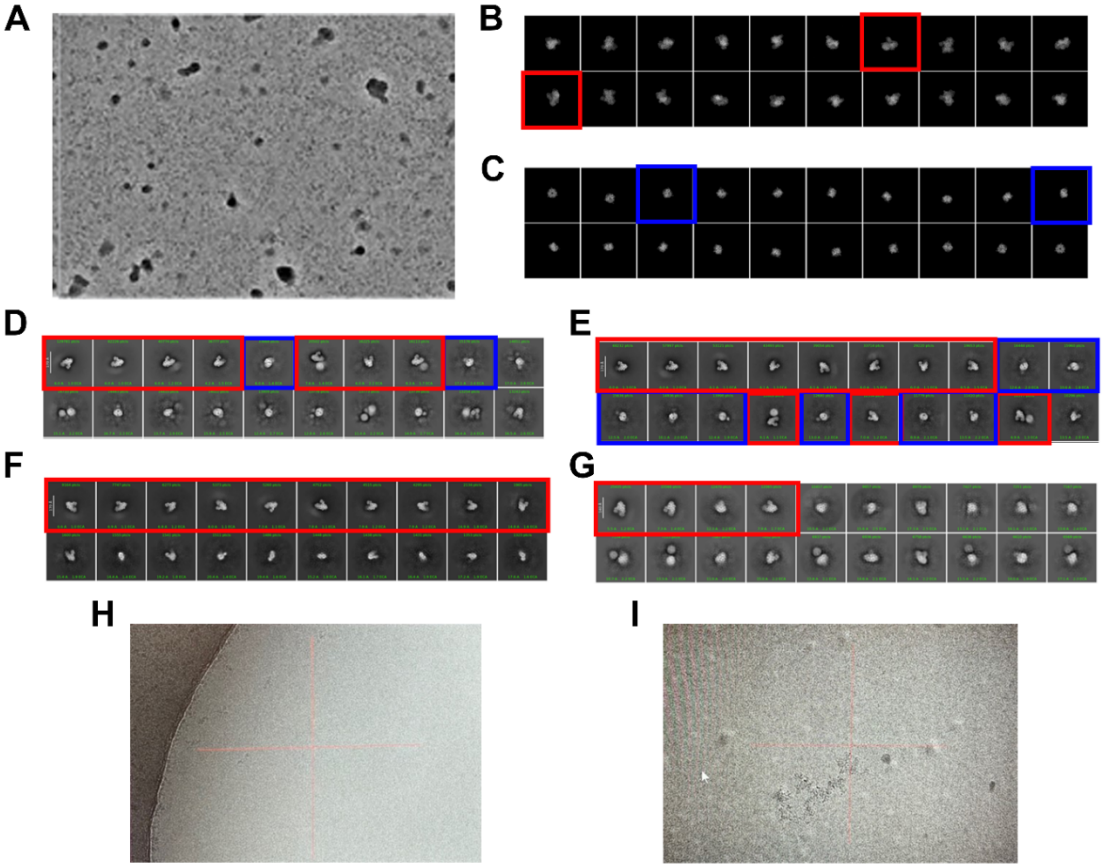

Figure 2. **Structural characterization of $(M_1B_1)_2A$.** (**A**) Representative micrograph of $(M_1B_1)_2A$. (**B,C**) Theoretical 2D projections of MutAB (B) and MMAB (C). Views observed in the experimental data are outlined in red (MutAB) and blue (MMAB), respectively. (**D**) Experimental 2D classes of apo-$(M_1B_1)_2A$. (**E-G**) 2D classes of the $(M_1B_1)_2A$ complex with AdoCbl and ATP. The grids were prepared with lauryl maltose neopentyl glycol (E), late embryogenesis abundant (LEA) protein (F), or graphene oxide coated grids (G). Views containing MutAB and MMAB are outlined in red and blue, respectively. (**H**) Representative micrograph of grids frozen with fos-choline-8. Particles are strongly excluded from the hole and only very few were visible at the edge. (**I**) Representative micrograph of grids frozen with CHAPS. Only large chunks of aggregates are visible.