Figure S1. Fluorescence imaging (a) and quantification (b) of Rhodamine labeled PTLDH in mice (n = 3 per group).

Figure S2. Accumulative release profile of OVA protein from PTLDH (n = 3 per group).

Figure S3. *In vivo* DCs maturation induced by the treatment of AlgMA alone and PTLDH alone. Flow cytometry analysis (a) and statistic (b) of $CD45^+CD11c^+MHCII^+$ DCs. Flow cytometry analysis (c) and statistic (d) of $CD80^+CD86^+$ DCs in $CD11c^+MHCII^+$ cells (n = 4 per group). $*P< 0.05$, $**P< 0.01$.

Figure S4. *In vivo* inhibition of tumor recurrence in 7 days after the treatment. Representative flow cytometry analysis of matured DCs (a), $CD8^+$ (b) and $CD4^+$ T cells (c) after the treatment of different therapeutics. The statistics of matured DCs (d), $CD8^+$ T (e) and $CD4^+$ T cells (f). I: PBS group, II: AlgMA group, III: PTLDH group, IV: PTLDH/GM-CSF group, V: PTLDH/GM-CSF/αPD-L1 group, VI: αPD-L1 group (n = 4 per group). $**P< 0.01$, $***P< 0.001$.

Figure S5. $CD8^+$ T cells proliferation (a) and TNFα secretion (b) in the spleen of mice after treatment. I: PBS group, II: AlgMA group, V: PTLDH/GM-CSF/αPD-L1 group (n = 4 per group). $****P<0.0001$.

Figure S6. Hematology evaluations. (a) Liver toxicity evaluated using values of alanine aminotransferase (ALT), aspartate aminotransferase (AST) and alkaline phosphatase (ALP) in the serum. (b) Kidney toxicity evaluated using creatinine (CREA) and creatine kinase (CK) in the serum (n = 3 per group) *n.s.* = no significance.