**SUPPLEMENTARY FIGURE LEGENDS**

**Supplementary Figure S1. Effect of *H. pylori* infection.** (A) Heatmap showing increased CDX1 expression in gastric epithelia of *Rhesus macaque* infected with *H. pylori*. Protein expression of CD44 and Slug increased as well, suggesting induction of stemness and increased epithelial mesenchymal transition potential. (B) HFE 145 cells infected with *H. pylori* WT 60190 showed scattering and cellular elongation suggestive of an invasive phenotype. Arrows indicate representative morphological changes. (C) HFE 145 cells infected with WT *H. pylori* showed increased proliferative activity compared to cells infected with the mutant strain. (D) Immunofluorescence assay clearly visualized increased CDX1 expression upon infected with WT *H. pylori*. (E) The expression of NANOG increased significantly after WT *H. pylori* infection while there was no significant increased with mutant *H. pylori* infection. (\*P<0.05 vs. control, \*\*P<0.01 vs. control, and \*\*\*P<0.001 vs. control)

**Supplementary Figure S2. Suppression of CDX1 in gastric cancer cell lines.** (A)Suppression of CDX1 in AGS and MKN28 cells did not significantly influence the cell proliferation. (B) CDX1 knockdown suppressed the invasion/migration activity. (\*P<0.05 vs. control, \*\*P<0.01 vs. control, and \*\*\*P<0.001 vs. control)

**Supplementary Figure S3. Expression of CDX1 and stemness markers.** (A)CDX1- overexpressing spheroids had an increased CD44+ cell subpopulation. (B and C) Expression of stemness markers was more prominent in HFE 145, AGS, and MKN28 spheroids than cells cultured in monolayers.

**Supplementary Figure S4. Effect of metformin on CDX1-expressing cells.** (A) Metformin suppressed expression of CDX1 and intestinal marker SI, (B) inhibited invasion/migration activity, and (C) decreased expression of EMT-associated proteins. (D) Invasion/migration activity was more prominent in spheroids compared to AGS and MKN28 cells cultured in monolayers. (\*P<0.05 vs. control, \*\*P<0.01 vs. control, and \*\*\*P<0.001 vs. control)

**Supplementary Figure S5. CDX1 suppression and the effect of chemotherapeutic agents.** (A) AGS spheroids were more chemo-resistant than monolayer AGS cells. (B) No significant change in the weights of xenograft animals with the use of shCDX1 was observed at day 15 compared to day 1. (\*P<0.05 vs. control, \*\*P<0.01 vs. control, and \*\*\*P<0.001 vs. control)