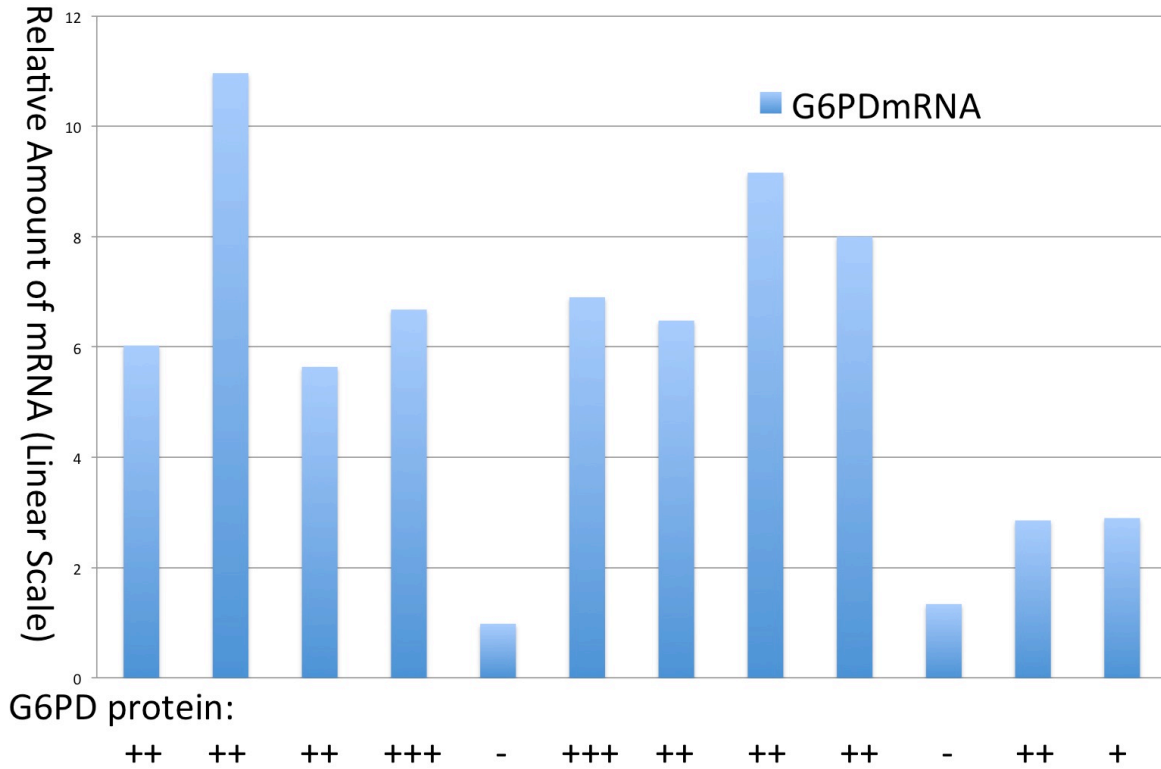


Supplementary Fig. 1

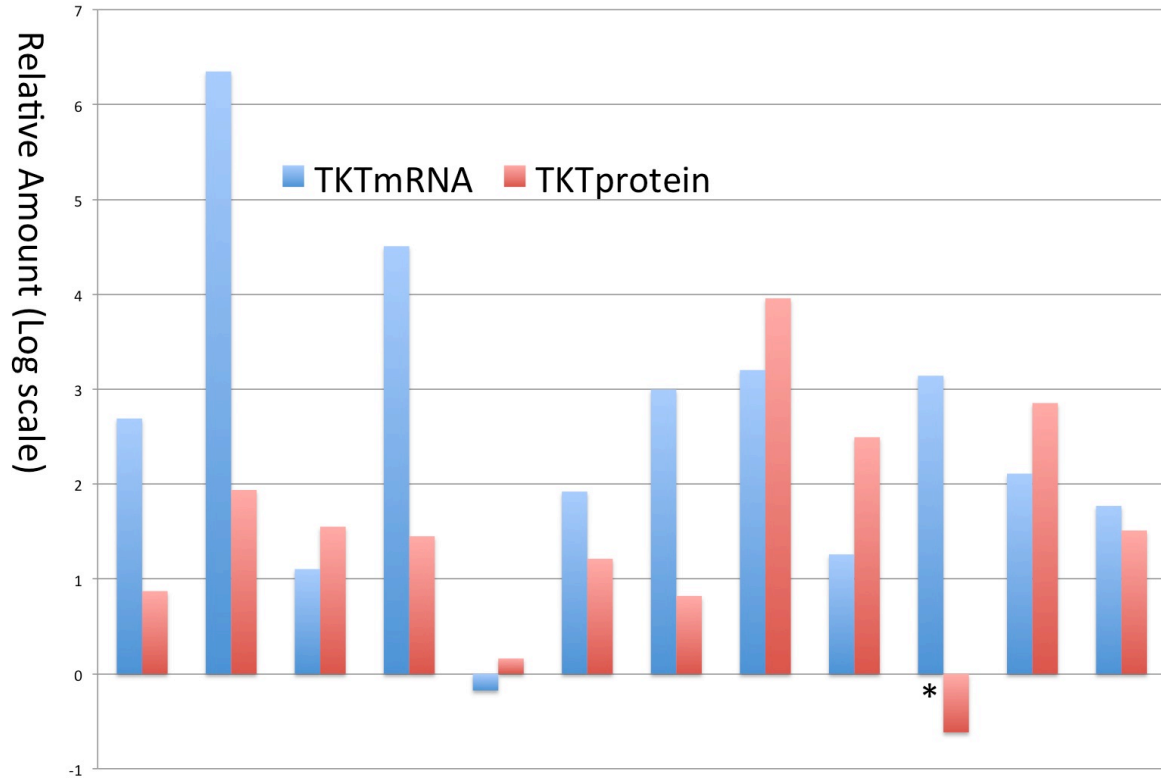


Supplementary Fig. 1

***G6PD* mRNA was increased in tumor, consistent with the *G6PD* protein synthesis.**

G6PD mRNA was quantified as the ratio between tumor and non-tumor counterpart. Note that the presence of *G6PD* protein in tumor tissue (represented as +, ++ or +++) was highly correlated with the up-regulation of *G6PD* gene.

Supplementary Fig. 2

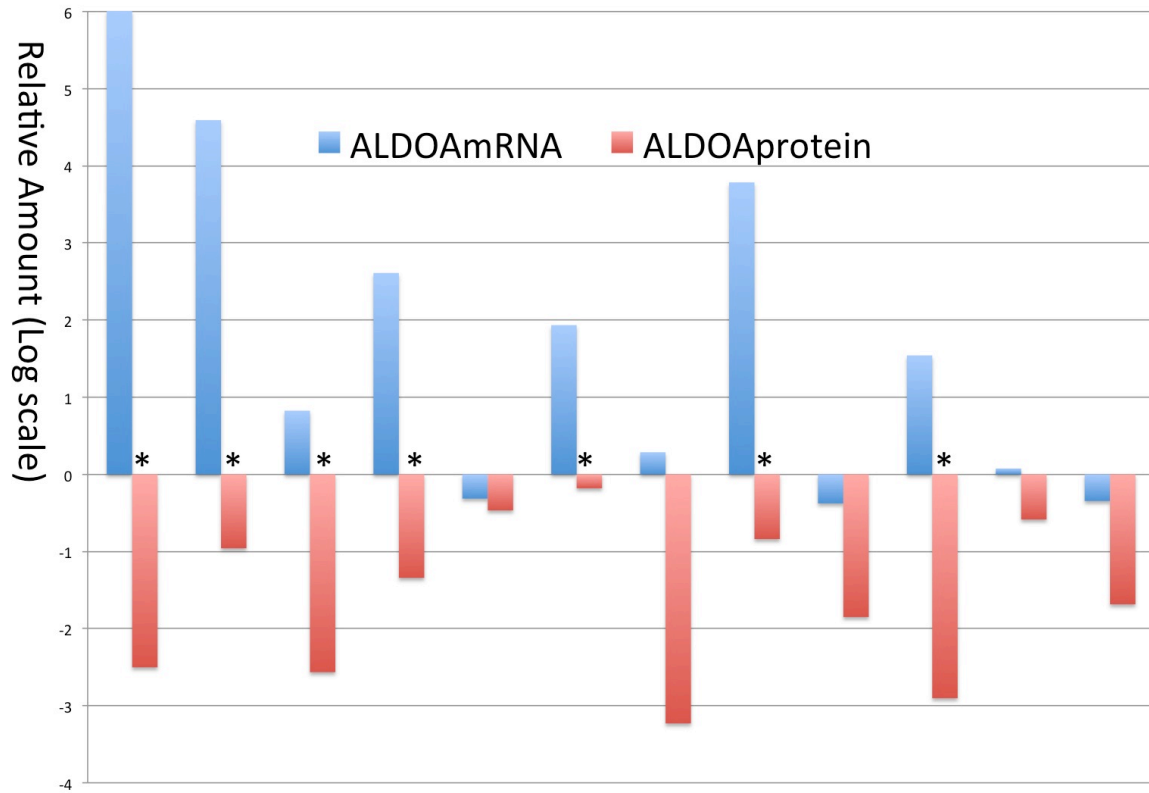


Supplementary Fig. 2

***TKT* mRNA was increased in tumor, consistent with the increase of TKT protein.**

TKT mRNA was quantified as the ratio between tumor and non-tumor counterpart. Note that the increased synthesis of TKT protein was fairly correlated with the up-regulation of *TKT* gene. Asterisk denotes the patient who displayed inverse alteration between mRNA and protein.

Supplementary Fig. 3

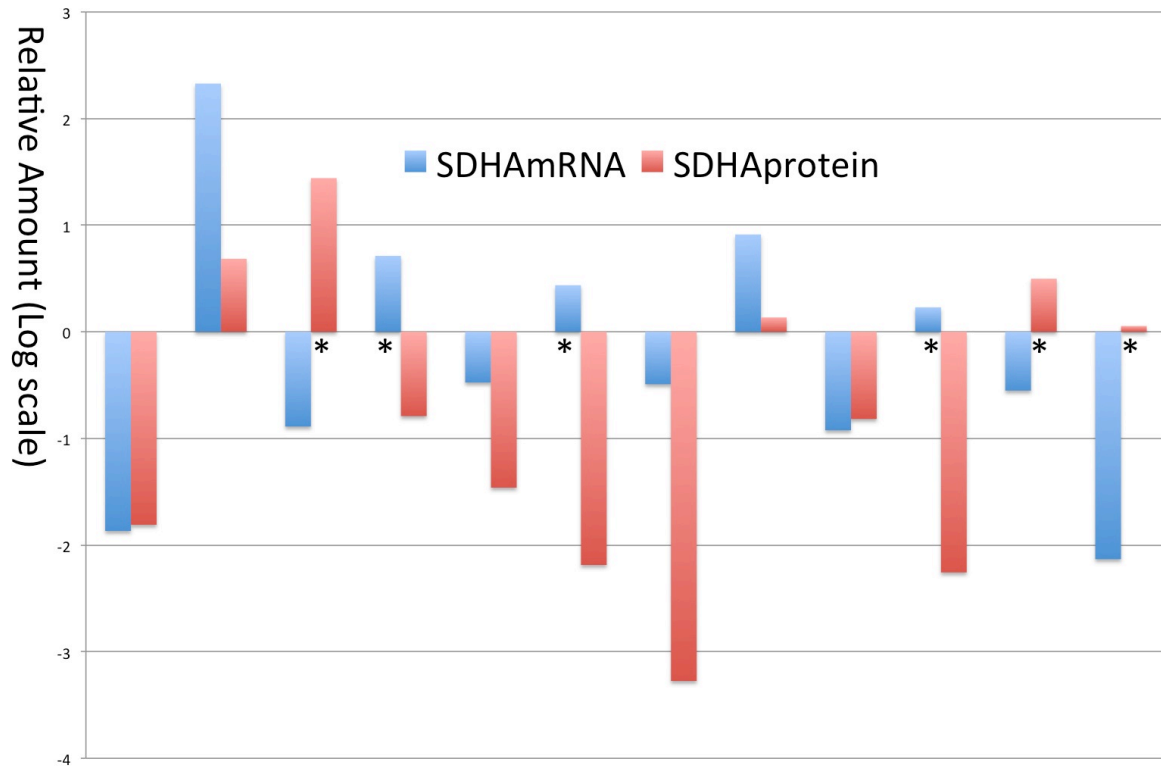


Supplementary Fig. 3

Alterations of *ALDOA* mRNA and *ALDOA* protein were inconsistent.

ALDOA mRNA was quantified as the ratio between tumor and non-tumor counterpart. Asterisks denote the patients who displayed inverse alteration between mRNA and protein.

Supplementary Fig. 4

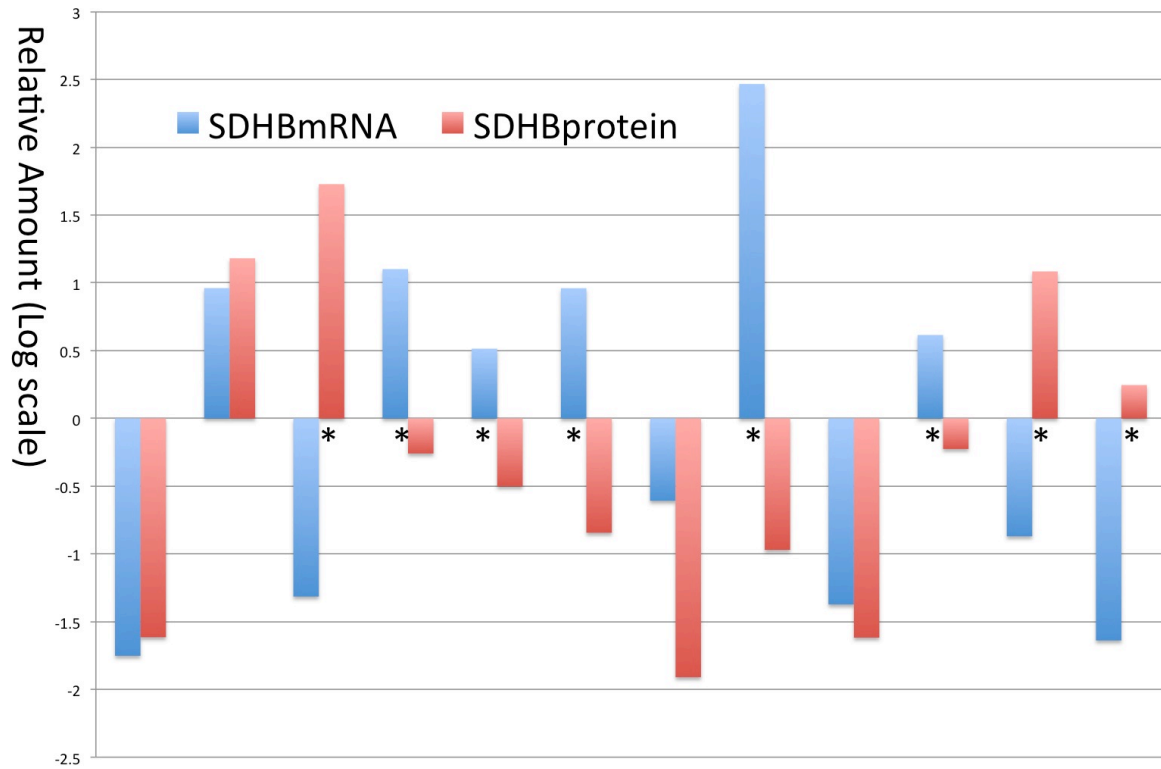


Supplementary Fig. 4

Alterations of *SDHA* mRNA and *SDHA* protein were inconsistent.

SDHA mRNA was quantified as the ratio between tumor and non-tumor counterpart. Asterisks denote the patients who displayed inverse alteration between mRNA and protein.

Supplementary Fig. 5

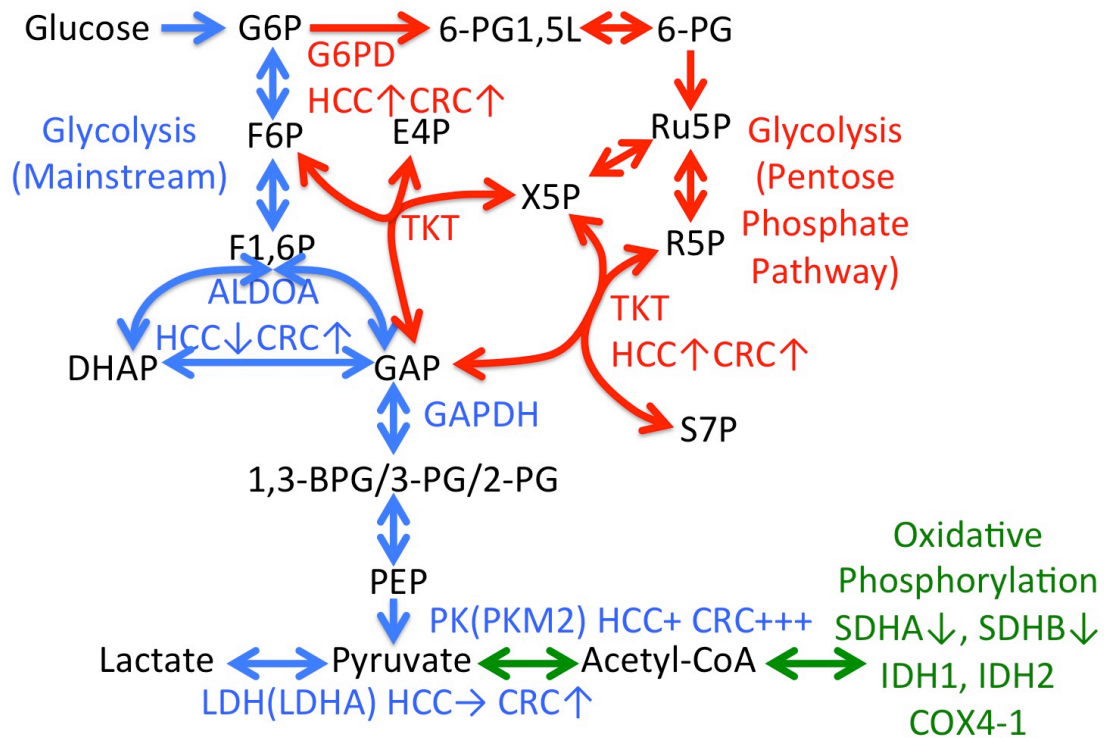


Supplementary Fig. 5

Alterations of *SDHB* mRNA and SDHB protein were inconsistent.

SDHB mRNA was quantified as the ratio between tumor and non-tumor counterpart. Asterisks denote the patients who displayed inverse alteration between mRNA and protein.

Supplementary Fig. 6



Supplementary Fig. 6

Schematic diagram of Warburg effects investigated in this study

Glucose metabolism is broadly classified into three branches, mainstream glycolysis (blue), PPP (red) and oxidative phosphorylation (green). Warburg effect is known as cancer's preference for glycolysis rather than oxidative phosphorylation. We confirmed that the enzymes for oxidative phosphorylation (SDHA or SDHB) were reduced in Japanese HCC patients. However, classical hypoxia response such as PKM2 activation or augmented synthesis of ALDOA and LDHA was rarely observed. In contrast, we are currently confirming that colorectal carcinomas (CRCs) displayed intensive hypoxia response and fit to the Warburg's theory. Common feature between HCCs and CRCs, however, was augmented synthesis of PPP enzymes and this could be a universal hallmark of gastrointestinal carcinogenesis.