# Glycolysis enzymatic inhibitors for cancer treatment

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## Objectives

- Review the role of glycolysis in cancer development.
- Review the use of glycolysis inhibitors drugs as a cancer treatment.

## Warburg effect

Cancer cells metabolism is characterized by an overexpression of glycolytic pathways and enzymes (Fig. 1). Anaerobic glycolysis produces less ATP than oxidative phosphorylation (2 vs 36 ATP) but allows cancer cells to consume glucose faster than immune system and stromatic cells, increases carbon influx to satisfy their biosynthetic demands and acidifies tumour microenviroment.

## Glycolytic enzyme inhibitors

Due to tumor cells dependence on glycolysis, inhibition of glycolytic enzymes may offer a treatment option for cancer.

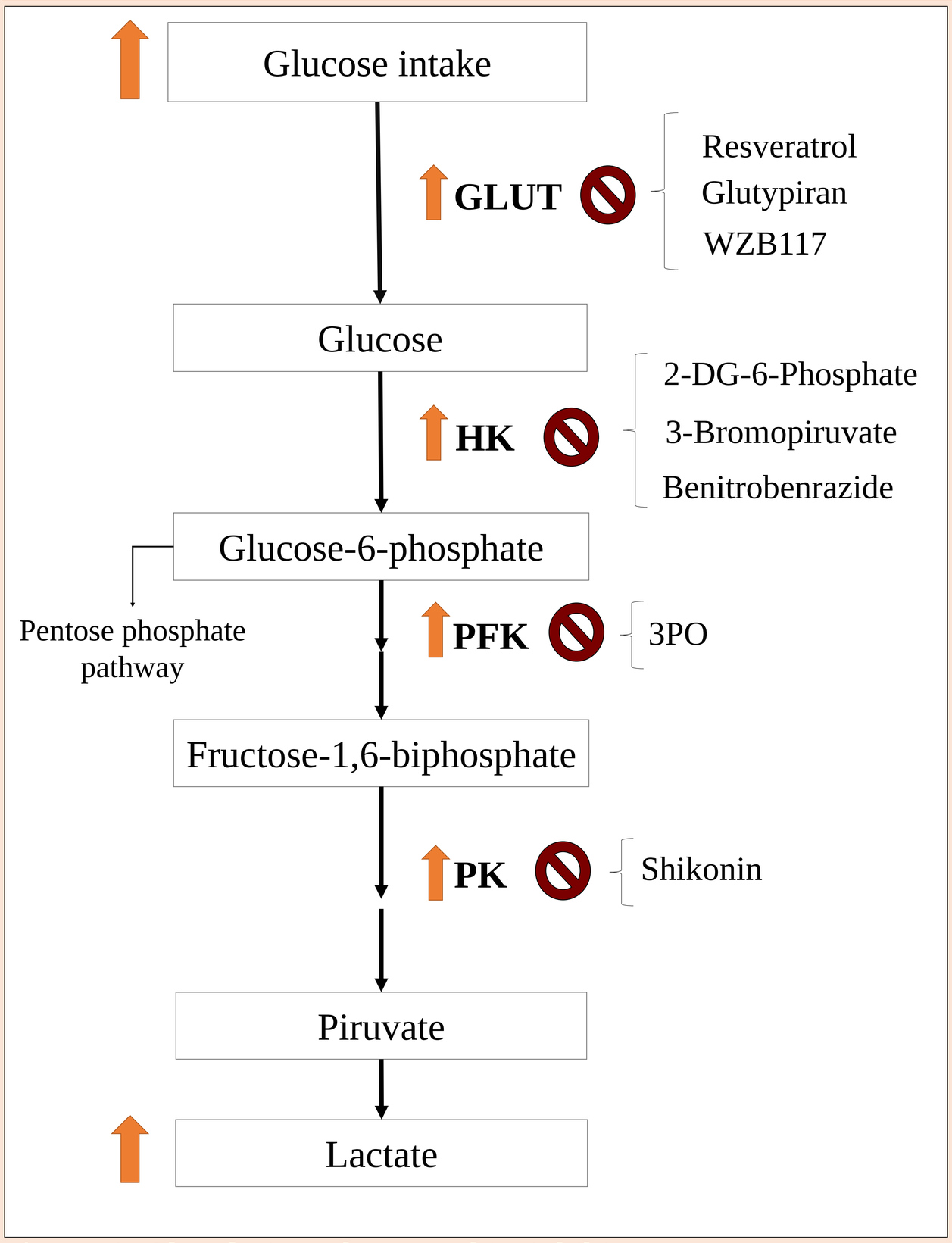


**Figure 1**. Glycolytic pathway and its inhibitors

| | | |
|---|---|---|
| **GLUT** | Resveratrol | Phase II |
| | Glutypiran | Preclinical |
| | WZB117 | Preclinical |
| **HK** | 2-DG-6-Phosphate | Phase I |
| | 3-Bromopiruvate | Preclinical |
| | Benitrobenrazide | Preclinical |
| **PFK** | 3PO | Preclinical |
| **PK** | Shikonin | Preclinical |

**Table 1**. Glycolytic inhibitors stage of development

## In vitro

- Reduced glucose intake
- Reduced lactate production
- Reduced cancer cells culture growth

## In vivo

- Reduced tumour growth

## Conclusions

The high glycolytic rate and glycolysis enzyme overexpression have a fundamental role in cancer growth. Drugs that inhibit glycolytic enzymes have been found to be effective in tumour treatments both in vivo and in vitro and opens a new way for cancer treatment.