Pentose cycle (FBLT)

Pentose Cycle Diagram The pentose cycle allows the **direct oxidation of glucose** to CO_2 without involving the Krebs cycle and respiratory chain.

Coenzyme $NADP^+$ molecules are used as a cofactor for dehydrogenases in the pentose cycle, which after receiving reduction equivalents (H atoms) are reduced to NADPH + H^+. These can be used in many places in the cell - they serve as sources of reducing equivalents during biosynthesis (e.g. synthesis of fatty acids or steroid substances), they help antioxidant protection of cells (including the system glutathione) or participate in the metabolism of foreign substances.

In the pentose cycle, ``ribose-5-P *(precursor in the synthesis of nucleic acids) or many other monosaccharides can also be formed.*
The purpose of the pentose cycle is not direct energy gain, since NADPH cannot be oxidized in the respiratory chain, but rather:

1) **NADPH gain** - the pentose cycle is the main producer of NADPH in the cell;

2) **ribose-5-P gain**;

3) **mutual transformations of monosaccharides**, used for example in the synthesis of glycoproteins.

The pentose cycle is localized in the cytosol (especially of liver cells, adipose tissue, testicles, adrenal cortex, then in erythrocytes or in the lactating mammary gland, but enzymes are found in all tissues).

Within the pentose cycle, we can distinguish two basic phases - "oxidative" and "non-oxidative" (regenerative).

🔎 *For more information see Oxidative phase of the pentose cycle.*

🔎 *For more information see Regenerative (non-oxidative) phase of the pentose cycle.*