

Název: **BIOCHEMICKÉ SOUVISLOSTI V ZOBRAZOVÁNÍ
PET**

Školitel: Prof. Ing. René Kizek, Ph.D.

Datum: 15. 11. 2013

Reg.č.projektu: CZ.1.07/2.3.00/20.0148

Název projektu: Mezinárodní spolupráce v oblasti "in vivo" zobrazovacích technik



Nobel Prizes and Laureates

Medicine Prizes

< 1931 >

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▼ **Otto Warburg**

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The Nobel Prize in Physiology or Medicine 1931

Otto Warburg

Otto Warburg - Biographical



Otto Heinrich Warburg was born on October 8, 1883, in Freiburg, Baden. His father, the physicist Emil Warburg, was President of the Physikalische Reichsanstalt, Wirklicher Geheimer Oberregierungsrat. Otto studied chemistry under the great [Emil Fischer](#), and gained the degree, Doctor of Chemistry (Berlin), in 1906. He then studied under von Krehl and obtained the degree, Doctor of Medicine (Heidelberg), in 1911. He served in the Prussian Horse Guards during World War I. In 1918 he was appointed Professor at the Kaiser Wilhelm Institute for Biology, Berlin-

Dahlem. Since 1931 he is Director of the Kaiser Wilhelm Institute for Cell Physiology, there, a donation of the Rockefeller Foundation to the Kaiser Wilhelm Gesellschaft, founded the previous year.

Warburg's early researches with Fischer were in the polypeptide field. At Heidelberg he worked on the process of oxidation. His special interest in the investigation of vital processes by physical and chemical methods led to attempts to relate these processes to phenomena of the inorganic world. His methods involved detailed studies on the assimilation of carbon dioxide in plants, the metabolism of tumors, and the chemical constituent of the oxygen transferring respiratory ferment. Warburg was never a teacher, and he has always been grateful for his opportunities to devote his whole time to scientific research. His later researches at the Kaiser Wilhelm Institute have led to the discovery that the flavins and the nicotinamide were the active



Discover features and trivia about the Nobel Prize

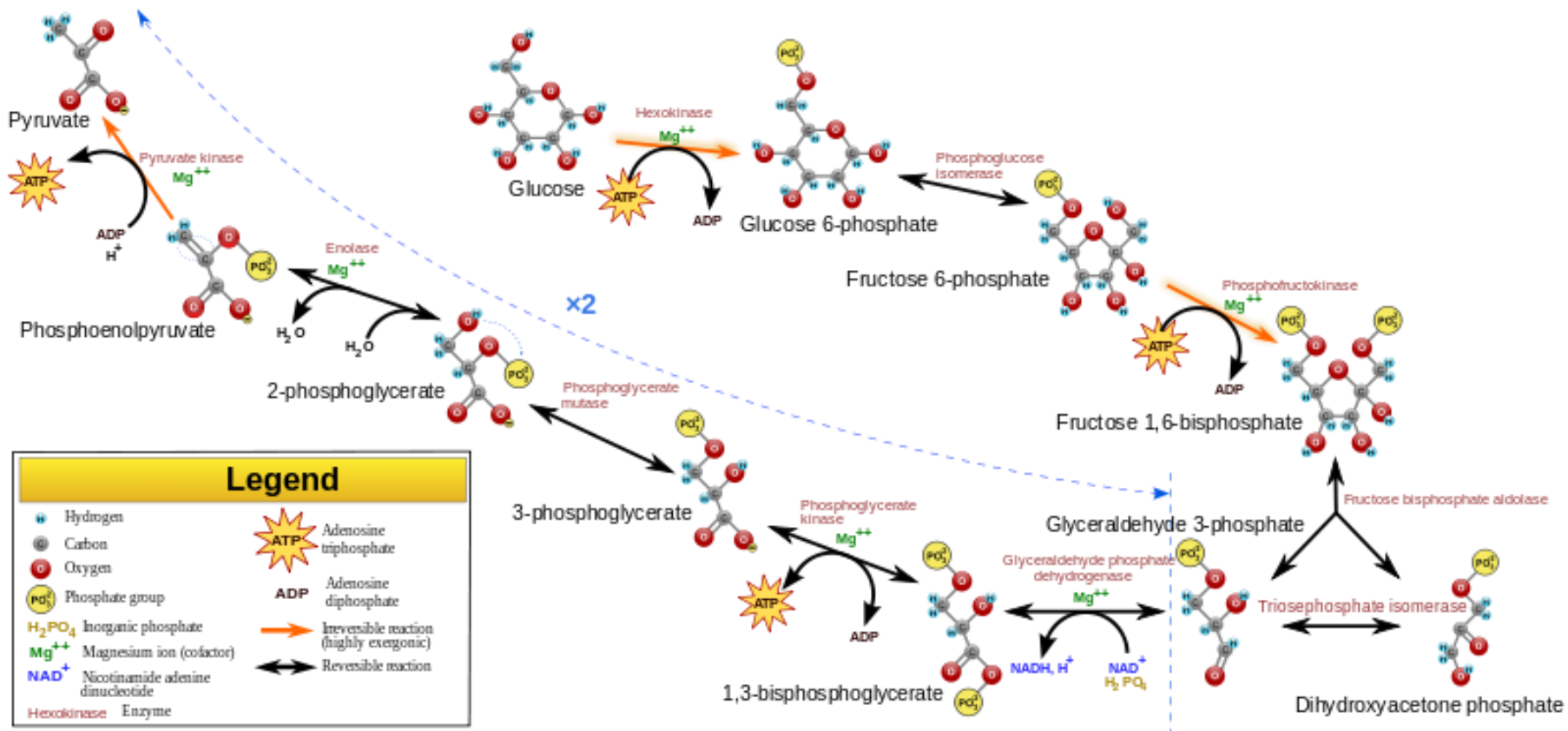


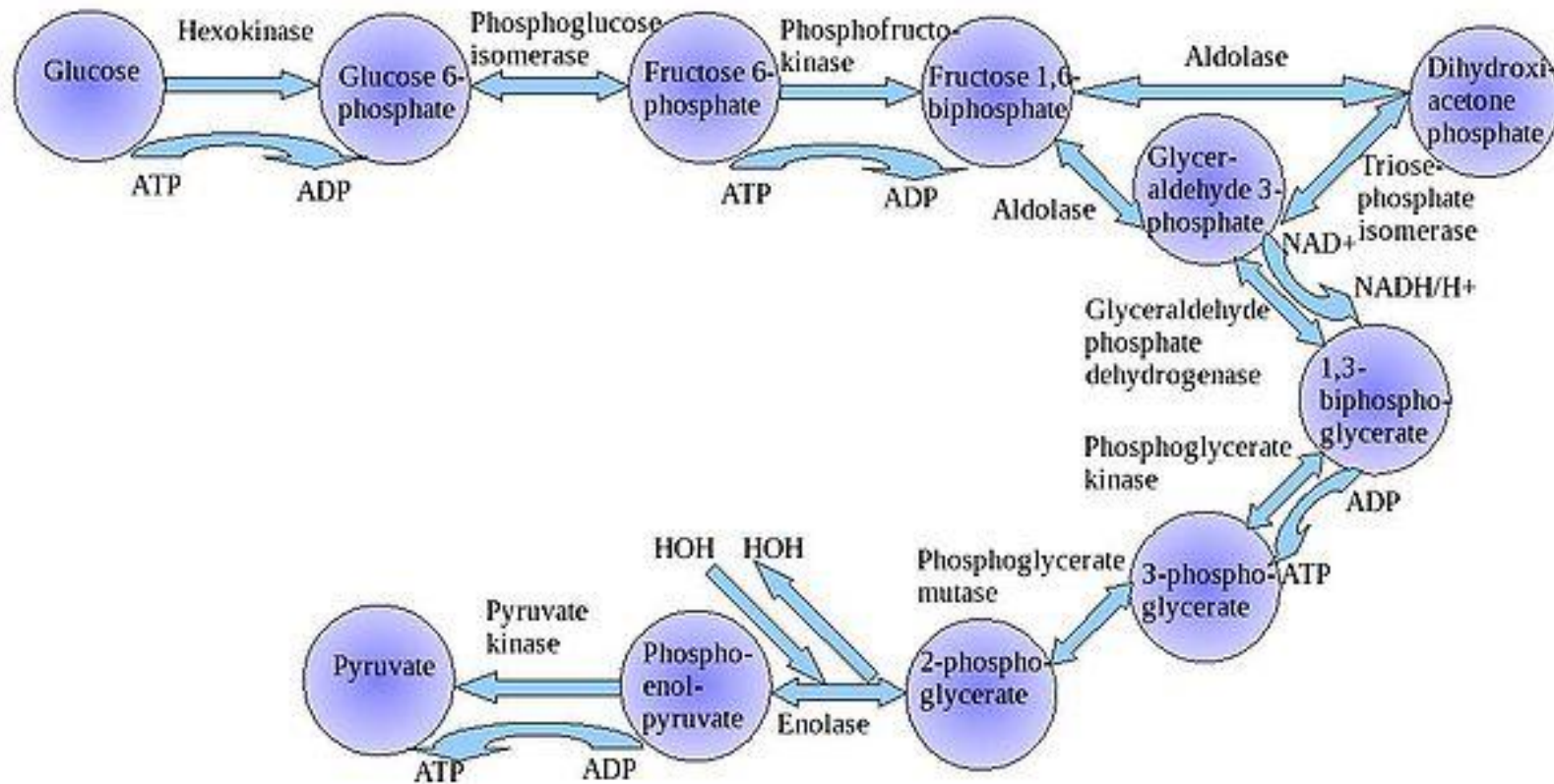
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9 December 2013, Gothenburg, Sweden

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INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Differentiated tissue



+O₂

-O₂

Glucose

Glucose

Pyruvate

Pyruvate

Lactate

Lactate

O₂

O₂

CO₂

CO₂

Oxidative phosphorylation

~36 mol ATP/
mol glucose

Anaerobic glycolysis

2 mol ATP/
mol glucose

Proliferative tissue



or

Tumor tissue



+/-O₂

Glucose

Pyruvate

Lactate

5%

85%

O₂

CO₂

Aerobic glycolysis (Warburg effect)

~4 mol ATP/mol glucose



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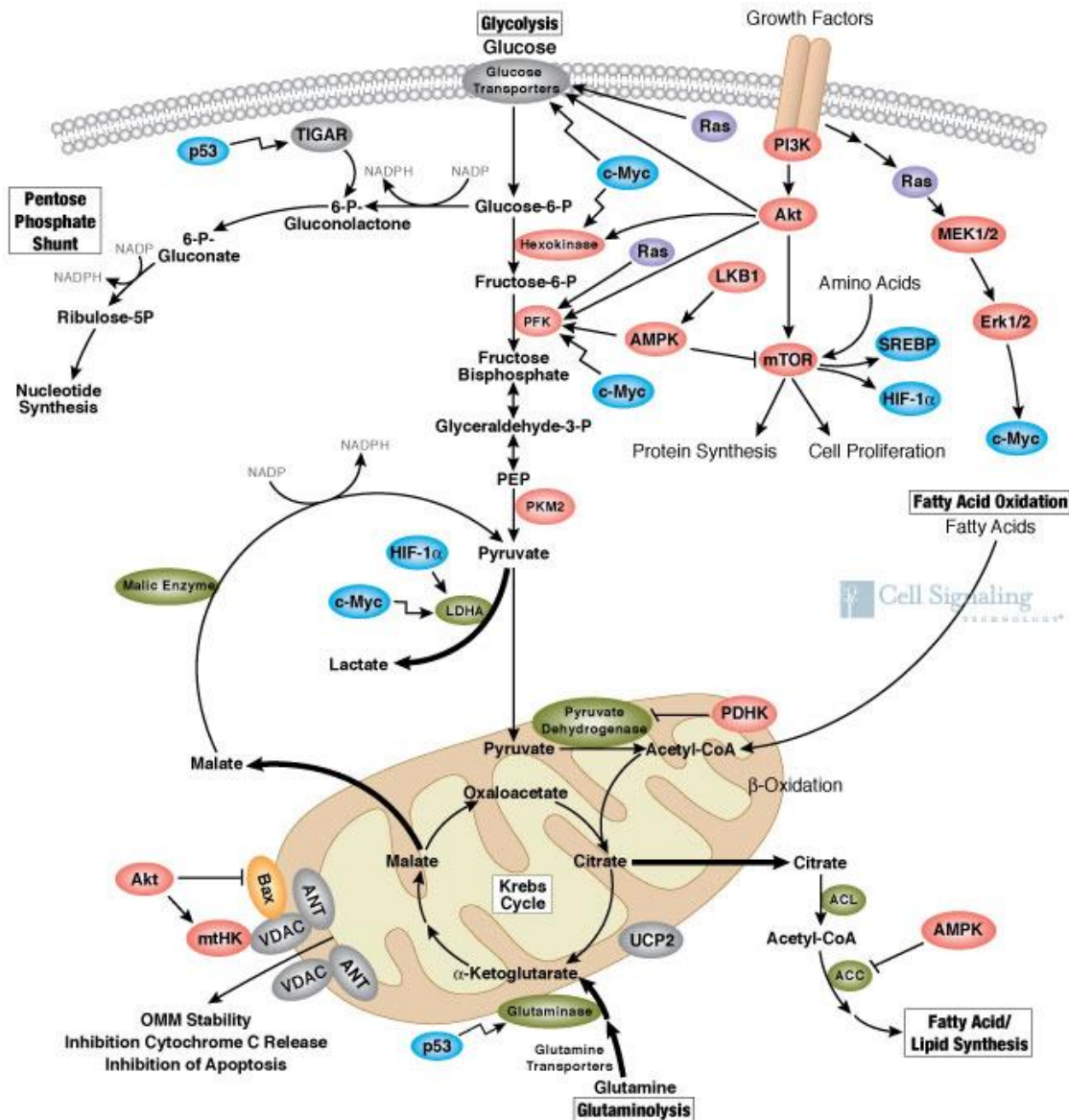


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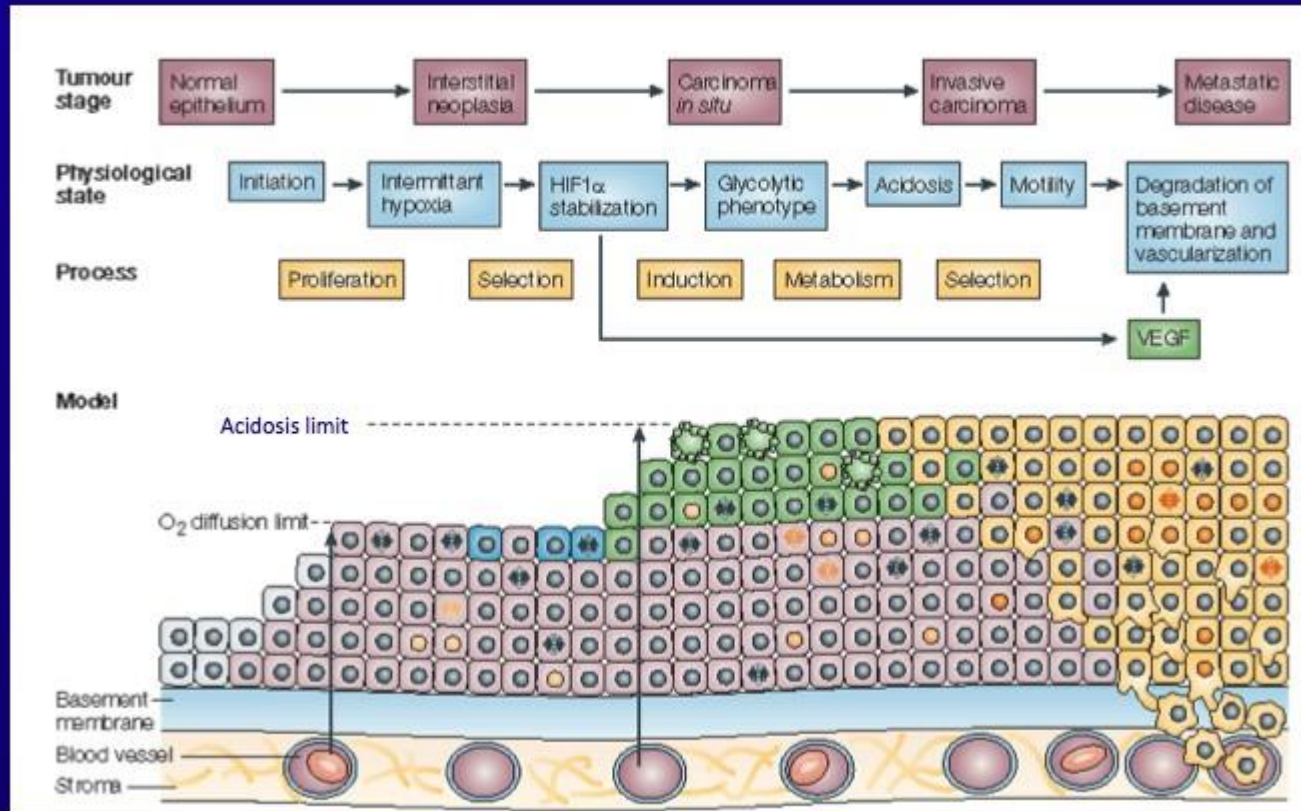
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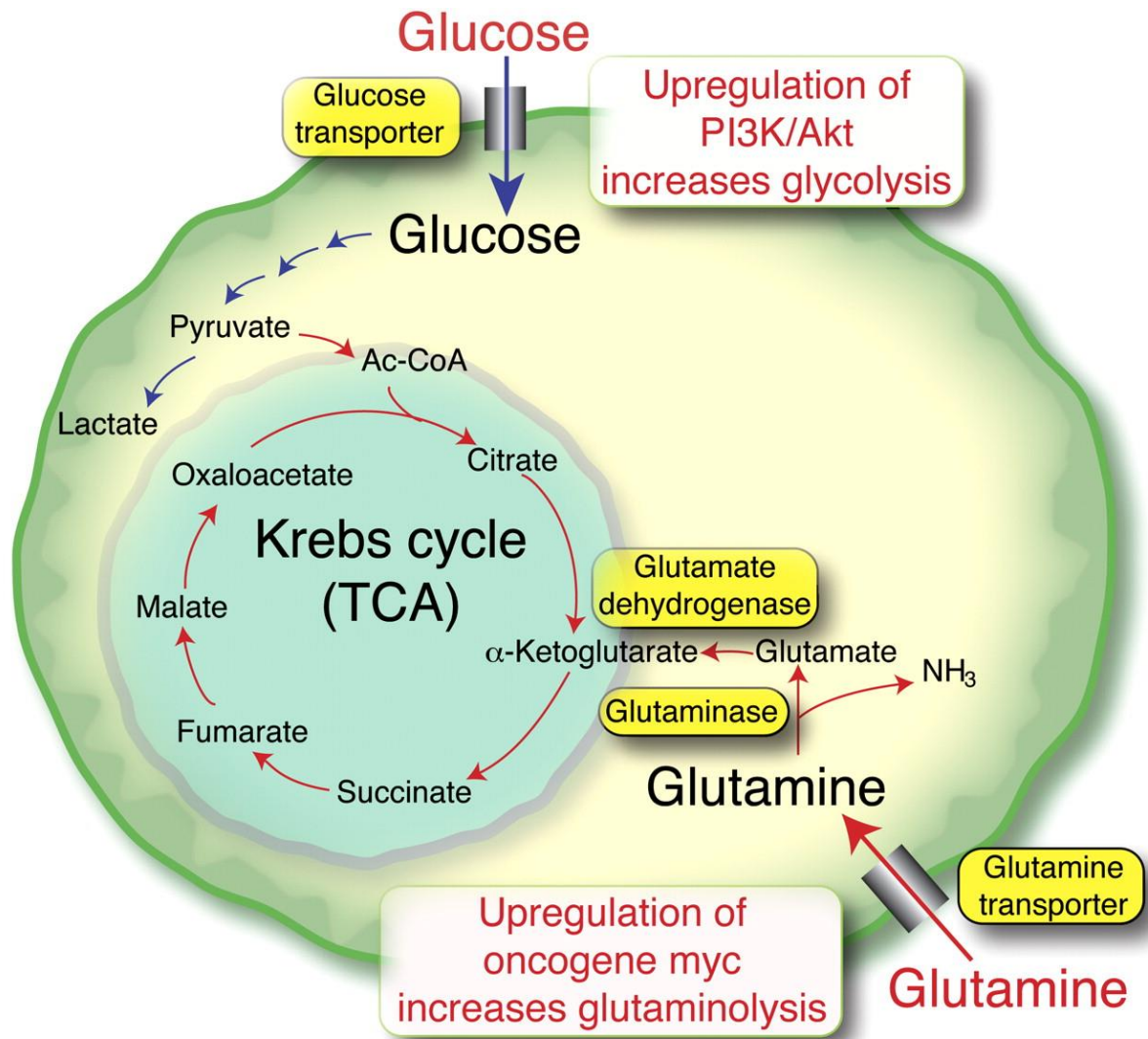


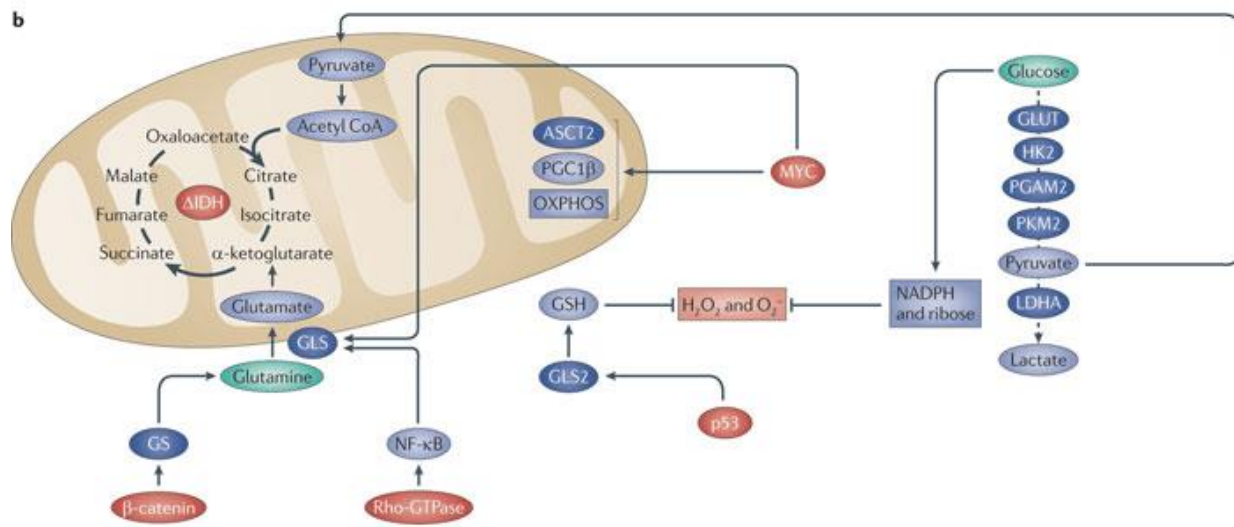
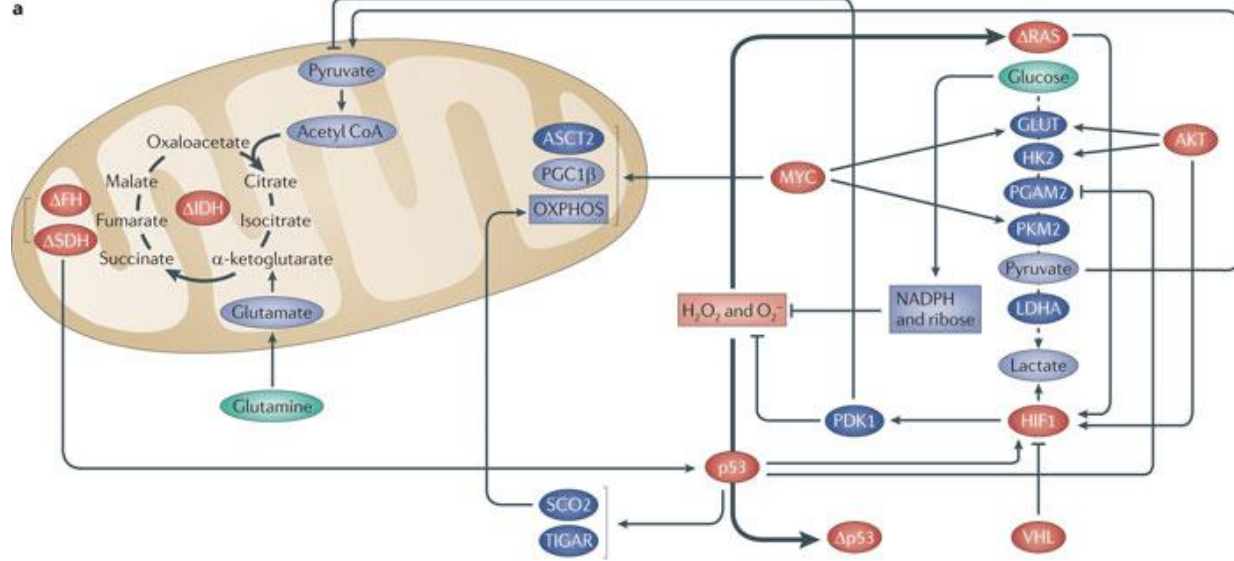
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The Warburg Effect becomes hardwired early in carcinogenesis (DCIS stage)

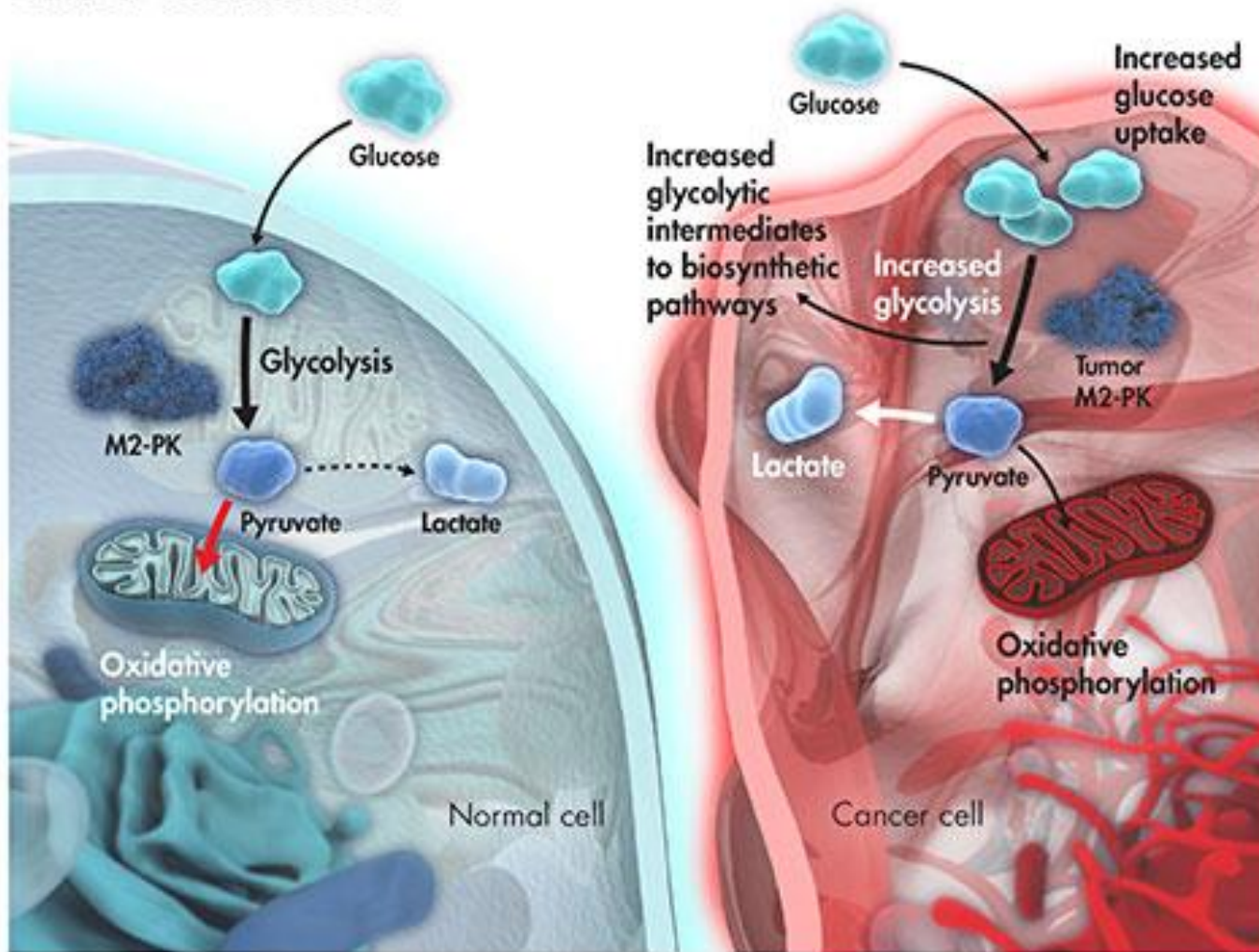


Gatenby and Gillies, Nature Rev. Cancer, 2004





Cancer metabolism



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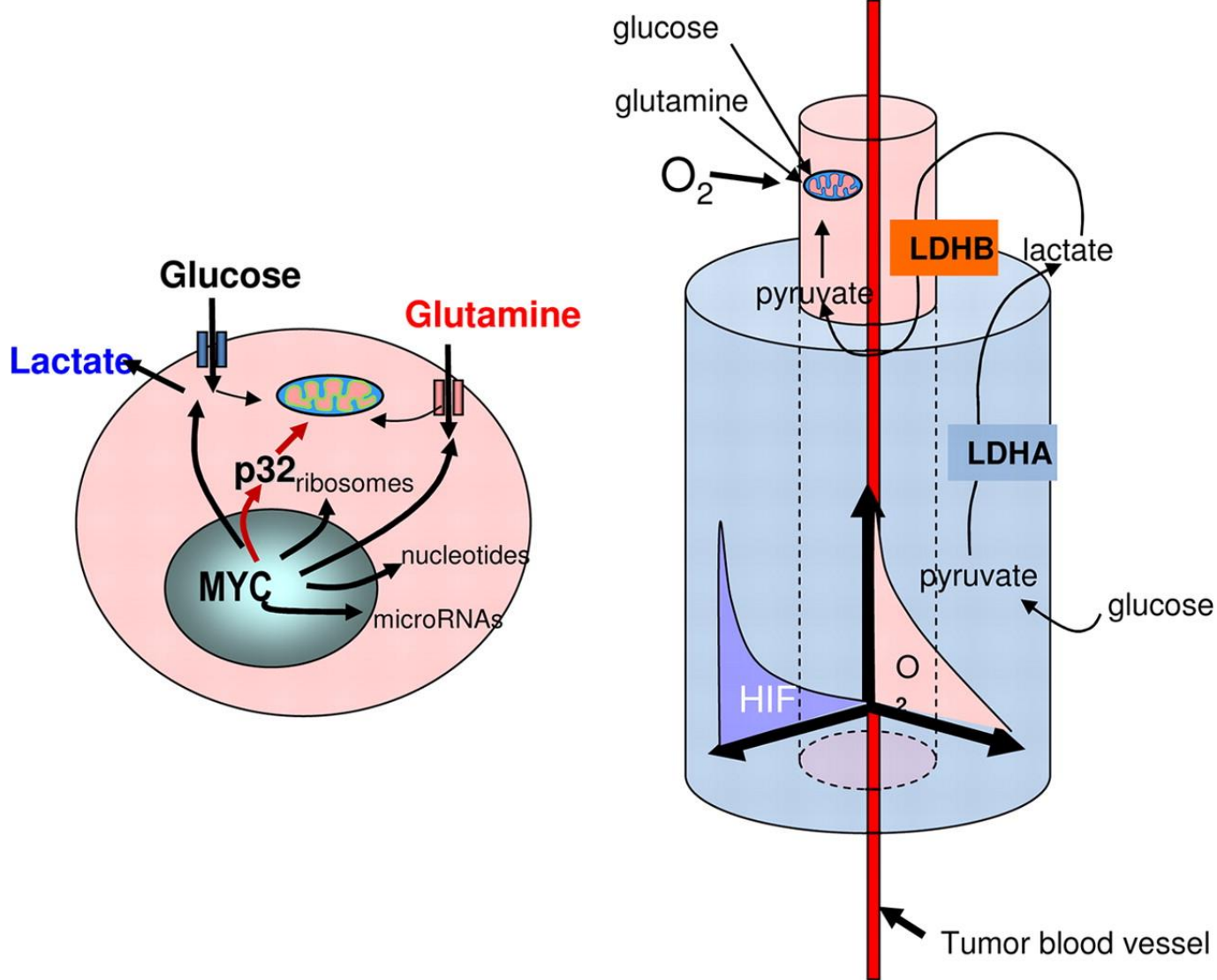


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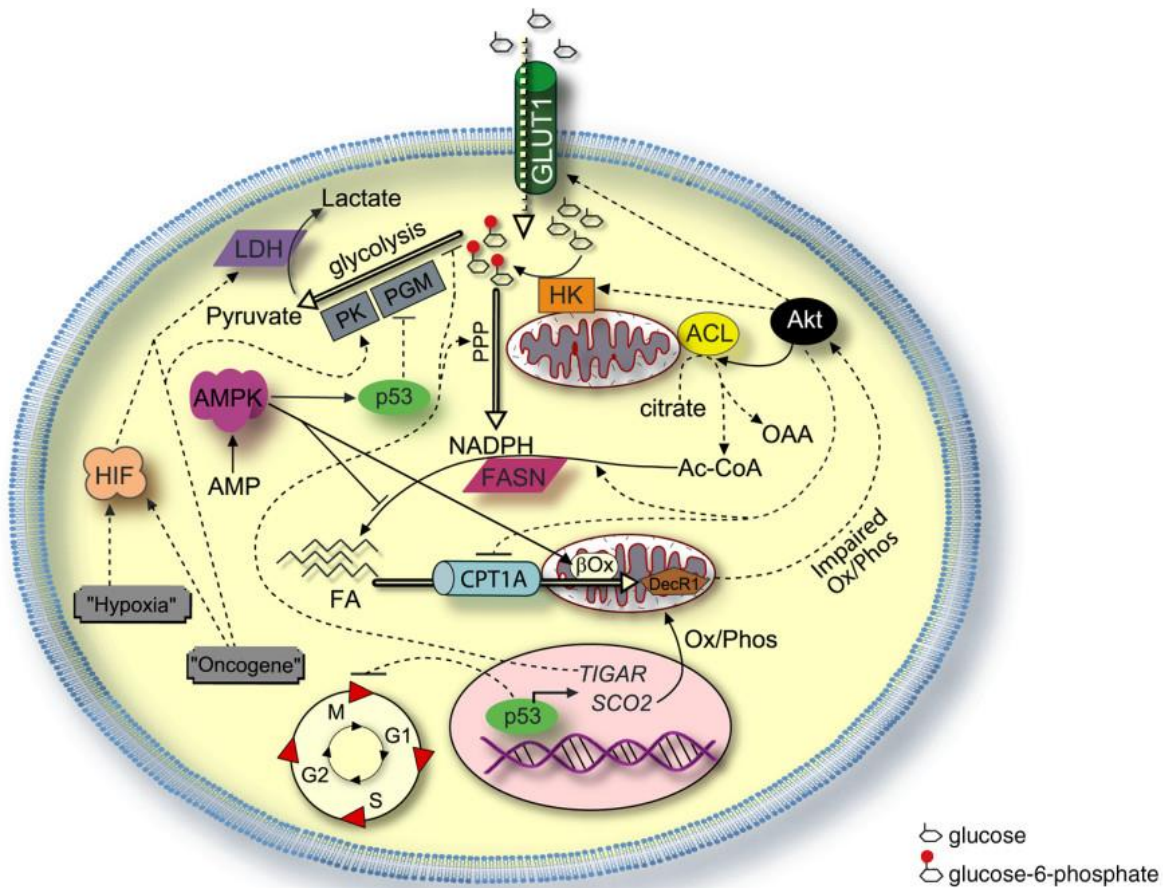


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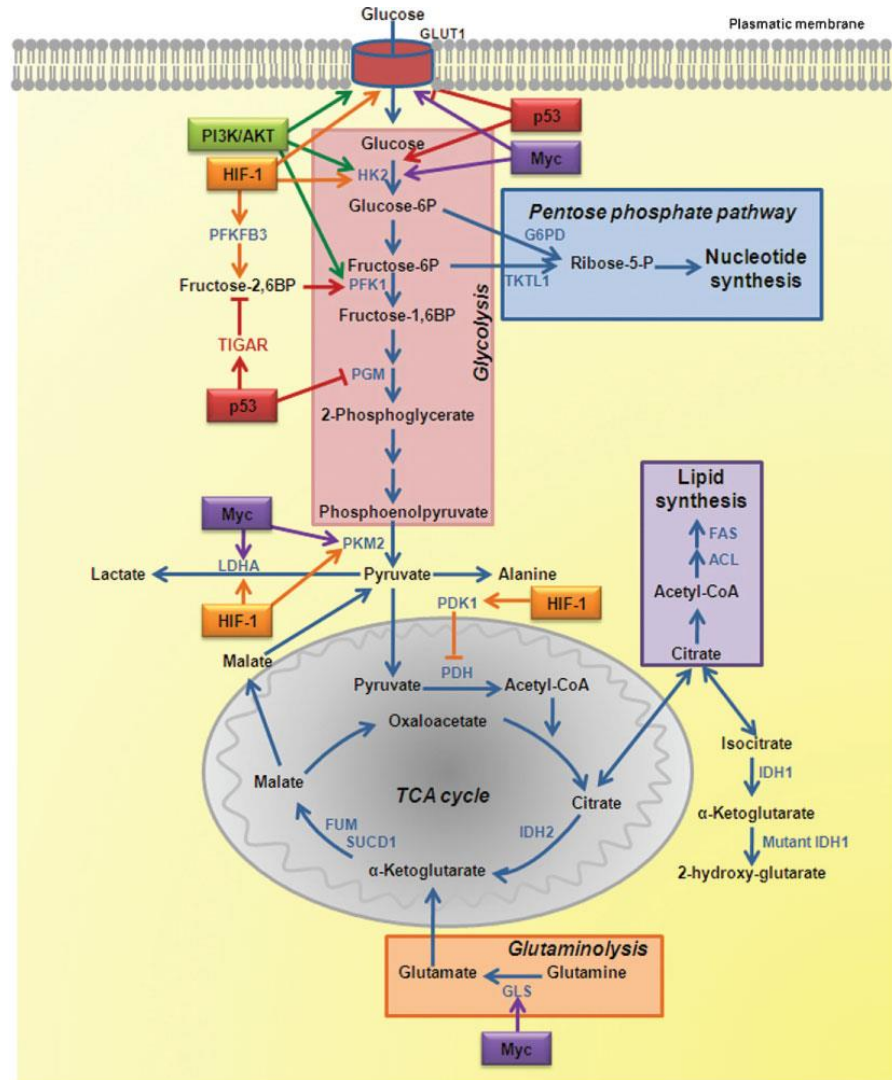
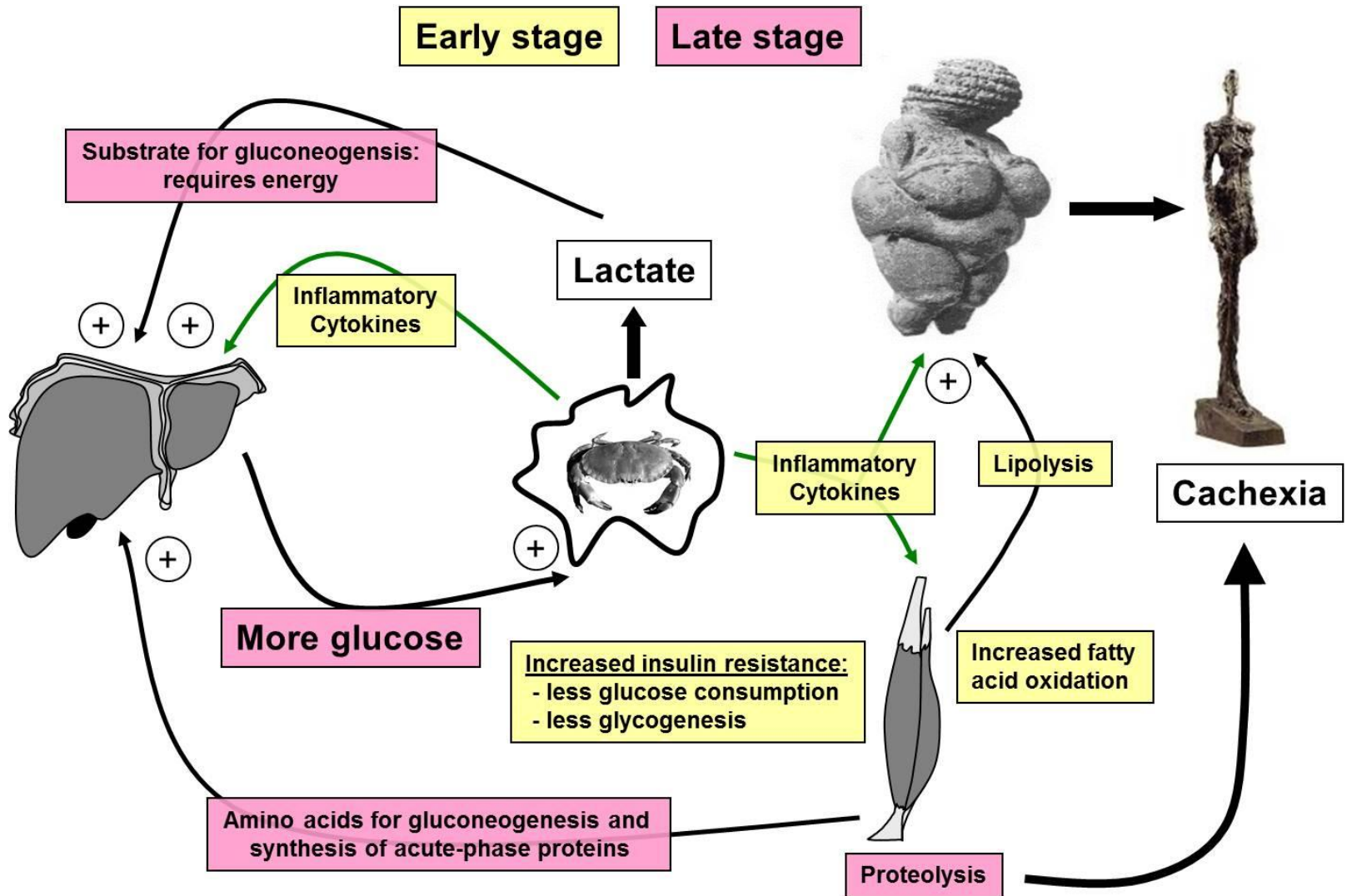


Figure 2 - Metabolic remodeling in cancer cells and regulation by signaling pathways involving oncogenes and tumor suppressor genes. The key enzymes of glycolysis, the TCA cycle, the pentose phosphate pathway, glutaminolysis, nucleotide, and lipid biosynthesis are shown as the regulation points by oncogenes and tumor suppressor genes.

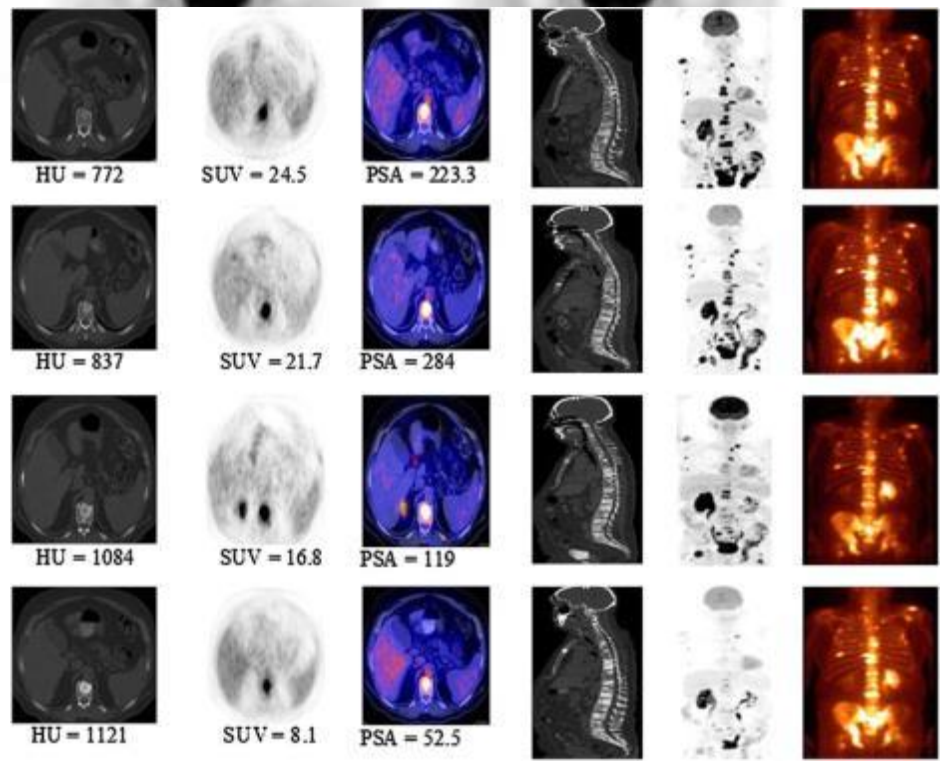
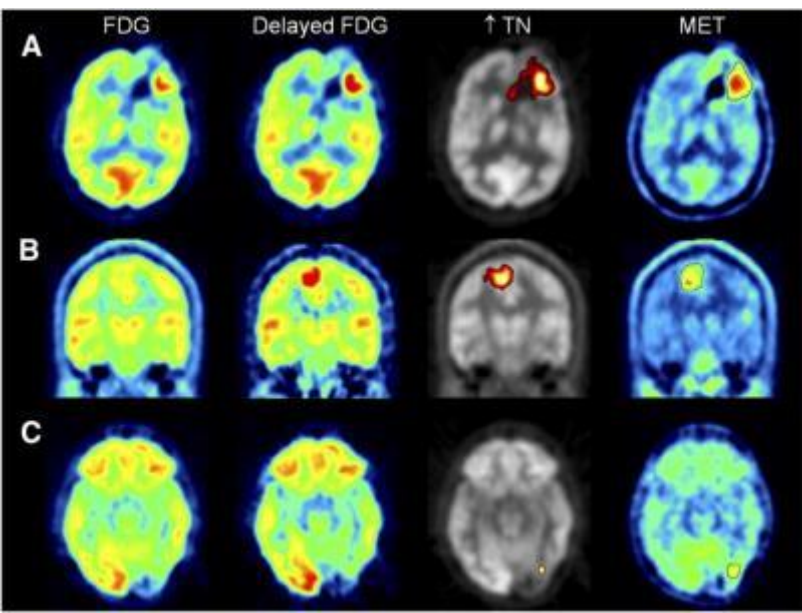
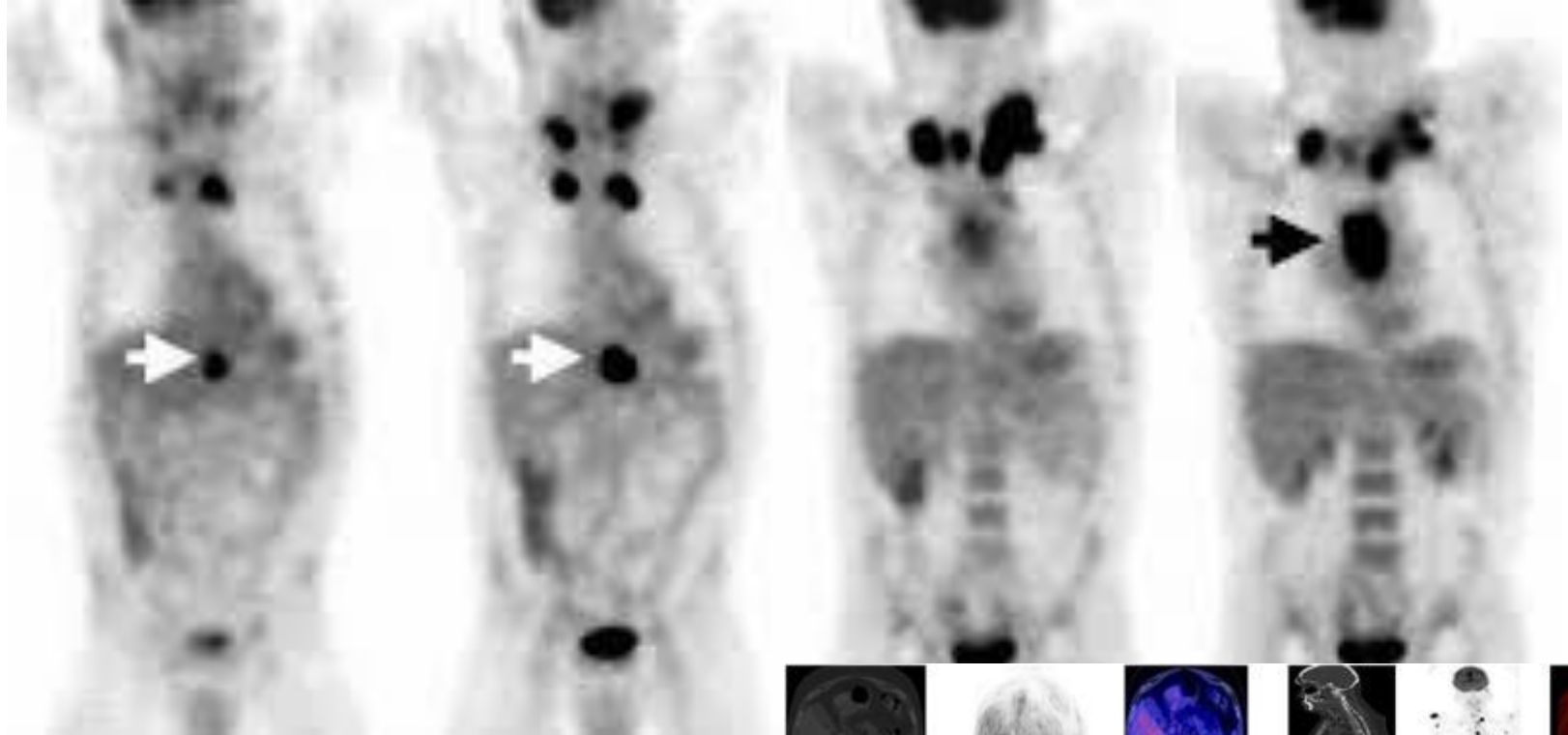


Pre-therapy



Post-therapy

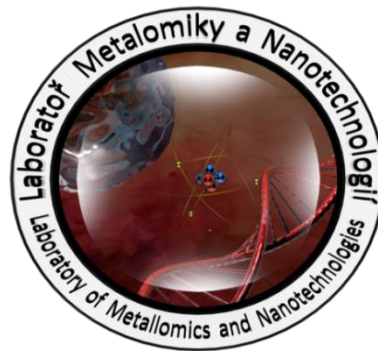






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Děkuji za pozornost!



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