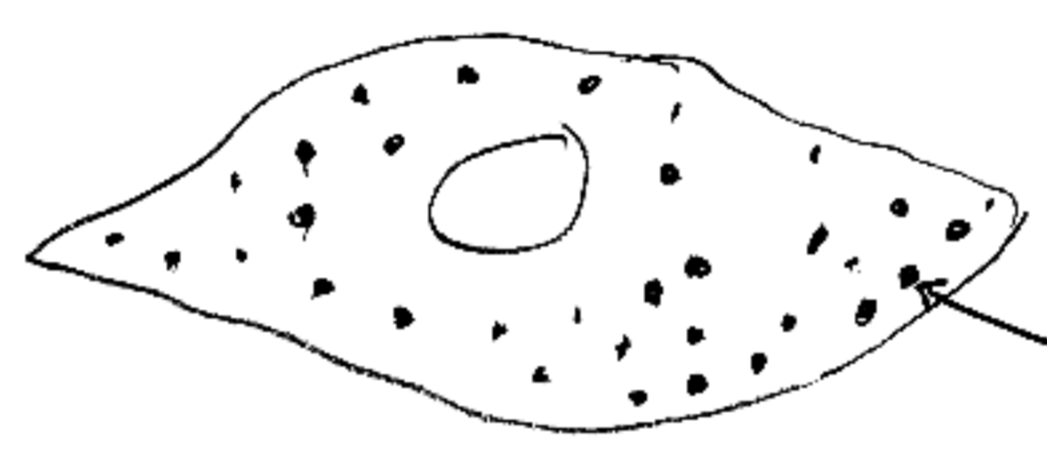


GLYCOGEN METABOLISM:

GLYCOGEN IS A READILY MOBILIZED FORM OF GLUCOSE FOUND PRIMARILY IN SKELETAL MUSCLE & THE LIVER.

IT IS IMPORTANT IN THE MAINTENANCE OF BLOOD GLUCOSE AND AS A SOURCE OF GLUCOSE DURING PROLONGED MUSCLE ACTIVITY.

GLYCOGEN GRANULES:

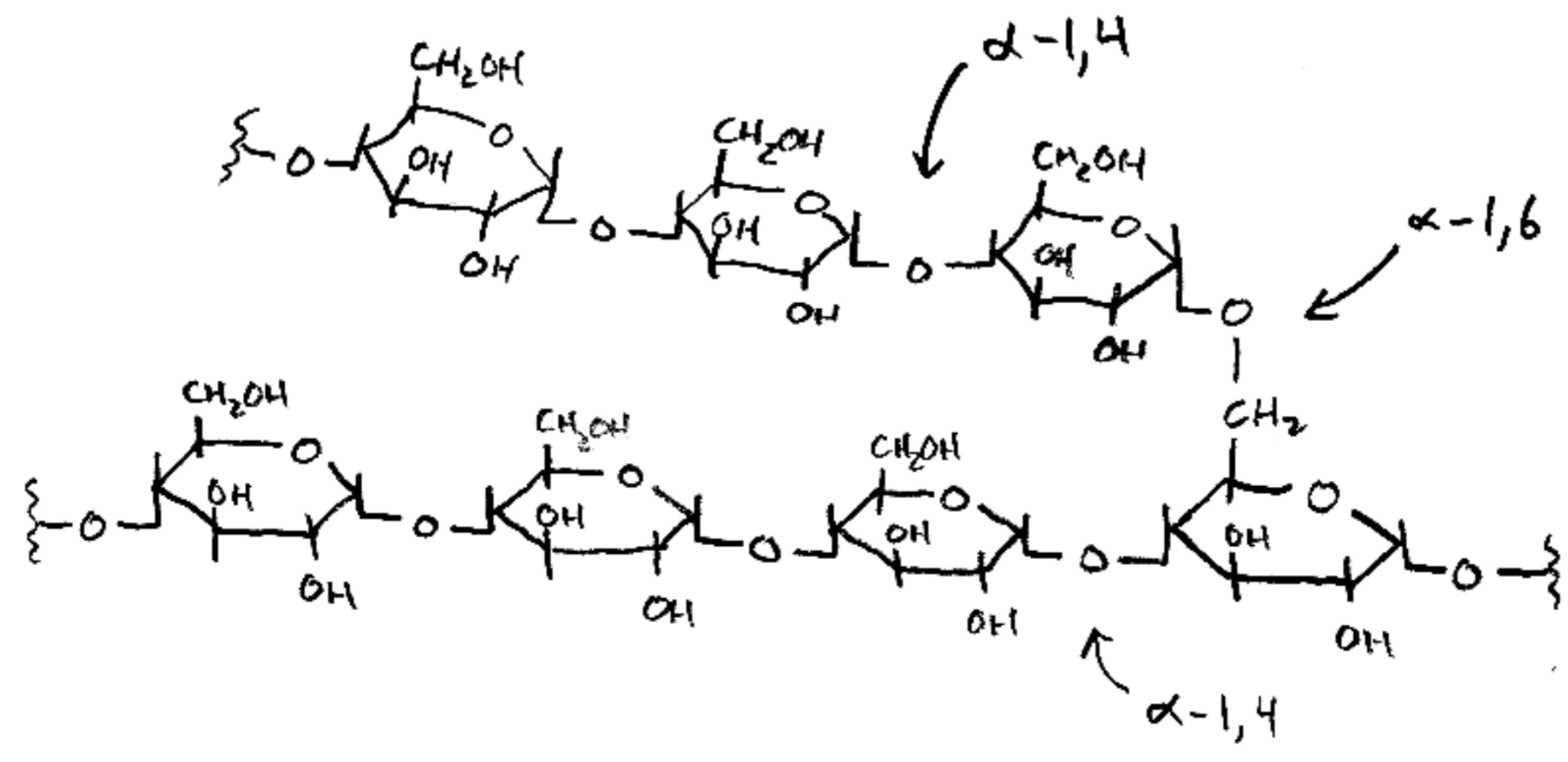


LIVER CELL

GLYCOGEN GRANULES ARE PRESENT IN THE CYTOSOL & CONTAIN THE ENZYMES THAT CATALYZE ITS SYNTHESIS & BREAKDOWN.

10-40 nm DIAMETER GRANULES

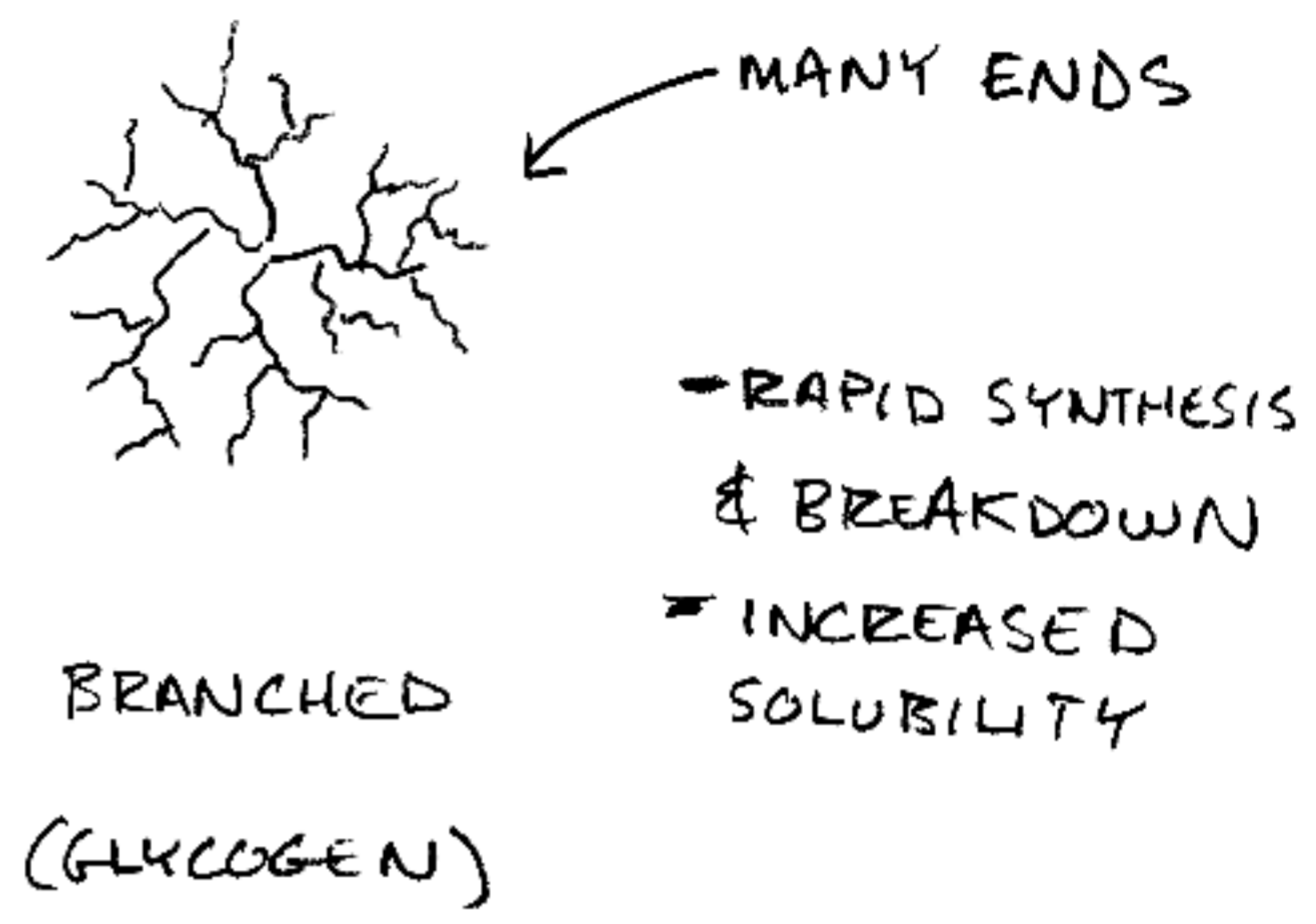
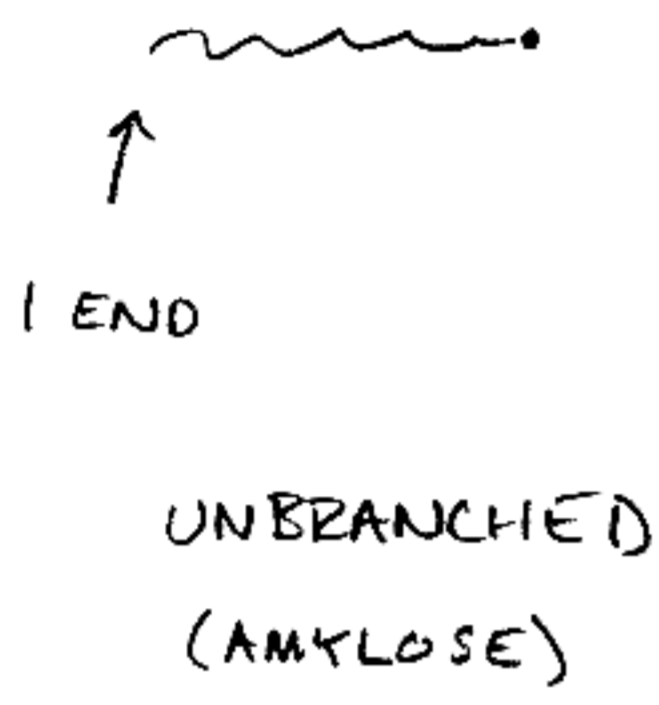
REMEMBER:



BRANCH POINTS ~ 10 RESIDUES

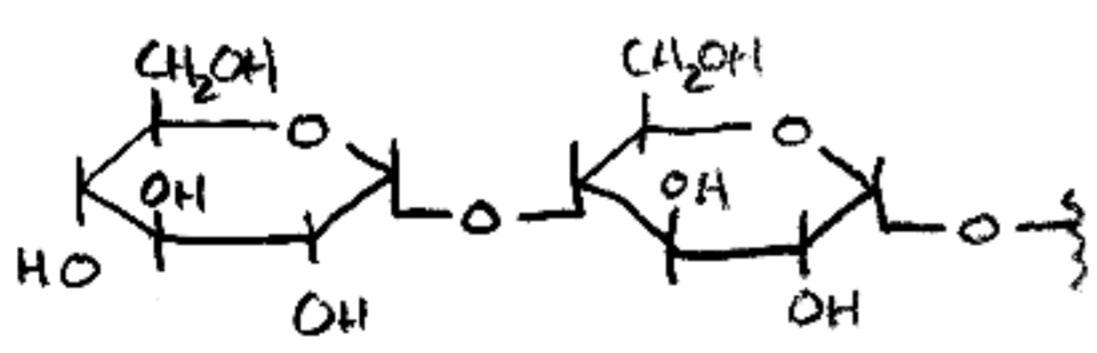
GLYCOGEN BREAKDOWN:

ALL OF THE "BUSINESS" IN GLYCOGEN METABOLISM OCCURS AT THE ENDS OF STRANDS

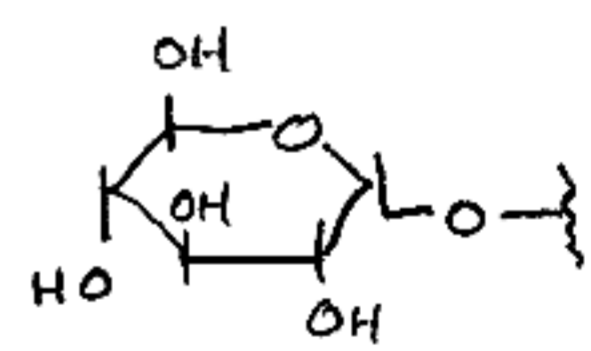
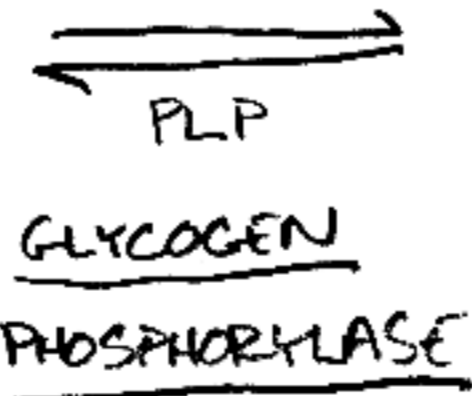
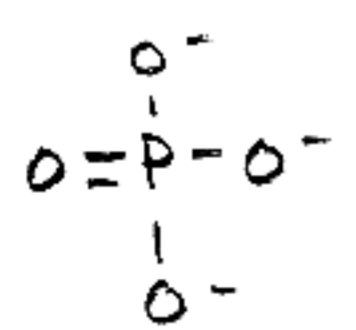


GLYCOGEN PHOSPHORYLASE CLEAVAGE OF GLYCOGEN

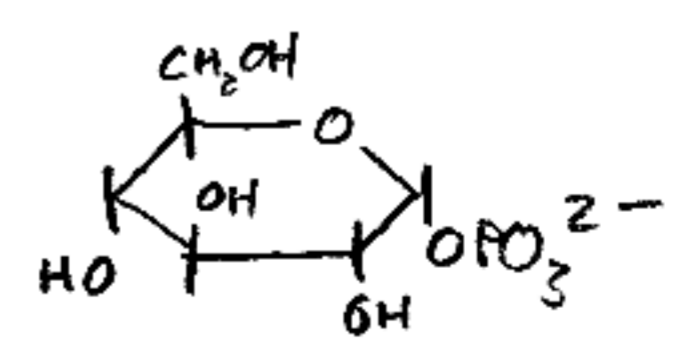
CATALYZES THE PHOSPHORYLYTIC



+



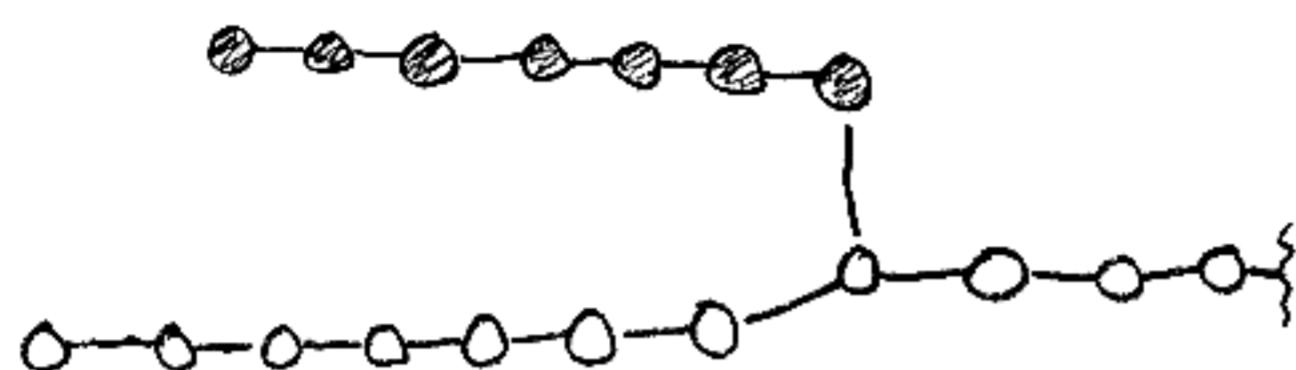
+



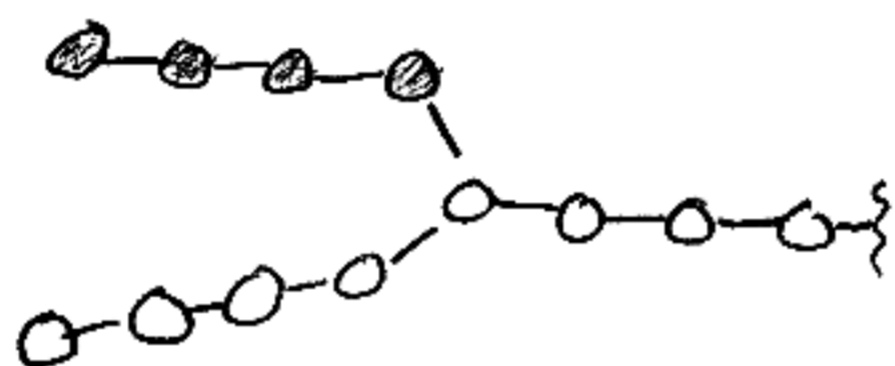
GLUCOSE-1-PHOSPHATE

PLP = PYRIDOXAL PHOSPHATE

GLYCOGEN PHOSPHORYLASE CAN CLEAVE TO WITHIN FOUR RESIDUES OF A BRANCH POINT?

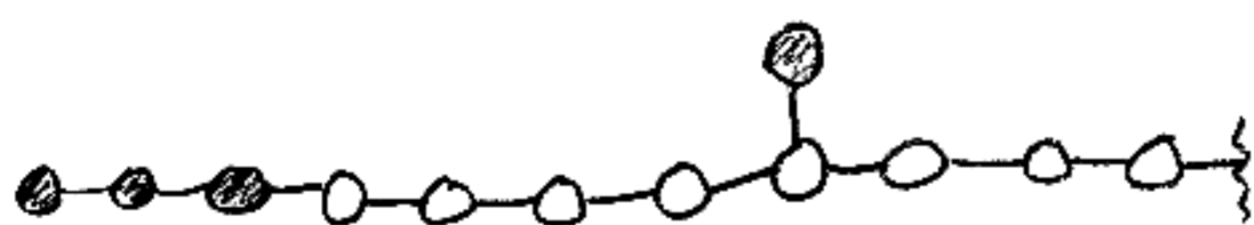


↓ GLYCOGEN PHOSPHORYLASE



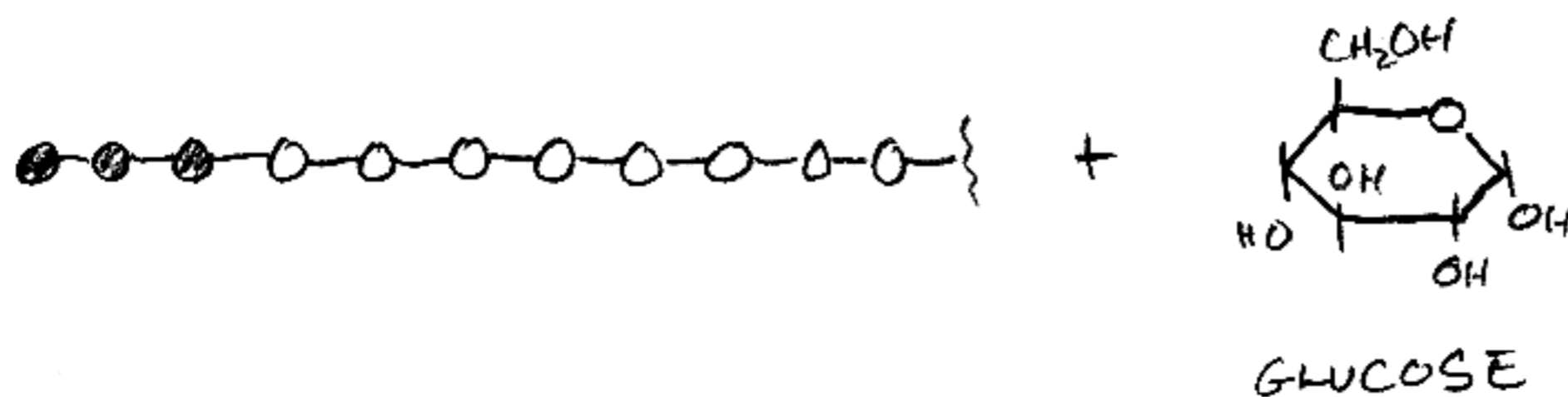
WHAT THEN?

↓ TRANSFERASE

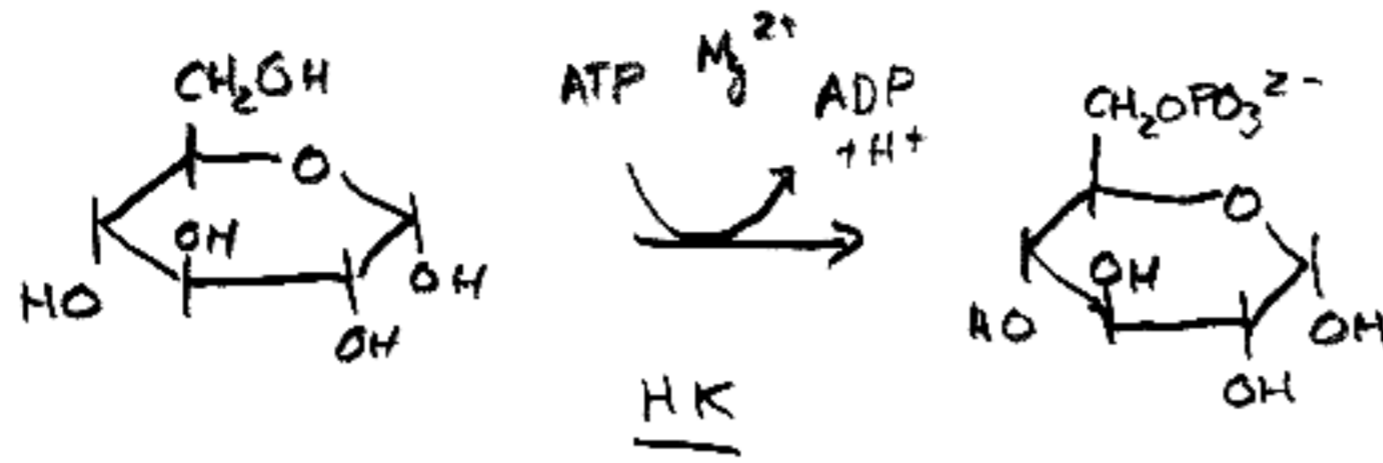


← SAME PEPTIDE
↓

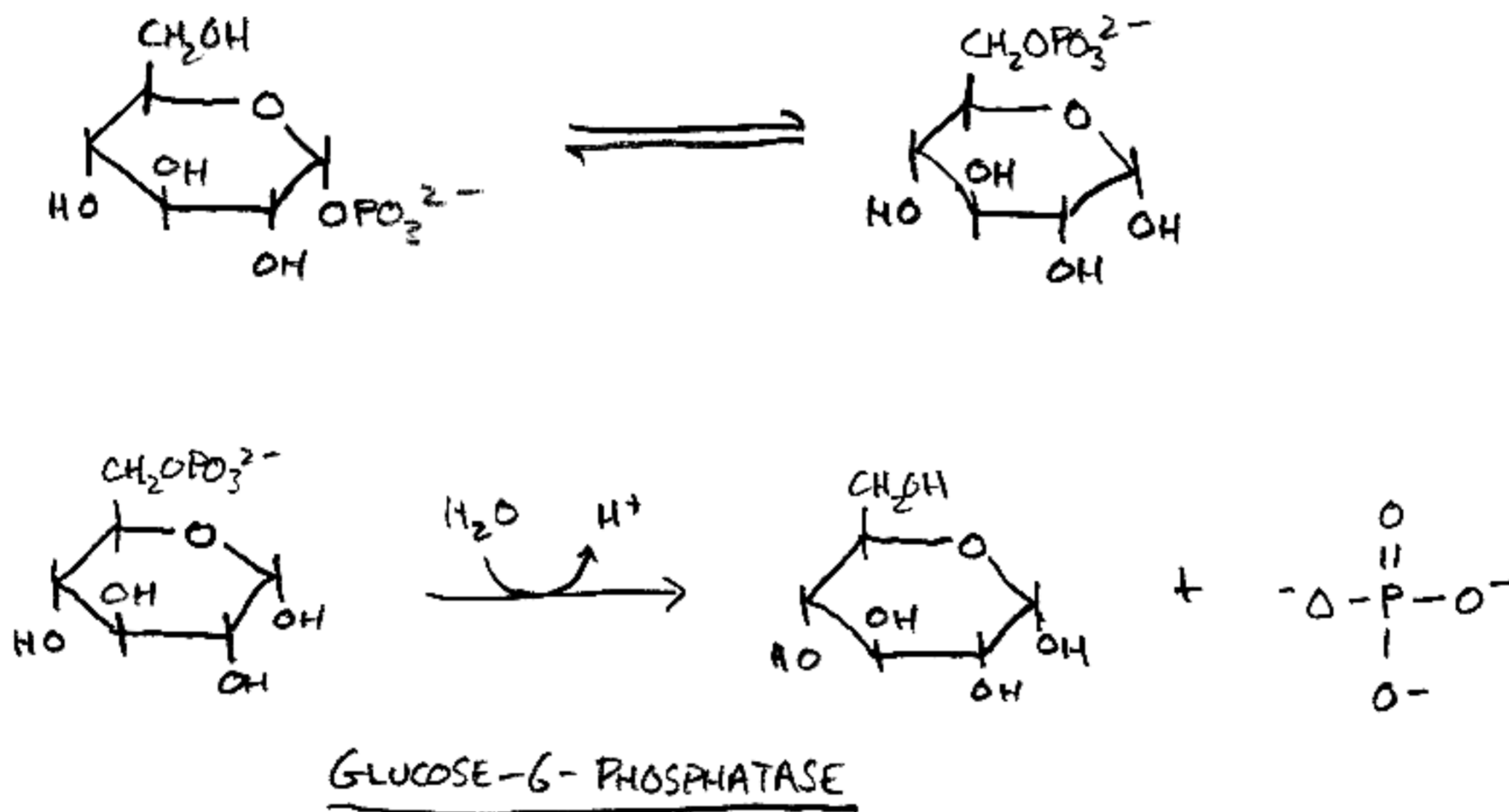
↓ DEBRANCHING ENZYME (α-1,6-GLUCOSIDASE)



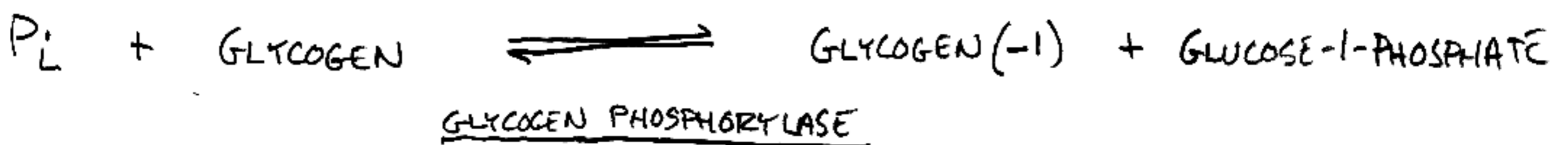
FREE GLUCOSE CAN DIFFUSE OUT OF THE CELL, OR IT CAN BE PHOSPHORYLATED BY HEXOKINASE,



GLUCOSE-1-PHOSPHATE CANNOT DIFFUSE OUT OF THE CELL. TO CONVERT IT TO GLUCOSE:



GLYCOGEN SYNTHESIS IS NOT THE REVERSE OF BREAKDOWN:



REVERSIBLE, BUT $\text{P}_i/\text{G-1-P}$ RATIO IS TOO HIGH

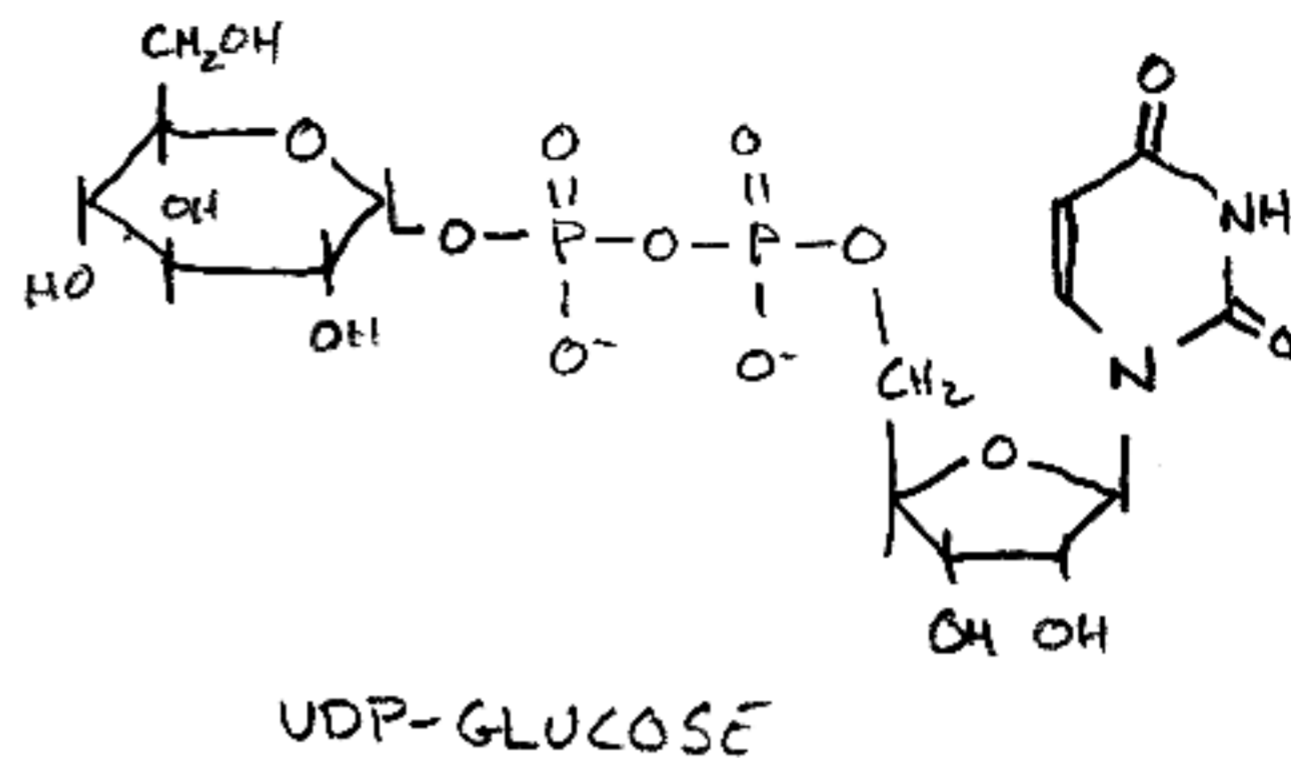
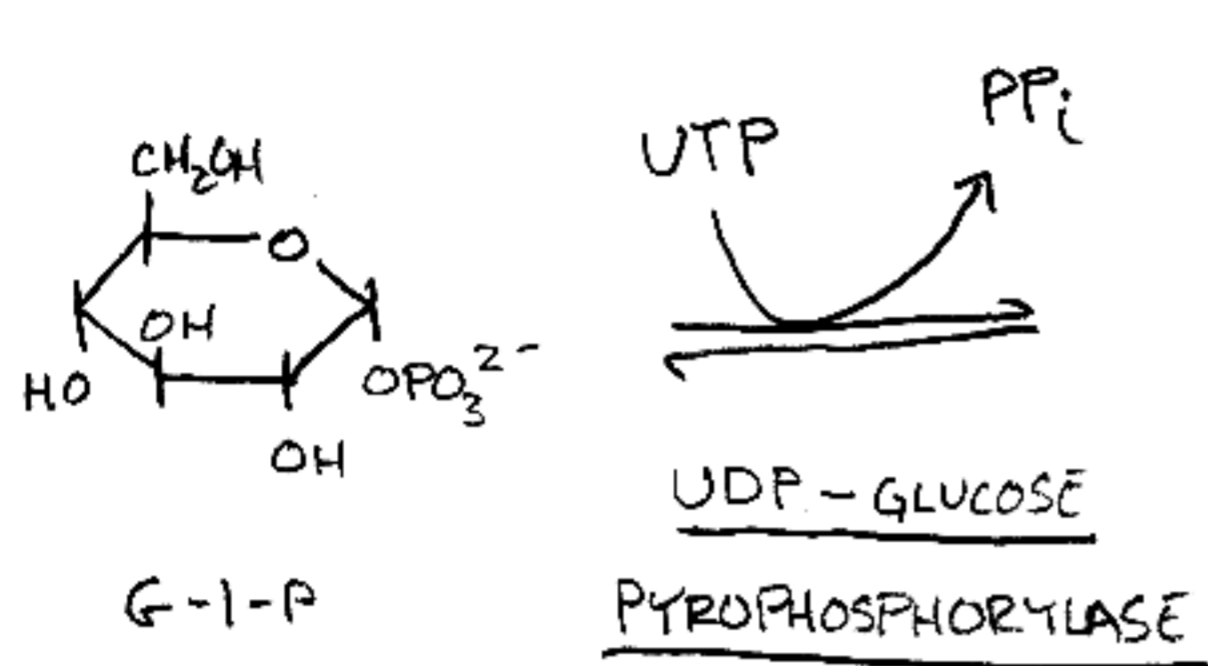
GLYCOGEN SYNTHESIS:

GLUCOSE ACTIVATION:

NOMENCLATURE:

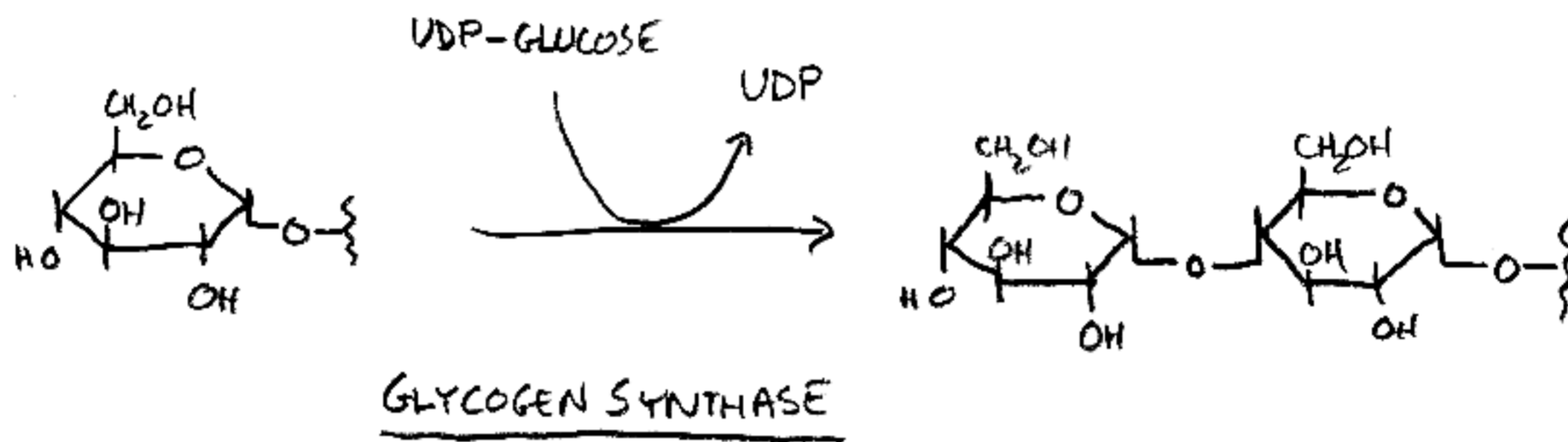
URACIL - BASE ONLY

URIDINE - BASE + RIBOSE



- THIS REACTION IS MADE IRREVERSIBLE BY HYDROLYSIS OF PYROPHOSPHATE.

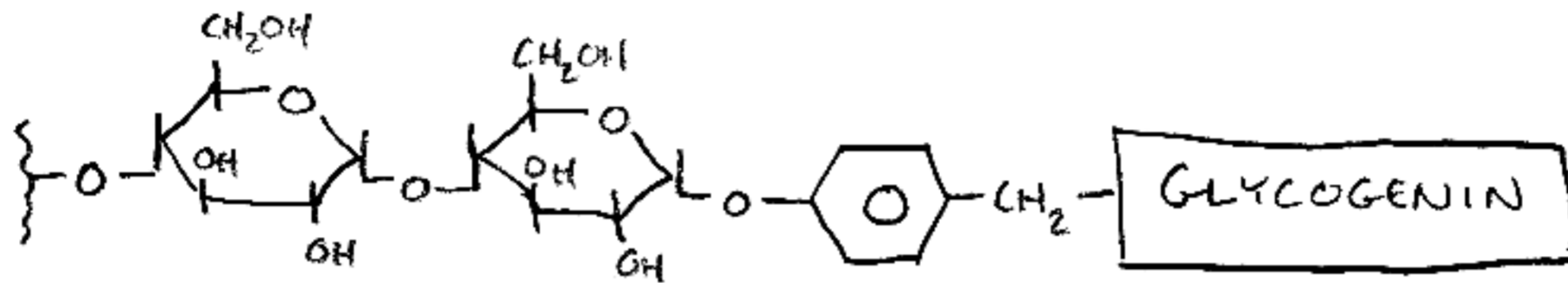
GLYCOGEN SYNTHASE:



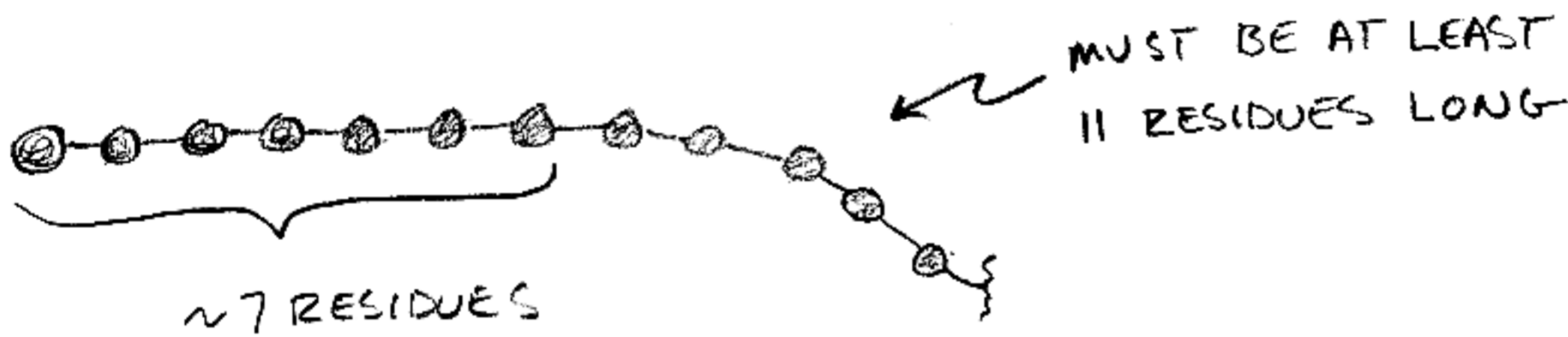
GLYCOGEN SYNTHASE CAN ONLY ADD TO A CHAIN OF AT LEAST FOUR RESIDUES.

GLYCOGEN SYNTHASE CANNOT CATALYZE THE FORMATION OF α -1,6 GLYCOSIDIC LINKAGES.

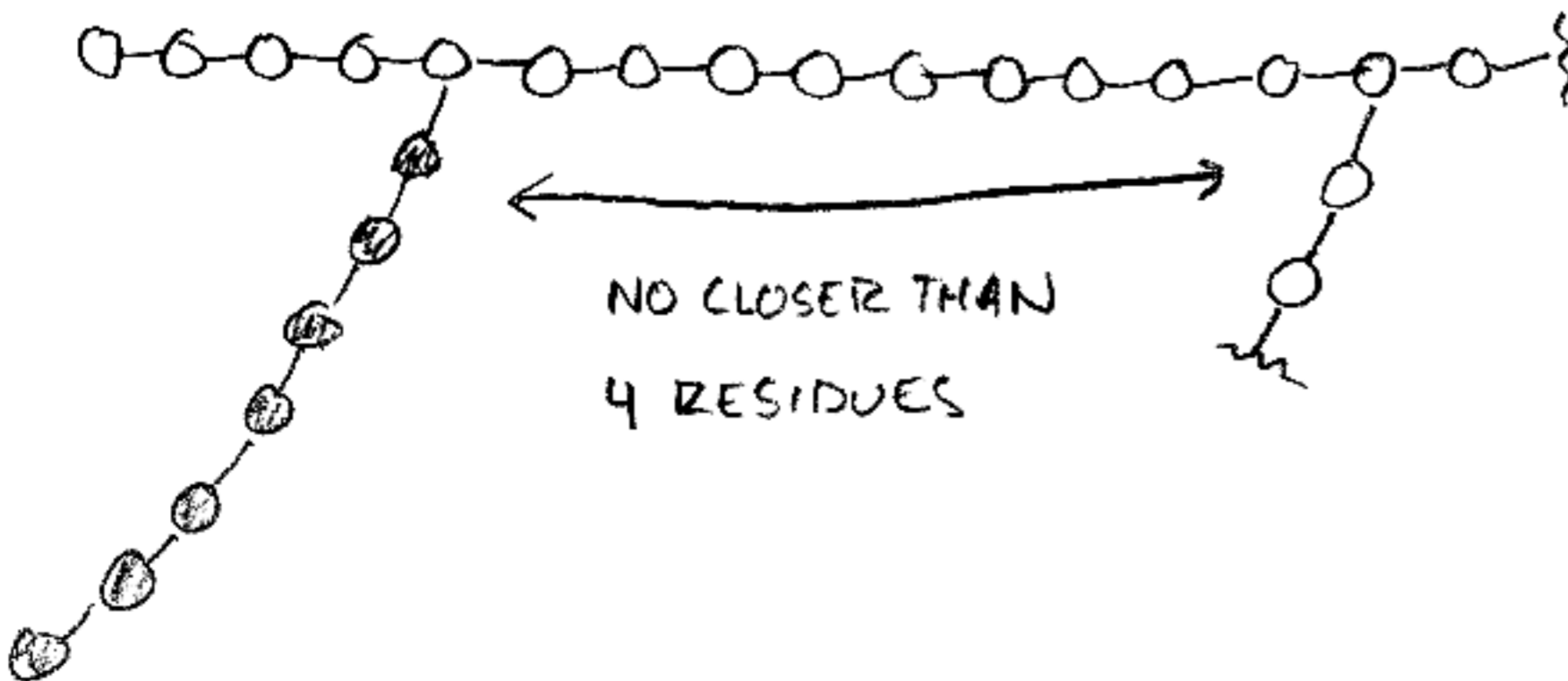
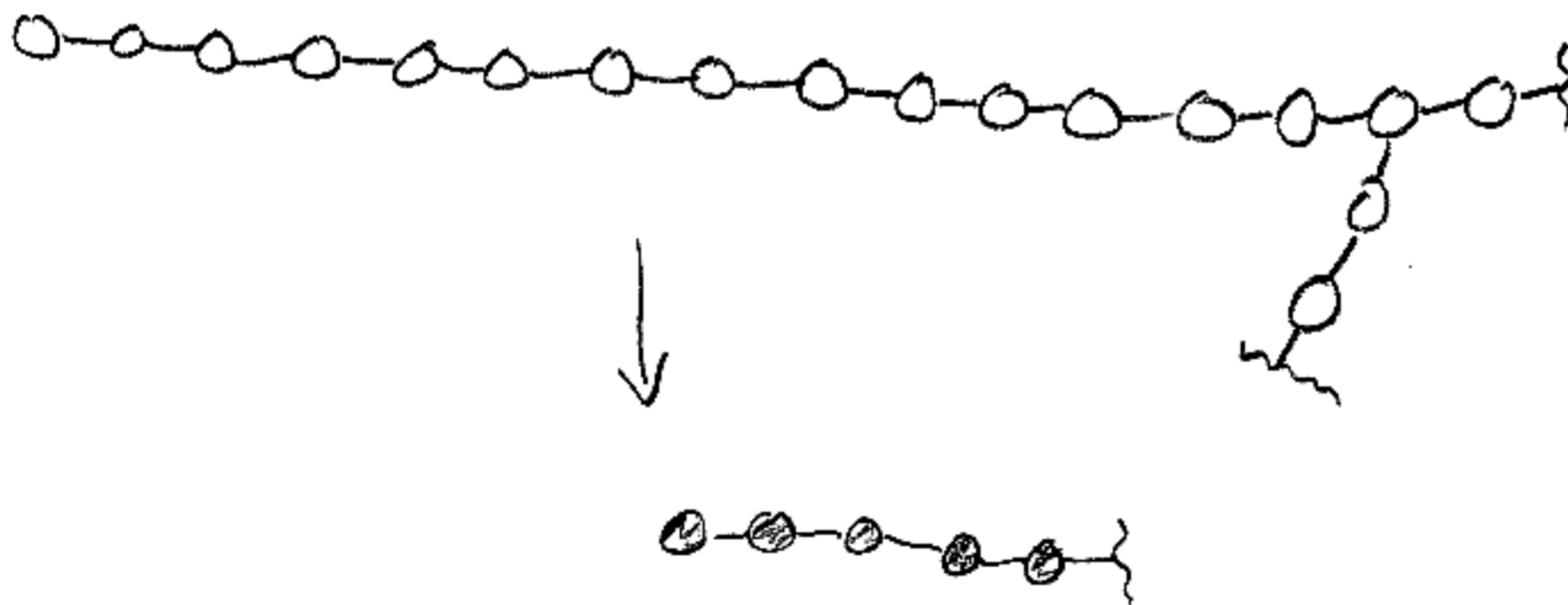
TO INITIATE A STRAND, AN ENZYME CALLED GLYCOGENIN SELF GLYCOSYLATES ITSELF BY FORMING AN OLIGOSACCHARIDE (~8 RESIDUES) THAT ATTACHES TO ONE OF ITS TYROSINE RESIDUES:



BRANCHING ENZYME:



TYPICALLY ~7 RESIDUES ARE TRANSFERRED FROM THE END OF A CHAIN LONGER THAN 11 RESIDUES TO ANOTHER CHAIN



THE BRANCHING ENZYME IS AN AMYLO-(1,4->1,6)-TRANSGLYCOSYLASE