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Sommario/riassunto

GAPDH (glyceraldehyde 3-phosphate dehydrogenase) is more than just a glycolytic enzyme. An unprecedented amount of literature demonstrates that GAPDH has an astounding multiplicity of function. This diversity is not simply due to cell compartmentation (i.e. redistributing glycolytic energy to where it is needed), although this feature is undoubtedly important and discussed in the book. GAPDH integrates glycolysis with other cellular processes. This concept of integration cannot be understated. But, there is more. GAPDH actively participates in numerous non-glycolytic cellular events that fall into very broad categories including the cell infrastructure and the transmission of genetic information. Some of GAPDH's biological properties are completely non-intuitive given the current undergraduate textbook understanding of this glycolytic enzyme. For example, GAPDH binds to select phospholipids and catalyzes organelle biogenesis. It has fusogenic properties, enabling it to be actively involved in nuclear envelop reassembly, autophagy and membrane trafficking. Human macrophages exhibit surface-localized GAPDH with receptor function. As scientists, we are trained to consider GAPDH as a soluble cytosolic dehydrogenase enzyme. The literature observations - as described in this book - tell us something quite different. Besides oxidoreductase activity, GAPDH exhibits peroxidase, uracil DNA glycosylase, nitrosylase, mono-ADP-ribosylase, esterase and phosphotransferase activity. GAPDH binds membrane transport proteins, G-proteins, poly-nucleotides, adenines, specific lipids, select carbohydrates, cytoskeletal proteins, nuclear import and export proteins, diverse ATPases, molecular chaperones and other molecules.
