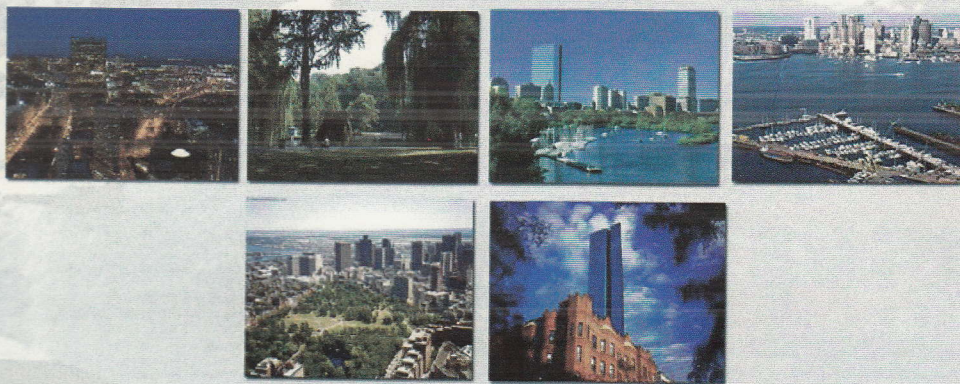




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115. DEUTERIUM DEPLETED WATER ALTERS GLUCOSE-DERIVED FATTY ACID AND CHOLESTEROL SYNTHESIS OF TUMOR CELLS

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Deuterium incorporation from common water into DNA increases its fragility thus accelerating mutations, aging and cancer. Meanwhile deuterium depletion temporarily decelerates cell growth *in vitro* and induces tumor regression *in vivo*. Herein we report metabolic flux-modifying effects of deuterium depleted water (DDW: 100, 50 and 25 ppm) as compared to normal D-containing water (150 ppm) on [1,2-¹³C₂]-D-glucose metabolism in cultured pancreatic (MIA-PaCa), lung (H-441) and breast (MCF-7) ductal carcinoma cells. After 72 hours of incubation with the tracer in DDW we analyzed its uptake, lactate production, glycolysis, RNA ribose, glycogen, cholesterol and long chain fatty acid and TCA cycle glutamate syntheses, as well as ¹³CO₂ release using GC/MS. DDW did not significantly alter glucose uptake, oxidation, glycogen, RNA ribose, lactate production or glucose oxidation in the TCA cycle in any of the cell lines. However, in MCF-7 cells cholesterol ¹³C labeling was increased by 4.3%, 50.2% and 66.5% during 100, 50 and 25 ppm water administration via HMG-CoA and mevalonate formation. In H441 and MIA cells DDW induced a dose dependent, uniform and significant inhibition of fractional cholesterol and long-chain saturated fatty acid synthesis. Based on this data deuterium to hydrogen ratios regulate sterol and fatty acid precursor synthesis, which likely affects the rate of divisions and cellular proliferation via the regulation of reductive synthesis and new membrane formation.