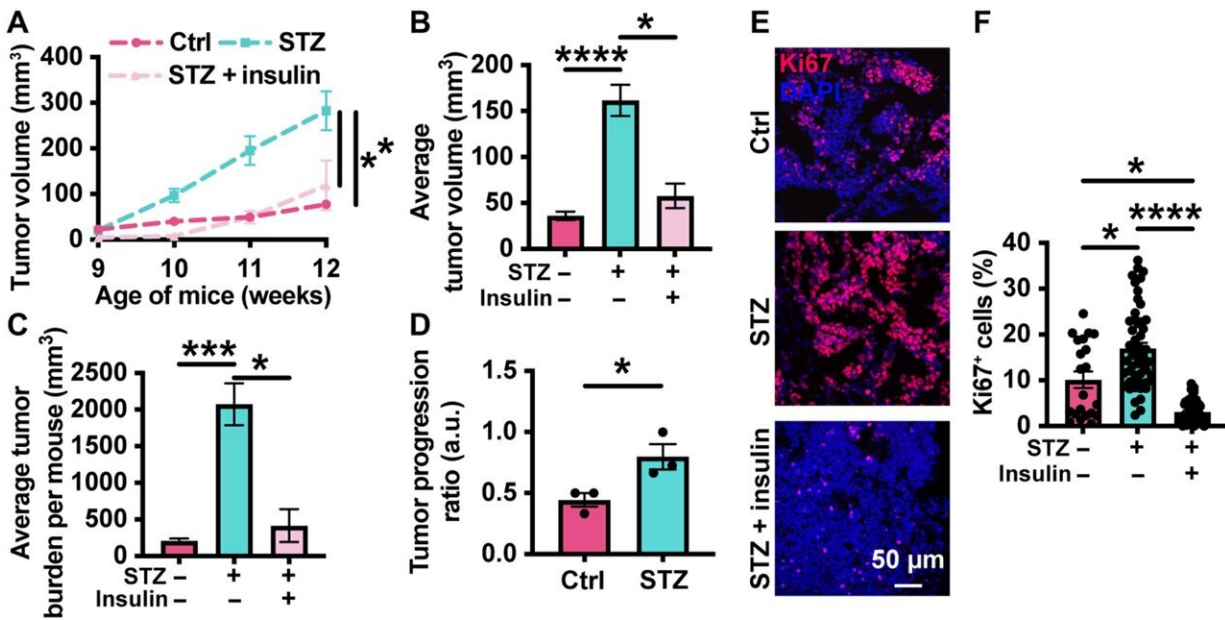


Study finds that diabetes may hasten breast cancer tumor growth and stiffness

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Hyperglycemia increases tumor growth through promoting cell proliferation. (A) Weekly average tumor volume measurements for nondiabetic (Ctrl), diabetic (STZ), and diabetic mice treated with insulin (STZ + insulin) from when tumors become palpable and large enough for caliper measurements (week 9) to study endpoint (Ctrl, N = 14; STZ, N = 12; STZ + insulin, N = 3). (B) Average tumor volume for control (Ctrl), diabetic (STZ), and diabetic mice treated with insulin (STZ + insulin) at study endpoint (Ctrl, N = 7 and n = 22; STZ, N = 13 and n = 75; STZ + insulin, N = 3 and n = 12). (C) Average tumor burden per mouse for control (Ctrl), diabetic (STZ), and diabetic mice treated with insulin (STZ + insulin) at study endpoint (Ctrl, N = 7; STZ, N = 22; STZ + insulin, N = 3). (D) Tumor differentiation grading of tumors extracted from control group and mice treated with STZ (N = 3 and n = 3). (E) Representative images showing Ki67

and nucleus colocalization within nondiabetic, diabetic (STZ), and diabetic tumors treated with insulin (STZ + insulin). (F) Corresponding quantification of the percentage of cells with Ki67⁺ nuclei (Ctrl, N = 7 = 3 and n = 3, 21 imaging fields; STZ, N = 4 and n = 6, 67 imaging fields; STZ + insulin, N = 3 and n = 8, 80 imaging fields included). Data are presented as means ± SEM. *P Science Advances (2022). DOI: 10.1126/sciadv.abo1673

While diabetes is already associated with an increased risk of developing breast cancer, a new Vanderbilt study published in *Science Advances* on November 18 indicates that presence of the disease may increase tumor growth and stiffness.

Researchers also found that diabetes treatments could reduce the tumor growth and stiffness to levels comparable with non-diabetic ones. The research was led by Cynthia Reinhart-King, Cornelius Vanderbilt Professor of Engineering and University Distinguished Professor. Vanderbilt Ph.D. student Wenjun Wang, a current member of Reinhart-King's cellular mechanics lab, and Lauren Hapach, Ph.D.'21, a former lab member, were co-authors.

The study sheds light on a previously unknown biomechanical mechanism in which diabetic hyperglycemia acts on the [extracellular matrix](#)—a molecular network that promotes the growth of cells—to accelerate [tumor growth](#) and stiffness in [breast cancer](#).

The research offers potential evidence for future therapies targeted to diabetic cancer patients.

More information: Wenjun Wang et al, Diabetic hyperglycemia promotes primary tumor progression through glycation-induced tumor extracellular matrix stiffening, *Science Advances* (2022). [DOI:](#)

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