Qeios

Peer Review

Review of: "Development of a Type 2 Diabetes Mellitus Model in Rats with Administration of High-Fat Diet and Streptozotocin"

Kayvan Khoramipour[1]

1. Miguel de Cervantes European University, Valladolid, Spain

- While the rationale for combining HFD and low-dose STZ is sound, the study could benefit from explicit justification for the specific dose (25 mg/kg x2) and timing (5-day interval). Prior literature is cited, but empirical reasoning for this exact adaptation is thin.
- Only 6 animals per group is below optimal for variability-rich metabolic studies. This raises concerns about statistical robustness and generalizability.
- A missing STZ-only or HFD-only group limits the ability to isolate the individual contribution of each intervention to the diabetic phenotype. This weakens mechanistic interpretation.
- The study evaluates parameters only shortly after diabetes induction. No follow-up on progression, organ damage, or behavioral/metabolic shifts over time.
- Curiously, HOMA-IR values are lower in diabetic rats, despite other markers clearly indicating insulin resistance. This is counterintuitive and suggests potential issues with insulin assay sensitivity or timing of measurement.
- Insulin levels were not reported directly.
- No glucose tolerance tests (GTT) or insulin tolerance tests (ITT) were conducted, which are critical to functionally assess insulin resistance.
- Inflammatory cytokines, lipids beyond cholesterol, and adipokines (e.g., leptin, adiponectin) could further validate the metabolic phenotype.
- The large weight gain in diabetic animals is expected with HFD, but weight usually declines after STZ due to β-cell loss and glycosuria. The net weight gain warrants more discussion.

doi.org/10.32388/M9BNLO

- There is no direct evidence provided for β-cell damage (e.g., histology, insulin staining, islet size/count). The model assumes this but doesn't verify it.
- Elevated creatinine is reported, but without urine data (e.g., albuminuria, proteinuria), it's hard to conclude early nephropathy.
- No oxidative stress, mitochondrial dysfunction, or inflammatory signaling markers were evaluated—yet the discussion invokes them. This creates a disconnect between claims and data.
- The model is good for early T2DM, but not suitable for studies on chronic complications (retinopathy, neuropathy, etc.) unless extended longitudinally.

Declarations

Potential competing interests: No potential competing interests to declare.