Markers of bladder fibrosis and inflammation across six rodent models of type 1 and type 2 diabetes

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Introduction

- Bladder dysfunction is common in diabetes and can manifest as detrusor over- and underactivity
- Overactive bladder syndrome is less effectively treated in diabetes[1,2].
- A major enlargement of bladder mass occurs in all rodent models of type 1 diabetes (T1DM) and in many but not all of type 2 diabetes (T2DM)[3,4].
- Organ hypertrophy in other tissues is typically accompanied by fibrosis and (non-infectious) inflammation. In contrast, if anything, collagen content decreases in bladders of the streptozotocin (STZ) model of T1DM. Nothing is known on models of T2DM.

Research question

- Explore expression of markers of fibrosis (collagens I and II, and TGF-β) and of inflammation (MCP-1) in the bladder of six models of T1DM and T2DM that do and do not exhibit bladder enlargement.

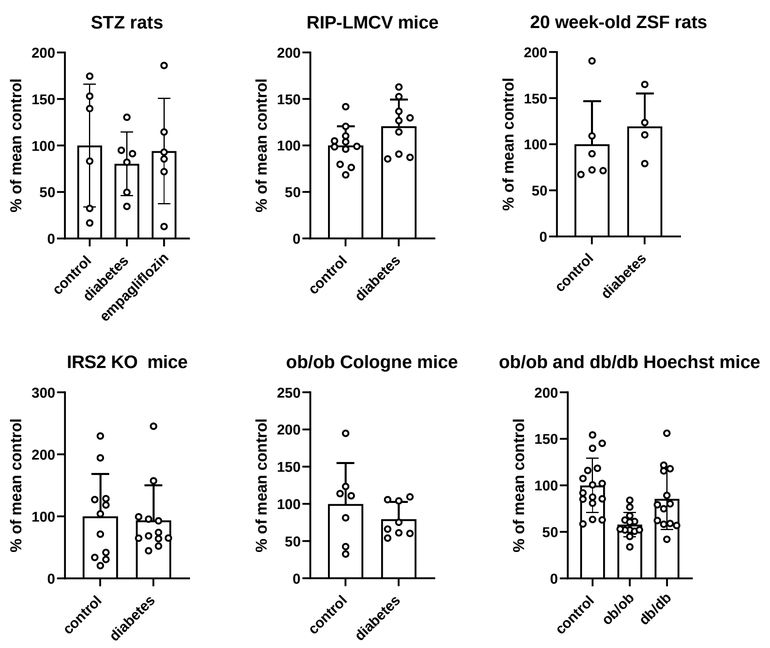
Materials and Methods

- Bladder specimens were obtained from six rodent models
  - Female STZ rats (T1DM)
  - Both sexes of RIP-LCMV mice (T2DM)
  - Male ZSF1 rats (T2DM)
  - Both sexes of IRS2 knock-out mice (T2DM)
  - Both sexes of ob/ob mice (T2DM, 2 studies)
  - Both sexes of db/db mice (T2DM)
- PCR performed and mRNA data normalized for GAPDH/β-actin as reported[5]
- Data shown as means ± SD; each data point one animal

Results

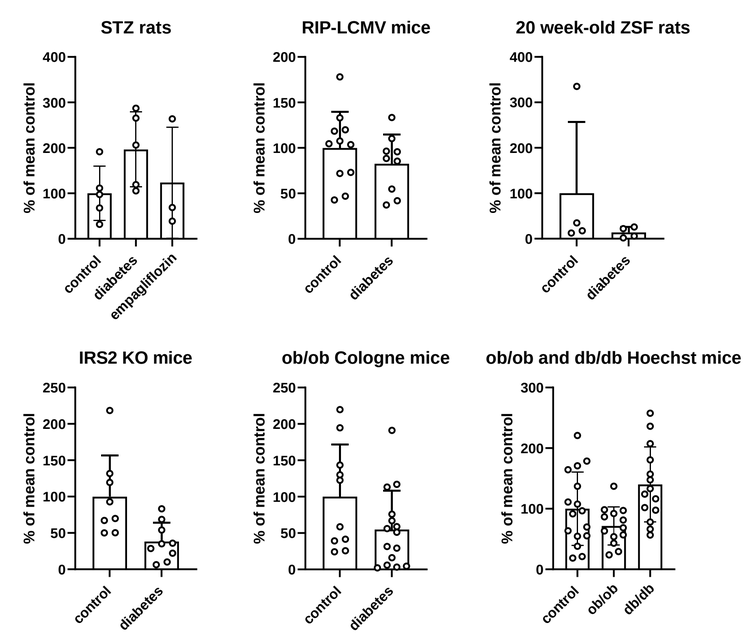
- No increase in mRNA expression of collagen I (Figure 1), collagen III or TGF-β in any of the six models (not shown)

Figure 1



- No increase in mRNA expression of MCP-1 (Figure 2) in any of the six models

Figure 2



Conclusions

- This is the first report on markers of fibrosis and inflammation in the bladder of animal models of diabetes other than the STZ model of T1DM.
- Together with previous data in the STZ model, our data show lack of fibrosis and inflammation (at least at the mRNA level for the markers studied here).
- Apparently, bladder enlargement in diabetes has a fundamentally distinct pathophysiology than that in non-diabetic animal models.

References

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