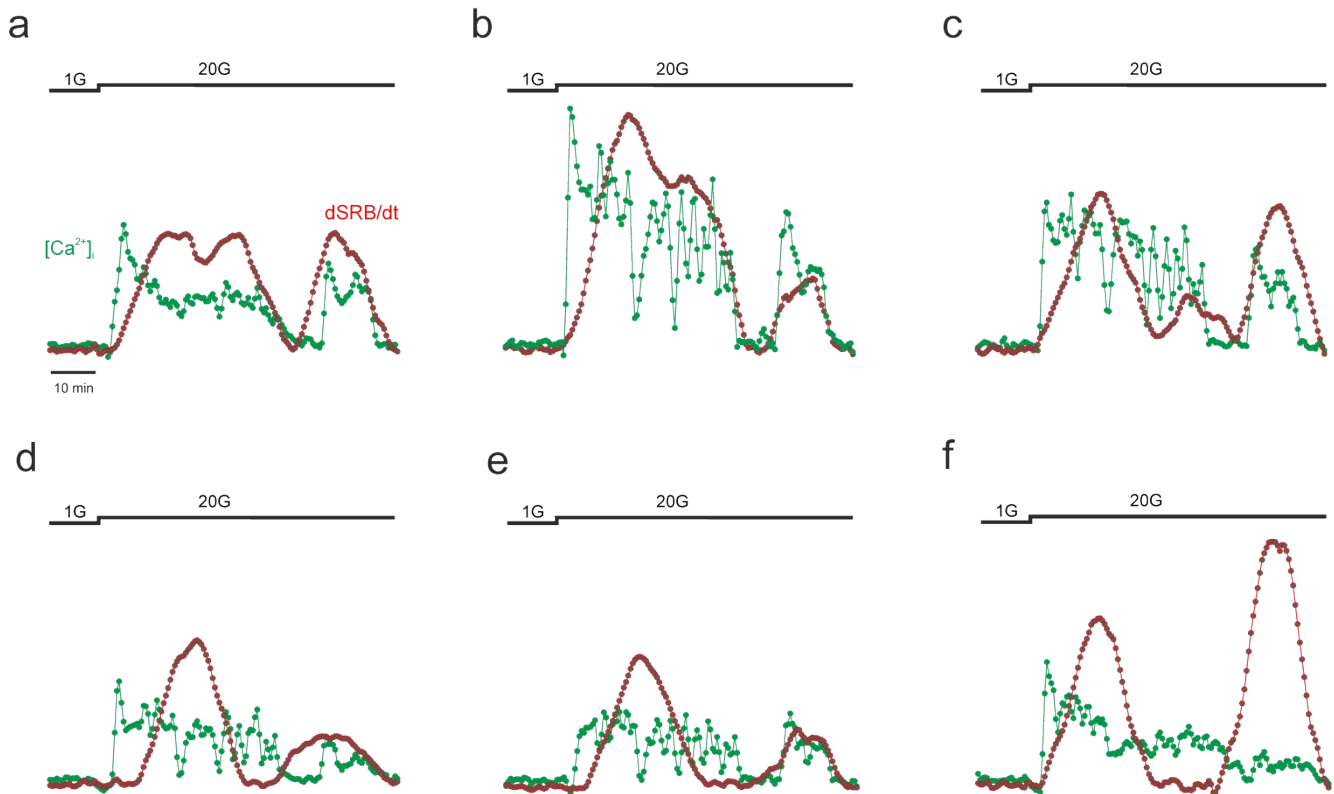


## Supporting Information

**Figure S1 Co-staining and co-imaging, paracrine signalling and optogenetic stimulation.** **(a)** Co-staining of freshly isolated mouse islets with SRB and Lectin-FITC. Note the high co-localization in the vessel endothelia cells. **(b)-(c)** Effect of  $\alpha_2$ -agonist (clonidine) and antagonist (yohimbine) **(b)** and broad range sstR-antagonist CYN154806 **(c)** on PATP. **(d)** Detailed view of the responses of the extracellular sensor Zimir and SRB patterned uptake to high glucose. **(e)** Effect of the  $K_{ATP}$  channel opener diazoxide on PAPT in pancreatic islet cells. **(f)** Kinetics of the PATP from regions *R1-R6*, as shown in Figure e. **(g)** Expression of the  $[ATP/ADP]_i$  sensor Perceval (above) and trappable  $Ca^{2+}$  sensing dye Fluo4 in pancreatic islets.



**Figure S2 The coupling and the discrepancy between the  $[Ca^{2+}]_i$  and PAPT response. (a)-(f):** PAPT (red) and  $[Ca^{2+}]_i$  response to high glucose from the same cells within an islet of Langerhans. The scale is identical for all six cells.

**Movie 1** Exocytosis in pancreatic islet  $\beta$ -cells imaged as transient SRB  $\Omega$ -shapes:

[https://www.dropbox.com/s/x9zrepzl7sghbho/omega\\_shape\\_exocytosis.gif?dl=0](https://www.dropbox.com/s/x9zrepzl7sghbho/omega_shape_exocytosis.gif?dl=0)

**Movie 2** Post-secretory endocytosis in pancreatic islets (2D, raw) in mouse pancreatic islets:

[https://www.dropbox.com/s/d8v4g3ozbnk27na/mouse\\_2D.gif?dl=0](https://www.dropbox.com/s/d8v4g3ozbnk27na/mouse_2D.gif?dl=0)

**Movie 3** Feature-detected 3D post-secretory endocytosis in mouse pancreatic islets:

[https://www.dropbox.com/s/31ufhkrpbc6j53e/3D\\_mouse\\_feature\\_detected.gif?dl=0](https://www.dropbox.com/s/31ufhkrpbc6j53e/3D_mouse_feature_detected.gif?dl=0)

**Movie 4** Post-secretory endocytosis in pancreatic islets (2D, raw) in human pancreatic islets  
(healthy donor):

[https://www.dropbox.com/s/gdzt9bwaz1o0cuj/human\\_2D.gif?dl=0](https://www.dropbox.com/s/gdzt9bwaz1o0cuj/human_2D.gif?dl=0)