

Table 1. Insulin Vesicle Secretion Kinetics in Primary Cultures of Pancreatic Beta Cells

Stimulus Type	Lag (s)	Pulse Mass (ves/ μm^2)	Pulse Duration (s)	Pulse Interval (s)	Secretion Rate (Overall [†] , Burst [‡] , Maximum [§]) (ves/min/ μm^2)	Number of Pulses	Vesicles Secreted in Bursts (%)	Arrival Rate (ves/hr/ μm^2)	Membrane Surface Area (μm^2)	Fluorescent Vesicle Density (ves/ μm^2)
<i>Rat</i>										
K^+ (n=5)	2.0±0.6 ^{*,}	0.09±0.03	5.2±1.4	NA	0.10±0.02 ^{††} 1.29±0.35 ^{*,#} 4.69±1.32	NA	NA	0.13±0.03 (n=3)	1200±50	0.70±0.10
Glucose (n=8)	54±30	0.02±0.01	10.2±2.7	46 ^{‡‡}	0.02±0.01 0.25±0.09 3.13±1.73	5.5±0.9	79±4	0.07±0.02 (n=8)	1500±300	
<i>Human</i>										
K^+ (n=5)	1.7±0.5 ^{*,¶}	0.18±0.03	14.8±3.5	NA	0.22±0.04 ^{††} 1.00±0.35 4.75±0.65	NA	NA	0.74±0.11 (n=13)	1100±150	0.70±0.09
Glucose (n=5)	63±19	0.08±0.04	18.4±7.8	50 ^{‡‡}	0.05±0.02 0.26±0.08 3.79±0.67	6.8±1.3	80±6	0.43±0.18 ^{*,**} (n=5)	900±210	

[†]Overall Secretion Rate=(Total Vesicles Secreted)/(Total Imaging Time)

[‡]Burst Secretion Rate=(Vesicles Secreted in Pulse)/(Pulse Duration)

[§]Maximum Secretion Rate=Maximum(Vesicles Secreted in Single Frame)/(Frame Duration)

For cells stimulated with glucose, the data are compiled from the first ten minutes of stimulation.

* p<0.05, Student's two-sided t-test

|| Compared to "Lag" for glucose-stimulated rat cells

¶ Compared to "Lag" for glucose-stimulated human cells

Compared to "Burst Secretion Rate" for glucose-stimulated rat cells

** Compared to "Arrival Rate" for glucose-stimulated rat cells

NA—Not Applicable

^{††} Calculated using the first minute of secretion following stimulation.

^{‡‡} Median value for the distribution of all pulse intervals in all cells. Pulses were identified by a sudden change in the slope of the cumulative secretion plot. See figure legends for statistically significant pulse intervals identified in specific cells.