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Invited review

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Pierre Maechler

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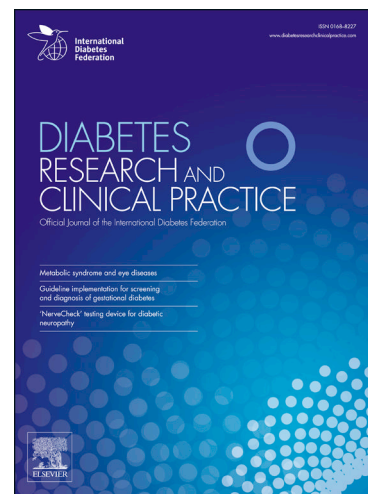
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# Glutamate pathways of the beta-cell and the control of insulin secretion

Pierre Maechler

Department of Cell Physiology and Metabolism & Faculty Diabetes Center, University of Geneva Medical Center, Geneva, Switzerland.

## Abstract

Pancreatic beta-cells secrete insulin in response to circulating glucose, thereby maintaining euglycemia. Inside the beta-cell, glucose is transformed into intracellular signals stimulating exocytosis. While calcium is an obligatory messenger, this ion is not sufficient to promote the full secretory response. Accordingly, glucose metabolism produces the additive factor glutamate that participates to an amplifying pathway of the calcium signal. Although intracellular glutamate potentiates insulin secretion, extracellular glutamate may activate ionotropic receptors. As a consequence of such activation, insulin exocytosis is slowed down. Therefore, for the beta-cell glutamate is a double-edged sword, an amplifying pathway and a negative feedback, illustrating the principle of homeostasis.

**Key words:** pancreatic beta-cell, insulin, glucose, glutamate

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