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EDITORIAL

- 1549** Multidisciplinary approach toward enhanced recovery after surgery for total knee arthroplasty improves outcomes

Nag DS, Swain A, Sahu S, Sahoo A, Wadhwa G

- 1555** Using clinical cases to guide healthcare

Colwill M, Baillie S, Pollok R, Poullis A

ORIGINAL ARTICLE**Retrospective Study**

- 1560** Analysis of the causes of primary revision after unicompartmental knee arthroplasty: A case series

Zhao JL, Jin X, Huang HT, Yang WY, Li JH, Luo MH, Liu J, Pan JK

- 1569** Efficacy and safety of minimally invasive laparoscopic surgery under general anesthesia for ovarian cancer

Qin X, Chen C, Liu Y, Hua XH, Li JY, Liang MJ, Wu F

- 1578** Factors influencing Frey syndrome after parotidectomy with acellular dermal matrix

Chai XD, Jiang H, Tang LL, Zhang J, Yue LF

Clinical Trials Study

- 1585** Allogeneic mesenchymal stem cells may be a viable treatment modality in cerebral palsy

Boyalı O, Kabatas S, Civelek E, Özdemir O, Bahar-Ozdemir Y, Kaplan N, Savrunlu EC, Karaöz E

Observational Study

- 1597** Clinical characteristics of acute non-varicose upper gastrointestinal bleeding and the effect of endoscopic hemostasis

Wang XJ, Shi YP, Wang L, Li YN, Xu LJ, Zhang Y, Han S

Clinical and Translational Research

- 1606** Construction of the underlying circRNA-miRNA-mRNA regulatory network and a new diagnostic model in ulcerative colitis by bioinformatics analysis

Yuan YY, Wu H, Chen QY, Fan H, Shuai B

- 1622** Exploring the autophagy-related pathogenesis of active ulcerative colitis

Gong ZZ, Li T, Yan H, Xu MH, Lian Y, Yang YX, Wei W, Liu T

CASE REPORT

- 1634** Low-molecular-weight heparin and preeclampsia — does the sword cut both ways? Three case reports and review of literature

Shan D, Li T, Tan X, Hu YY

- 1644** Pulmonary alveolar proteinosis induced by X-linked agammaglobulinemia: A case report
Zhang T, Li M, Tan L, Li X
- 1649** Gradient inflammation in the pancreatic stump after pancreaticoduodenectomy: Two case reports and review of literature
Wang TG, Tian L, Zhang XL, Zhang L, Zhao XL, Kong DS
- 1660** Low interleukin-10 level indicates a good prognosis in *Salmonella enterica* serovar typhimurium-induced pediatric hemophagocytic lymphohistiocytosis: A case report
Chen YY, Xu XZ, Xu XJ
- 1669** Multi-systemic melioidosis in a patient with type 2 diabetes in non-endemic areas: A case report and review of literature
Ni HY, Zhang Y, Huang DH, Zhou F
- 1677** Endoscopic ultrasound-guided tissue sampling induced pancreatic duct leak resolved by the placement of a pancreatic stent: A case report
Kim KH, Park CH, Cho E, Lee Y
- 1685** Upadacitinib for refractory ulcerative colitis with primary nonresponse to infliximab and vedolizumab: A case report
Xu X, Jiang JW, Lu BY, Li XX
- 1691** Exogenous insulin autoimmune syndrome: A case report and review of literature
Xu LL, Chen JX, Cheng JP, Luo N
- 1698** Unexplained fetal tachycardia: A case report
Wang H, Duan RZ, Bai XJ, Zhang BT, Wang J, Song WX
- 1704** Challenging anticoagulation therapy for multiple primary malignant tumors combined with thrombosis: A case report and review of literature
Chen JX, Xu LL, Cheng JP, Xu XH

LETTER TO THE EDITOR

- 1712** Epinephrine also acts on beta cells and insulin secretion
Zabulienė L, Ilias I

ABOUT COVER

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Epinephrine also acts on beta cells and insulin secretion

Lina Zabuliene, Ioannis Ilias

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Abstract

In a recent review examining neurotransmitter modulation of insulin secretion, the significant impact of epinephrine was not addressed. Its primary action involves inhibiting insulin release *via* alpha-adrenergic receptors, thereby reducing the response to insulin secretion stimulators, through the activation of K⁺ channels and resulting in membrane hyperpolarization in beta cells.

Key Words: Epinephrine; Insulin; Islets; Glucose; Human

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Core Tip: Among the neurotransmitters influencing insulin secretion, the role of epinephrine (EPI) might be underestimated. EPI mainly inhibits insulin release through alpha-adrenergic receptors, thereby attenuating the response to insulin secretion stimulators.

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TO THE EDITOR

We have reviewed with interest the concise examination by Kong *et al*[1] of neurotransmitter influence on insulin secretion. While the authors extensively cover norepinephrine (NEPI), the role of epinephrine (EPI) is overlooked. Both EPI and NEPI, acting as neurotransmitters and hormones, are synthesized and released in the central

and peripheral nervous systems and the adrenal medulla[2]. Despite NEPI's primary role as a neurotransmitter, the significance of EPI, which also functions as a hormone, should not be disregarded for its neurotransmitter functions. Hence, EPI's impact closely parallels that of NEPI, though with more pronounced peripheral effects[2].

EPI can prompt insulin release *via* beta-adrenergic receptor activation, involving adenylate cyclase, cAMP generation, and the cAMP Response Element-Binding Protein pathway[3]. However, its primary effect, mediated by alpha-adrenergic receptor activation, inhibits insulin secretion through the Protein kinase A pathway. This inhibition significantly moderates the response to insulin's strongest stimulants[4]. EPI achieves this by activating K⁺ channels, leading to hyperpolarization of pancreatic beta cell membranes[5,6].

The above concise overview of EPI's impact on insulin secretion complements the excellent and comprehensive review of neurotransmitter effects on insulin secretion[1].

FOOTNOTES

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