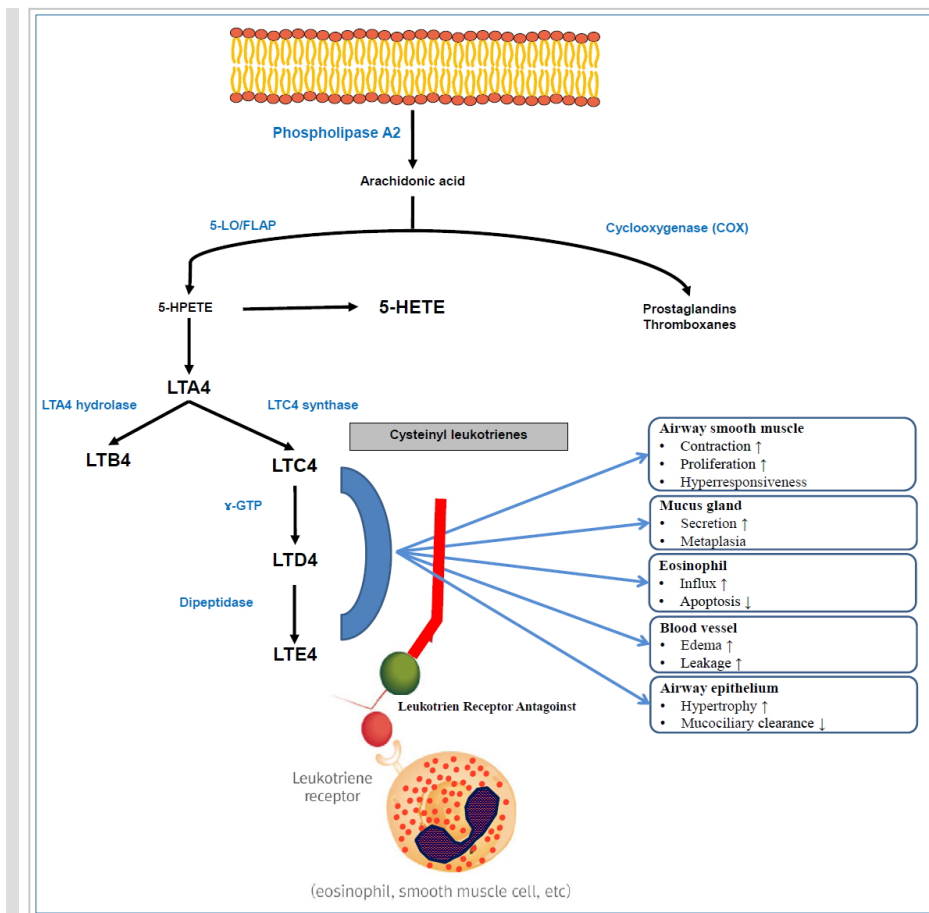




## Montelukast use over the past 20 years: monitoring of its effects and safety issues

Yong Ju Lee, Chang-Keun Kim



Clin Exp Pediatr. 2020;63(10):376-381.

[Fulltext](#) [PubReader](#) [PDF](#)

## Air pollution and childhood obesity

Moon Young Seo, Shin-Hye Kim, Mi Jung Park

Pollutant	Ambient	Household
<b>Primary pollutants</b>		
CO	Incomplete combustion of carbon-containing fuels, vehicular exhaust, and photochemical reactions in the atmosphere	Gas stoves and tobacco smoke
SO <sub>2</sub>	Industrial activities that process sulfur-containing fuels, and motor vehicles emissions	Combustion of coal/oil
NO <sub>2</sub>	Power plants and motor vehicles emissions	Gas and kerosene heaters, and tobacco smoke
PAHs	Incomplete combustion of organic materials (e.g., coal, oil, petrol, and wood)	Wood stoves, barbecues, and tobacco smoke
VOCs	Fossil fuels and motor vehicles emissions	Paints, disinfectant, air-fresheners, and photocopy machines
<b>Secondary pollutants</b>		
PM	Directly emission or transformation of gaseous emissions (e.g., SO <sub>2</sub> , NO <sub>2</sub> , VOCs) by motor vehicle combustion of solid/fossil fuels, and forest fires	Gas/wood stoves, and gas space heaters
O <sub>3</sub>	The reaction of NO <sub>2</sub> and VOCs in the presence of sunlight	None

Clin Exp Pediatr. 2020;63(10):382-388.

[About](#)[Browse articles](#)[For contributors](#)

Clin Exp Pediatr. 2020;63(10):391-392.

[Fulltext](#) [PubReader](#) [PDF](#)

## Risk factors for in-hospital mortality in premature infants with critical congenital heart disease

Jeonghee Shin

Clin Exp Pediatr. 2020;63(10):391-392.

[Fulltext](#) [PubReader](#) [PDF](#)

## Utility of neonatal early-onset sepsis calculator in risk-based group B *Streptococcus* screening approach

Myo-Jing Kim

Clin Exp Pediatr. 2020;63(10):393-394.

[Fulltext](#) [PubReader](#) [PDF](#)

## New modified version of the Risk Adjustment for Congenital Heart Surgery category and mortality in premature infants with critical congenital heart disease

Young Mi Yoon, Seong Phil Bae, Yoon-Joo Kim et al.

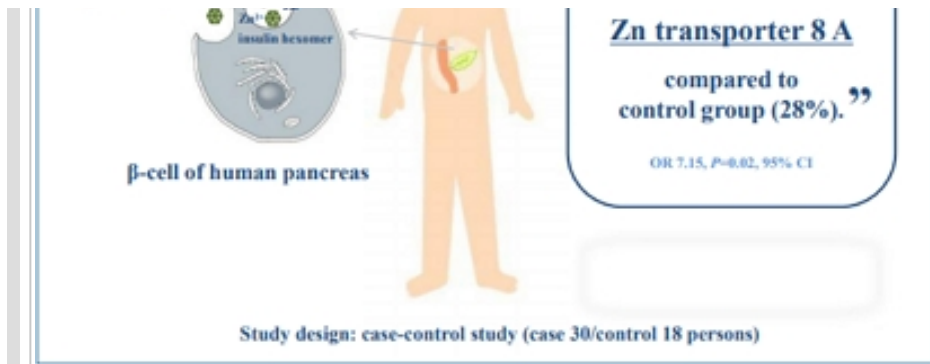
Variable	Total (n=78)		Intervention (n=68)	
	aOR <sup>a</sup> (95% CI)	P-value	aOR <sup>b</sup> (95% CI)	P-value
VLBW	7.45 (1.11–50.67)	0.039	23.63 (1.24–451.06)	0.036
PPHN	31.57 (1.64–609.28)	0.022		
BPD	9.84 (1.71–56.44)	0.010	33.07 (2.49–438.61)	0.008
M-RACHS ≥5	18.20 (3.51–94.43)	0.001	51.45 (2.52–1,050.04)	0.010

Clin Exp Pediatr. 2020;63(10):395-401.

[Fulltext](#) [PubReader](#) [PDF](#)

## Zinc transporter 8 autoantibody in the diagnosis of type 1 diabetes in children

Nur Rochmah, Muhammad Faizi, Siti Wahyu Windarti

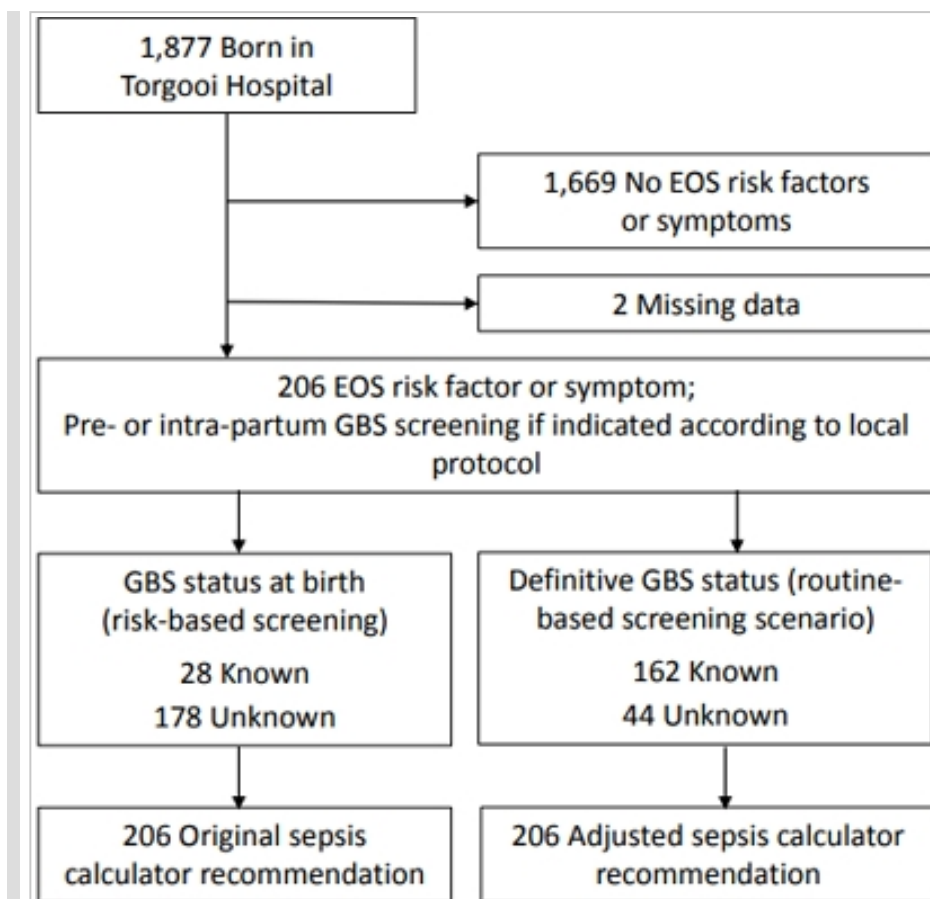
[About](#)[Browse articles](#)[For contributors](#)

Clin Exp Pediatr. 2020;63(10):402-405.

[Fulltext](#) [PubReader](#) [PDF](#)

## Risk-based maternal group B *Streptococcus* screening strategy is compatible with the implementation of neonatal early-onset sepsis calculator

Niek B. Achten, J. Wendelien Dorigo-Zetsma, Annemarie M.C. van Rossum et al.



Clin Exp Pediatr. 2020;63(10):406-410.

[Fulltext](#) [PubReader](#) [PDF](#)

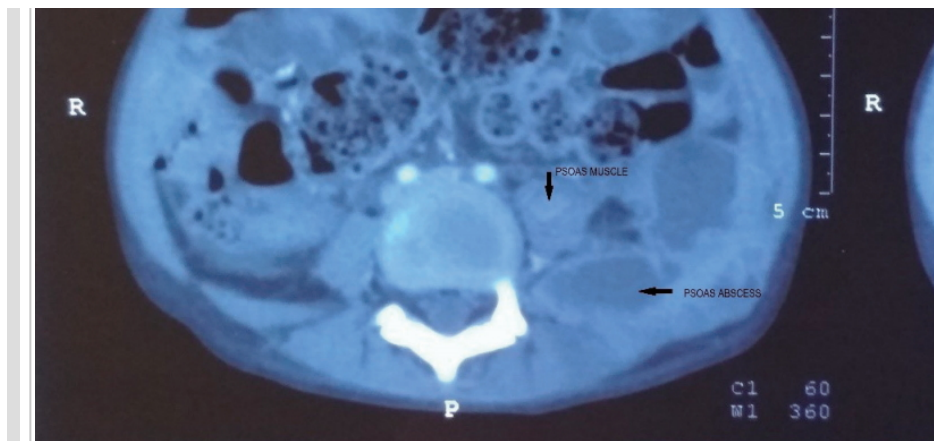
## First episode of nephrotic syndrome with acute abdominal pain

Samridhi Goyal, Rachita Singh Dhull, Bobby Deepthi et al.

[About](#)

[Browse articles](#)

[For contributors](#)



Clin Exp Pediatr. 2020;63(10):411-414.

[Fulltext](#) [PubReader](#) [PDF](#)

---

[View Full Site](#)

## Editorial board


[HOME](#) [ABOUT](#) [Editorial board](#)
[2020s](#) | [2010s](#) | [2000s](#) | [1990s](#) | [1980s](#) | [1970s](#)
[2021-2024](#) | [2018-2021](#)


### Editor-in-Chief

Man Yong Han  *Department of Pediatrics CHA University, Korea*


### Editorial Board


Cezmi Akdis  *Swiss Institute of Allergy and Asthma Research, Swiss*


Nyambat Batmunkh  *Regional Office for the Western Pacific, World Health Organization, Manila, Philippines*


Yiu-fai Cheung  *Department of Paediatrics and Adolescent Medicine, Queen Mary Hospital, The University of Hong Kong, Hong Kong, China*

Ga Won Jeon  *Department of Pediatrics, Inha University Hospital, Incheon, Korea*


Sun Hee Choi  *Department of Pediatrics Kyung Hee University, Korea*

Michael Z. David  *Department of Biostatistics, Epidemiology and Informatics, University of Pennsylvania Perelman School of Medicine, PA, USA*

Erwin Gelfand  *Division of Cell Biology, Department of Pediatrics, National Jewish Health, Denver, CO, USA*

Prastiya Indra Gunawan  *Department of Pediatrics, Faculty of Medicine Universitas Airlangga/Dr Soetomo General Academic Hospital, Surabaya, Indonesia*


Il Tae Hwang  *Department of Pediatrics, Hallym University, Korea*


Shuichi Ito  *Department of Pediatrics, Graduate School of Medicine, Yokohama City University, Yokohama, Japan*

Yuwu Jiang  *Department of Pediatrics, Peking University First Hospital, Beijing, China.*

Dae Sun Jo  *Department of Pediatrics, Chonbuk National University, Korea*


Hyunmi Kim  *Department of Neurology, Stanford University School of Medicine, USA*


Bee Wah Lee  *Department of Paediatrics, Yong Loo Lin School of Medicine, National University of Singapore, Singapore*

Jun Ah Lee  *Department of Pediatrics, Center for Pediatric Cancer, National Cancer Center, Republic of Korea*

Jung Won Lee  *Department of Pediatrics, Ewha Womans University, Korea*

Abolfazl Mahyar  *Department of pediatrics, Qazvin University of Medical Sciences, Qazvin, Iran*

Mika Mäkelä  *Department of Allergy, University of Helsinki and Helsinki University Hospital, Helsinki, Finland*

Jin Hee Oh  *Department of Pediatrics, St. Vincent's Hospital College of Medicine, The Catholic University of Korea*

E-submission  
[Submit Your Manuscript](#)



### MOST CITED

### AHEAD-OF PRINT


Cited By 35 **Clinical features, diagnosis, and outcomes of multisystem inflammatory syndrome in children associated with coronavirus disease 2019**

Cited By 22 **Cohort profile: National Investigation of Birth Cohort in Korea study 2008 (NICKs-2008)**

Cited By 13 **Myelin oligodendrocyte glycoprotein antibody encephalitis following severe acute respiratory syndrome coronavirus 2 in a pediatric patient**

Cited By 13 **Cognitive outcomes in late childhood and adolescence of neonatal hypoxic-ischemic encephalopathy**

Cited By 11 **Neurodevelopmental outcomes of very low birth weight infants in the Neonatal Research Network of Japan: importance of neonatal intensive care unit graduate follow-up**

[+more](#)
 E-mail Alert

 Metrics

4.9

97th percentile

2021  
CiteScore

Powered by **Scopus**


 PubMed Central


 PubMed

 Scopus

 DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

[TOPICS](#) [ARTICLE CATEGORY](#) [BROWSE ARTICLES](#) [FOR CONTRIBUTORS](#) [ABOUT](#)

Christian Taube  *Department of Pneumology, University Medicine Essen-Ruhrlandklinik, West  
German Lung Center, University Duisburg-Essen, Essen, Germany*


Jiu-Yao Wang  *College of Medicine, National Cheng Kung University, Tainan City, Taiwan, China*

Jung Min Yoon  *Department of Pediatrics, Konyang University College of Medicine, Korea*

#### Junior Editor

Hong Ki Ko  *Department of Pediatrics, Independent researcher, USA* [Graphical abstract]

#### Statistical consultant

Kee-Jae Lee  *Department of Information and Statistics, Korea National Open University, Seoul,  
Republic of Korea*

#### Editorial manager

Nam Hong Kim *The Korean Pediatric Society, Korea*

#### Manuscript editor

Hwan Tae Ahn *JTS, Seoul*

#### Layout editor

Hyun Sook Choi *PNMED Co., Korea*

#### Website and JATS XML File Producers

Yoon-Sang Cho *M2PI, Korea*



# Zinc transporter 8 autoantibody in the diagnosis of type 1 diabetes in children

Nur Rochmah, MD, Muhammad Faizi, MD, Siti Wahyu Windarti, MD

Department of Child Health, Dr. Soetomo General Hospital, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

**Background:** Type 1 diabetes (T1D) is an organ-specific autoimmune disease related to the autoimmune response against pancreatic  $\beta$ -cells. Zinc transporter 8 (ZnT8), an islet-specific gene product localized to the  $\beta$ -cell insulin granule, was recently identified as an autoantigen in T1D.

**Purpose:** To evaluate the use of ZnT8 autoantibody (ZnT8A) for diagnosing T1D.

**Methods:** This case-control study was conducted at Dr. Soetomo General Hospital, Surabaya, Indonesia, from March to May 2019. Children younger than 18 years of age with T1D based on the International Society for Pediatric and Adolescent Diabetes guideline and healthy controls were included. We measured ZnT8A level using enzyme-linked immunosorbent assay (cutoff value, 0.315).

**Results:** There were 30 children with T1D (50.0% boys; mean age,  $11.3 \pm 3.7$  years) and 18 healthy controls (44.4% boys; mean age,  $8.3 \pm 3.1$  years); 1 patient in each group was Madurese, while the others were Javanese. Twenty-two of 30 subjects with T1D (73.3%) tested positive for ZnT8A compared to 5 of 18 controls (27.8%) ( $P=0.02$ ; odds ratio, 7.15; 95% confidence interval, 1.93–26.52). When ZnT8A-positive and -negative T1D cases were compared, no differences were detected in age at diagnosis, duration of diabetes, presence of ketoacidosis, body mass index, glycosylated hemoglobin concentration, or C-peptide concentrations.

**Conclusion:** ZnT8A may be useful in the diagnosis of T1D.

**Key words:** ZnT8 autoantibody, Type 1 diabetes, Diagnosis, Child

## Key message

**Question:** Can zinc transporter 8 autoantibody (ZnT8A) be used for diagnosing type 1 diabetes (T1D)?

**Finding:** Twenty-two of 30 subjects with type 1 diabetes (73.3%) were positive for ZnT8A compared to 5 of 18 controls (27.8%).

**Meaning:** ZnT8A has potential for clinical applications in the diagnosis of T1D.

## Introduction

Type 1 diabetes (T1D) is a kind of organ-specific autoimmune disease related to the autoimmune response against pancreatic  $\beta$ -cells. Measurement of the autoantibodies against pancreatic  $\beta$ -cell antigens, such as glutamic acid decarboxylase antibody (GADA), anti-insulin autoantibody (IAA), insulinoma-associated antigen-2 antibody (IA-2A), and islet cell autoantibody, is helpful to diagnose T1D. Zinc transporter 8 (ZnT8), an islet-specific gene product localized to the  $\beta$ -cell insulin granule, is recently identified as an autoantigen in T1D.<sup>1)</sup> The introduction of zinc transporter 8 autoantibody (ZnT8A) in the routine diagnostic process of T1D may improve the overall autoantibody sensitivity.<sup>2)</sup> Positivity of ZnT8A in T1D is related to the early onset of illness and increases the risk of diabetic ketoacidosis (DKA) as one of the complications.<sup>3)</sup> The presence of ZnT8A in T1D was associated with ethnic that could be explained by genetic factors.<sup>4,5)</sup> To date, study about ZnT8A as a diagnostic parameter of T1D is still limited in Asia Pacific region, especially in Indonesia. Therefore, we aimed to evaluate the use of ZnT8A for diagnosing T1D.

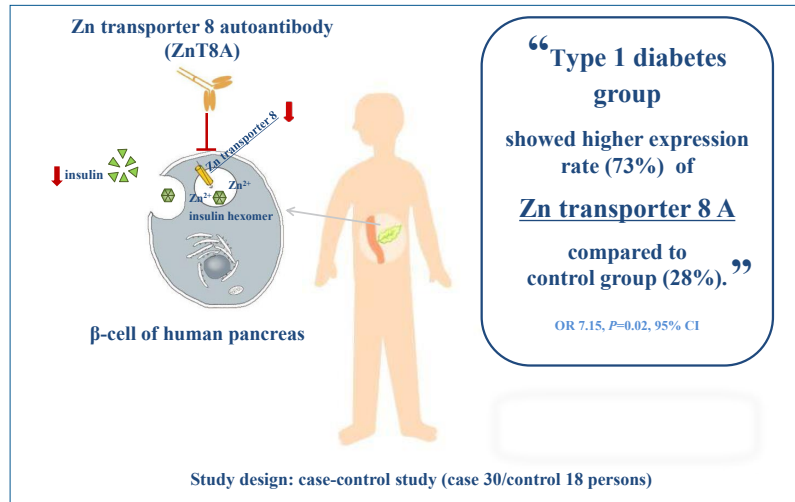
## Methods

This case-control study was approved by the ethical committees of the Dr. Soetomo General Hospital, Surabaya, Indonesia (1131/KEPK/IV/2019). Written informed consent was obtained from all participants. This study was conducted in the outpatient clinic of Endocrinology Department of Dr. Soetomo General Hospital, Surabaya, Indonesia from March to May 2019. A total of 30 patients, between 1–18 years of age (15 boys and 15 girls) diagnosed with T1D according to International Society for Pediatric and Adolescent Diabetes guideline,<sup>6)</sup> were included. Eighteen healthy children with no diabetes or other autoimmune diseases were included in the study as controls.

We interviewed the subjects to collect data on their demographic, height, and weight. Body mass index (BMI,  $\text{kg}/\text{m}^2$ ) z score

Corresponding author: Nur Rochmah, MD, Department of Child Health, Dr. Soetomo General Hospital / Faculty of Medicine, Universitas Airlangga, Address: Mayjend Prof. Dr. Moestopo No. 6-8, Surabaya, East Java 60286, Indonesia  
✉ E-mail: drnurrochmah@gmail.com, <https://orcid.org/0000-0002-9626-9615>  
Received: 1 October, 2019, Revised: 11 March, 2020, Accepted: 28 March, 2020

This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.  
Copyright © 2020 by The Korean Pediatric Society



**Graphical abstract.** Total population (children with type 1 diabetes mellitus, T1DM) at Department of Child Health of General Hospital Dr. Soetomo were 60. Thirty children with T1DM were included into diabetes group and 18 healthy children were included into control group. We examined zinc transporter 8 autoantibody (ZnT8A) using enzyme-linked immunosorbent assay kit. We found that positivity ZnT8A in 22/30 children with T1DM (73.3%) and 5/18 in healthy children (27.8%). We conclude that diabetes group showed higher expression of ZnT8A compared to control group, so ZnT8A has potential for clinical application in the diagnosis of T1DM.

**Table 1. Patients' baseline characteristics**

Characteristic	T1D (n=30)	Controls (n=18)	P value
Sex			
Male	15 (50.0)	8 (44.4)	
Female	15 (50.0)	10 (55.6)	
Age (yr)	11.3±3.7	8.3±3.1	
Weight (kg)	27.0 (13-65)	27.0 (11-57)	
Height (cm)	132.1±19.3	124.2±18.5	
Body mass index (kg/m <sup>2</sup> )	16.7±4.6	19.5±5.2	
Ethnicity			
Javanese	29 (96.7)	17 (94.4)	
Madurese	1 (3.3)	1 (5.6)	
C-peptide level (ng/mL)	0.01 (0.01–2.49)	1.28 (0.29–3.83)	<b>&lt;0.001<sup>a</sup></b>

Values are presented as number (%), mean±standard deviation, median (range).

<sup>a</sup>Mann-Whitney *U* test.

Boldface indicates a statistically significant difference with *P*<0.05.

**Table 2. Clinical characteristics of patients with type 1 diabetes**

Variable	ZnT8A-positive (n=22)	ZnT8A-negative (n=8)	P value
Age at diagnosis (yr)	6.8±3.6	7.9±4.0	0.483 <sup>a</sup>
Duration of diabetes (yr)	4.1±3.0	4.6±3.2	0.686 <sup>a</sup>
Ketosis (%)	86.4	87.5	0.716 <sup>b</sup>
Body mass index (kg/m <sup>2</sup> )	14.3 (10.8–30)	16.0 (15.1–22.3)	0.241 <sup>c</sup>
HbA1c (%)	8.5 (6–21)	7.0 (7–11)	0.285 <sup>c</sup>
C-peptide level (ng/mL)	0.05 (0.01–2.49)	0.01 (0.01–0.78)	0.161 <sup>c</sup>

Values are presented as mean±standard deviation and median (range).

HbA1c, glycosylated hemoglobin.

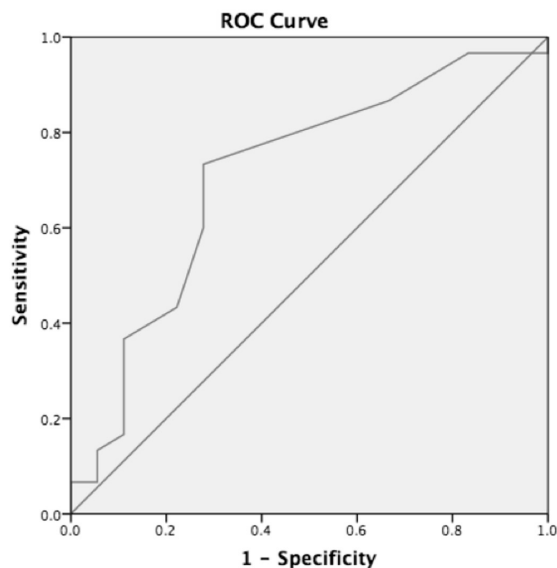
<sup>a</sup>Independent *t* test. <sup>b</sup>Fisher exact test. <sup>c</sup>Mann-Whitney *U* test.

by Independent *t* test. Differences in nonparametric data were analyzed by the Mann-Whitney *U* test. *P* value less than 0.05 were considered statistically significant.

## Results

There were 30 children with T1D (15 boys and 15 girls; aged 11.3±3.7 years) and 18 healthy children (8 boys and 10 girls; aged 8.3±3.1 years) included in this case-control study. The baseline characteristics of the patients with T1D and the controls were presented in Table 1. Twenty-two out of 30 subjects (73.3%) with T1D were positive for ZnT8A compared to 5 of 18 controls (27.8%) (*P*=0.02; odds ratio, 7.15; 95% CI, 1.93–26.52). The history-based, anthropometric, and metabolic characteristics of the patient with T1D were shown in Table 2. When ZnT8A-positive and -negative in T1D cases were compared, no difference was detected in age at diagnosis, duration of diabetes, presence of ketoacidosis, BMI *z* score, glycosylated hemoglobin





**Fig. 1.** Receiver operating characteristic (ROC) curve for Zinc transporter 8 as a screening test for type 1 diabetes mellitus.

concentration, and C-peptide concentrations. These variables were examined during the study.

An area under the curve (AUC) of 0.710 (95% CI, 0.553–0.867). According to ROC analysis, ZnT8A demonstrated sensitivity 73.3% and specificity 72.2% for diagnosing T1D at cutoff of 0.315 (Fig. 1).

## Discussion

This study showed that ZnT8A-positive is 73.3% in Javanese children with T1D. This result is in accordance with most of the studies done in other countries. ZnT8A positivity was reported to be between 60%–80% in Caucasians (11–8 years old), 72% in Czechs (1–19 years old), 65% in Argentinians (10–32 years old), and 58.6% in Turkish children (1–18 years old) with new onset T1D.<sup>9–12</sup> ZnT8A positivity was reported in 24% of Chinese new onset T1D patients (1–70 years old) and differences in human leukocyte antigen (HLA) genotypes or other interethnic genetic markers were thought to be a possible cause for this low rate.<sup>13</sup> However, in another Asian population, Japanese acute onset T1D patients (19.1±14.5 years old) had 58% ZnT8A positivity.<sup>14</sup> A study from Brazil, which encompassed both a Caucasian and a non-Caucasian new onset T1D population (30.3±11.4 years old), found an overall ZnT8A positivity of 24% and it was stated that neither ZnT8A positivity nor concentration was associated with ethnicity.<sup>15</sup> The differences in prevalence of various types of islet autoantibodies among different ethnic populations with T1D could be explained by genetic factors especially HLA genotypes and *SLC30A8* gene polymorphism.<sup>4,5</sup> Additionally, a recent international prospective cohort study identified a number of non-HLA genes as genetic factors for development of islet autoimmunity and T1D.<sup>16</sup>

The ZnT8A positivity prevalence of healthy controls from

different countries was reported as 1%–2.7%, which is a markedly lower rate than in this study (27.8%).<sup>2,8,9,13</sup> This difference may be attributed to the larger cohorts of the other studies which better reflects the population. However, the possible effect of ethnicity cannot be excluded. ZnT8A was shown to predict risk of progression to T1D in first degree relatives of T1D patients.<sup>17</sup> Although these healthy controls had a negative T1D history in their families, they may have a higher risk for diabetes.

Yang et al.<sup>13</sup> found no difference in ZnT8A prevalence in subjects stratified with duration of diabetes. Collectively, there was no difference between the duration of type 1 diabetic patients with ZnT8A-positive and ZnT8A-negative in the present study. Another study reported that 61% of patients with T1D onset were positive for ZnT8A, and the proportion was only 33% in patients with T1D for more than 6 months.<sup>18</sup> However, Howson et al.<sup>19</sup> demonstrated a higher prevalence of ZnT8A in the first 2 years of the disease. The factors involved in the maintenance of serum ZnT8A are still to be identified, but this characteristic makes the measurement of this antibody particularly useful in patients with long-standing diabetes and unclear diabetes classification, where the identification of an autoimmune marker can establish the definite diagnosis.<sup>20</sup>

In this study, we found the ZnT8A-positive in the T1D patient had younger age at diagnosis than with ZnT8A-negative but not significantly difference. Vaziri-Sani et al.<sup>21</sup> found ZnT8A titers were significantly higher in the 2- to 17-year-old type 1 diabetic patients as compared to the 15- to 34-year-old. Nevertheless, another study, which was conducted in children and adolescents who were younger than 15 years and were newly diagnosed with diabetes, reported that the ZnT8A positivity was associated with older age.<sup>3</sup> As above, varying ages may lead to different effects on the ZnT8A frequency. Likewise, age of onset also has an effect on the ZnT8A frequency. It was reported that the prevalence of ZnT8A declined with the increasing age at diagnosis in Chinese and Belgian patients with T1D.<sup>13,22</sup> Besides, the children aged 6–10 years had higher prevalence of ZnT8A than other older French within 6 months of T1D onset.<sup>18</sup> Taken together, it is speculated that the age at diagnosis may play an important role in the ZnT8A level.

Mbanya et al.<sup>23</sup> showed that the ZnT8A-positive patients with diabetes had significantly lower BMI z scores than the ZnT8A-negative ones. In the present study, the ZnT8A-positive type 1 diabetics had lower BMI z scores than the ZnT8A-negative type 1 diabetics, but not significantly.

The Diabetes Antibody Standardization Program workshop identified that ZnT8A measured by radioligand assay showed a median ROC-AUC of 0.848.<sup>24</sup> Dunseath et al.<sup>25</sup> showed an AUC of 0.80, 54% sensitivity, and 99% specificity by conducting ROC analysis of ZnT8A by ELISA in type 1 diabetics and healthy blood donors. In this study, the ROC-AUC for ZnT8A by ELISA is 0.71, 73.3% sensitivity, and 72.2% specificity. Hence, we speculate that the ZnT8A test by ELISA may have high accuracy, not lower than the test by radioligand assay.

ZnT8A was recently identified as an autoantibody marker in

T1D, which is detected earlier rather than other autoantibodies (IAA, IA-2A, and GADA) and increase diagnostic sensitivity of T1D.<sup>26)</sup> The study is limited by a relatively small number of subjects. The conclusion of this study is ZnT8A has potential for clinical applications in the diagnosis of T1D.

#### Conflicts of interest

No potential conflict of interest relevant to this article was reported.

#### Acknowledgments

The authors wish to thank the patients who participated in the study and the endocrine teams of Dr. Soetomo Hospital, Surabaya, Indonesia, for the support.

## References

1. Wenzlau JM, Frisch LM, Gardner TJ, Sarkar S, Hutton JC, Davidson HW. Novel antigens in type 1 diabetes: the importance of ZnT8. *Curr Diab Rep* 2009;9:105-12.
2. Fabris M, Zago S, Liguori M, Trevisan MT, Zanatta M, Comici A, et al. Anti-zinc transporter protein 8 autoantibodies significantly improve the diagnostic approach to type 1 diabetes: an Italian multicentre study on paediatric patients. *Auto Immun Highlights* 2015;6:17-22.
3. Juusola M, Parkkola A, Härkönen T, Siljander H, Ilonen J, Åkerblom HK, et al. Positivity for zinc transporter 8 autoantibodies at diagnosis is subsequently associated with reduced  $\beta$ -cell function and higher exogenous insulin requirement in children and adolescents with type 1 diabetes. *Diabetes Care* 2016;39:118-21.
4. Delli AJ, Vaziri-Sani F, Lindblad B, Elding-Larsson H, Carlsson A, Forsander G, et al. Zinc transporter 8 autoantibodies and their association with SLC30A8 and HLA-DQ genes differ between immigrant and Swedish patients with newly diagnosed type 1 diabetes in the Better Diabetes Diagnosis study. *Diabetes* 2012;61:2556-64.
5. Wenzlau JM, Liu Y, Yu L, Moua O, Fowler KT, Rangasamy S, et al. A common nonsynonymous single nucleotide polymorphism in the SLC30A8 gene determines ZnT8 autoantibody specificity in type 1 diabetes. *Diabetes* 2008;57:2693-7.
6. Craig ME, Jefferies C, Dabelea D, Balde N, Seth A, Donaghue KC, et al. ISPAD Clinical Practice Consensus Guidelines 2014. Definition, epidemiology, and classification of diabetes in children and adolescents. *Pediatr Diabetes* 2014;15 Suppl 20:4-17.
7. Kawasaki E, Maruyama T, Imagawa A, Awata T, Ikegami H, Uchigata Y, et al. Diagnostic criteria for acute-onset type 1 diabetes mellitus (2012): Report of the Committee of Japan Diabetes Society on the Research of Fulminant and Acute-onset Type 1 Diabetes Mellitus. *J Diabetes Investig* 2014;5:115-8.
8. Unal I. Defining an optimal cut-point value in ROC analysis: an alternative approach. *Comput Math Methods Med* 2017;2017:3762651.
9. Wenzlau JM, Juhl K, Yu L, Moua O, Sarkar SA, Gottlieb P, et al. The cation efflux transporter ZnT8 (Slc30A8) is a major autoantigen in human type 1 diabetes. *Proc Natl Acad Sci U S A* 2007;104:17040-5.
10. Petruzelkova L, Ananieva-Jordanova R, Vcelakova J, Vesely Z, Stechova K, Lebl J, et al. The dynamic changes of zinc transporter 8 autoantibodies in Czech children from the onset of Type 1 diabetes mellitus. *Diabet Med* 2014;31:165-71.
11. Faccinetti NI, Guerra LL, Penas Steinhardt A, Iacono RF, Frechtel GD, Trifone L, et al. Characterization of zinc transporter 8 (ZnT8) antibodies in autoimmune diabetic patients from Argentinian population using monomeric, homodimeric, and heterodimeric ZnT8 antigen variants. *Eur J Endocrinol* 2016;174:157-65.
12. Elmaogullari S, Uçaktürk SA, Elbeg Ş, Döğer E, Tayfun M, Gürbüz F, et al. Prevalence of ZnT8 antibody in Turkish children and adolescents with new onset type 1 diabetes. *J Clin Res Pediatr Endocrinol* 2018;10:108-12.
13. Yang L, Luo S, Huang G, Peng J, Li X, Yan X, et al. The diagnostic value of zinc transporter 8 autoantibody (ZnT8A) for type 1 diabetes in Chinese. *Diabetes Metab Res Rev* 2010;26:579-84.
14. Kawasaki E, Nakamura K, Kuriya G, Satoh T, Kobayashi M, Kuwahara H, et al. Zinc transporter 8 autoantibodies in fulminant, acute-onset, and slow-onset patients with type 1 diabetes. *Diabetes Metab Res Rev* 2011;27:895-8.
15. Araujo DB, Skärstrand H, Barone B, Dantas JR, Kupfer R, Zajdenverg L, et al. Zinc transporter 8 autoantibodies in patients with type 1 diabetes from a multiethnic population and their first degree relatives. *Arq Bras Endocrinol Metabol* 2014;58:737-43.
16. Sharma A, Liu X, Hadley D, Hagopian W, Chen WM, Onengut-Gumuscu S, et al. Identification of non-HLA genes associated with development of islet autoimmunity and type 1 diabetes in the prospective TEDDY cohort. *J Autoimmun* 2018;89:90-100.
17. Gorus FK, Balti EV, Vermeulen I, Demeester S, Van Dalem A, Costa O, et al. Screening for insulinoma antigen 2 and zinc transporter 8 autoantibodies: a cost-effective and age-independent strategy to identify rapid progressors to clinical onset among relatives of type 1 diabetic patients. *Clin Exp Immunol* 2013;171:82-90.
18. Garnier L, Marchand L, Benoit M, Nicolino M, Bendelac N, Wright C, et al. Screening of ZnT8 autoantibodies in the diagnosis of autoimmune diabetes in a large French cohort. *Clin Chim Acta* 2018;478:162-5.
19. Howson JM, Krause S, Stevens H, Smyth DJ, Wenzlau JM, Bonifacio E, et al. Genetic association of zinc transporter 8 (ZnT8) autoantibodies in type 1 diabetes cases. *Diabetologia* 2012;55:1978-84.
20. Trabucchi A, Faccinetti NI, Guerra LL, Puchulu FM, Frechtel GD, Poskus E, et al. Detection and characterization of ZnT8 autoantibodies could help to screen latent autoimmune diabetes in adult-onset patients with type 2 phenotype. *Autoimmunity* 2012;45:137-42.
21. Vaziri-Sani F, Oak S, Radtke J, Lernmark K, Lynch K, Agardh CD, et al. ZnT8 autoantibody titers in type 1 diabetes patients decline rapidly after clinical onset. *Autoimmunity* 2010;43:598-606.
22. Vermeulen I, Weets I, Asanghanwa M, Ruige J, Van Gaal L, Mathieu C, et al. Contribution of antibodies against IA-2 $\beta$  and zinc transporter 8 to classification of diabetes diagnosed under 40 years of age. *Diabetes Care* 2011;34:1760-5.
23. Mbanya A, Ngandeu A, Kamwa V, Donfack OT, Lontchi É, Leke R, et al. Metabolic features associated with positivity to ZnT8 autoantibody in sub-Saharan African young-onset diabetes patients. *Diabetes Metab* 2016;42:204-6.
24. Lampasona V, Schlosser M, Mueller PW, Williams AJ, Wenzlau JM, Hutton JC, et al. Diabetes antibody standardization program: first proficiency evaluation of assays for autoantibodies to zinc transporter 8. *Clin Chem* 2011;57:1693-702.
25. Dunseath G, Ananieva-Jordanova R, Coles R, Powell M, Amoroso M, Furmaniak J, et al. Bridging-type enzyme-linked immunoassay for zinc transporter 8 autoantibody measurements in adult patients with diabetes mellitus. *Clin Chim Acta* 2015;447:90-5.
26. Yi B, Huang G, Zhou ZG. Current and future clinical applications of zinc transporter-8 in type 1 diabetes mellitus. *Chin Med J (Engl)* 2015;128:2387-94.

**How to cite this article:** Rochmah N, Faizi M, Windarti SW. Zinc transporter 8 autoantibody in the diagnosis of type 1 diabetes in children. *Clin Exp Pediatr* 2020;63:402-5. <https://doi.org/10.3345/cep.2019.01221>



SJR

Scimago Journal & Country Rank

Enter Journal Title, ISSN or Publisher Name

- Home
- Journal Rankings
- Country Rankings
- Viz Tools
- Help
- About Us

# Korean Journal of Pediatrics

## COUNTRY

South Korea



Universities and research institutions in South Korea



Media Ranking in South Korea

## SUBJECT AREA AND CATEGORY

Medicine

Pediatrics, Perinatology and Child Health

Nursing

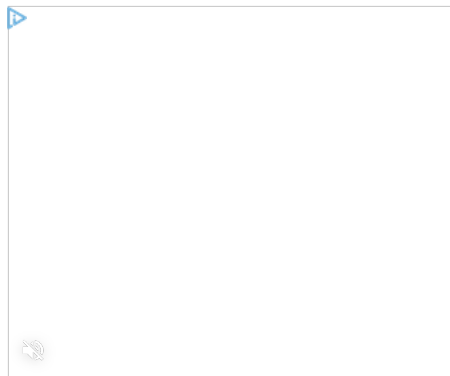
Pediatrics

## PUBLISHER

Korean Pediatric Society

## H-INDEX

3



## PUBLICATION TYPE

Journals

## ISSN

17381061, 20927258

## COVERAGE

2010-2021

## INFO

How published this kjpr il.cc

SCOPE

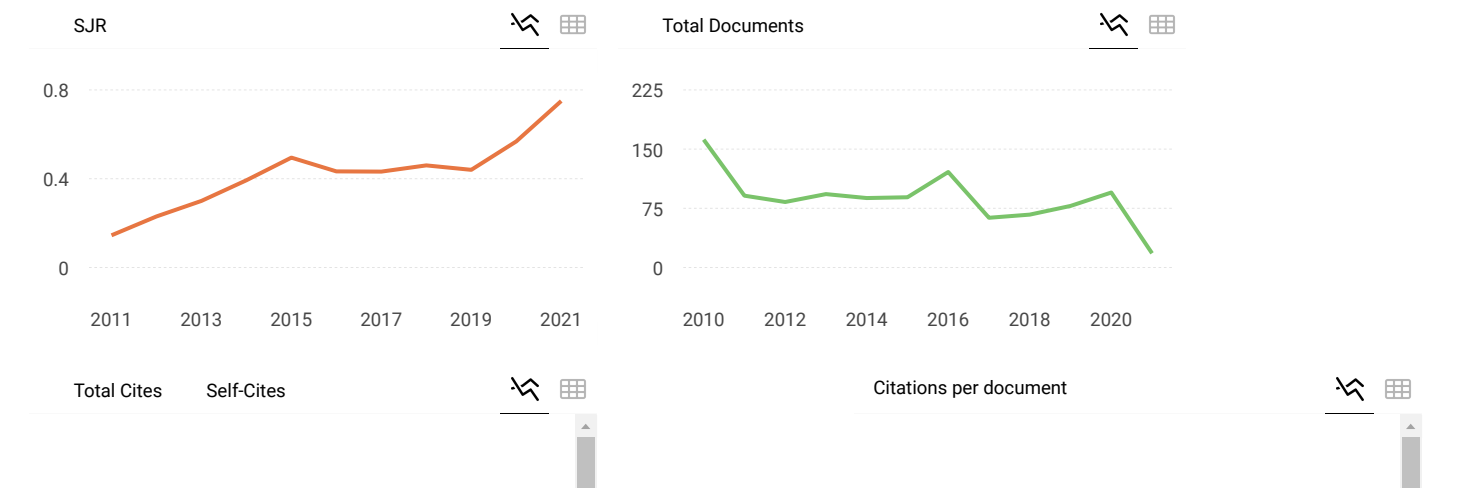
Korean J Pediatr covers clinical and research works relevant to all aspects of child healthcare. The journal aims to serve pediatric through the prompt publication of significant advances in any field of pediatrics and to rapidly disseminate recently updated know the public. Additionally, it will initiate dynamic, international, academic discussions concerning the major topics related to pediatric Manuscripts are categorized as review articles, original articles, and case reports. Areas of specific interest include: Growth and development, Neonatology, Pediatric neurology, Pediatric nephrology, Pediatric endocrinology, Pediatric cardiology, Pediatric allerg Pediatric pulmonology, Pediatric infectious diseases, Pediatric immunology, Pediatric hemato-oncology, Pediatric gastroenterolog Nutrition, Human genetics, Metabolic diseases, Adolescence medicine, General pediatrics.

Join the conversation about this journal

Quartiles

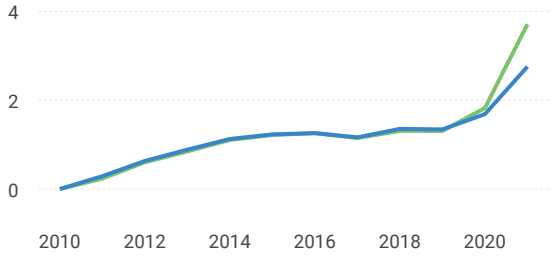
FIND SIMILAR JOURNALS ?

<p>1 <b>Pediatrics and Neonatology</b></p> <p>SGP</p> <p><b>72%</b> similarity</p>	<p>2 <b>BMC Pediatrics</b></p> <p>GBR</p> <p><b>70%</b> similarity</p>	<p>3 <b>European Journal of Pediatrics</b></p> <p>DEU</p> <p><b>70%</b> similarity</p>	<p>4 <b>Minerva Pec</b></p> <p>ITA</p> <p><b>6</b> s</p>
--	--	--	--

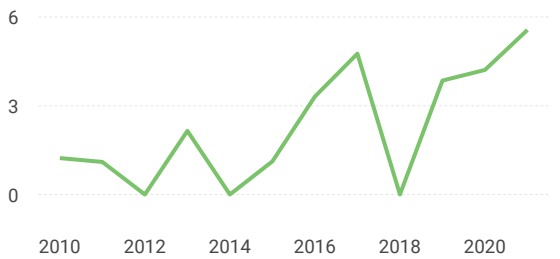




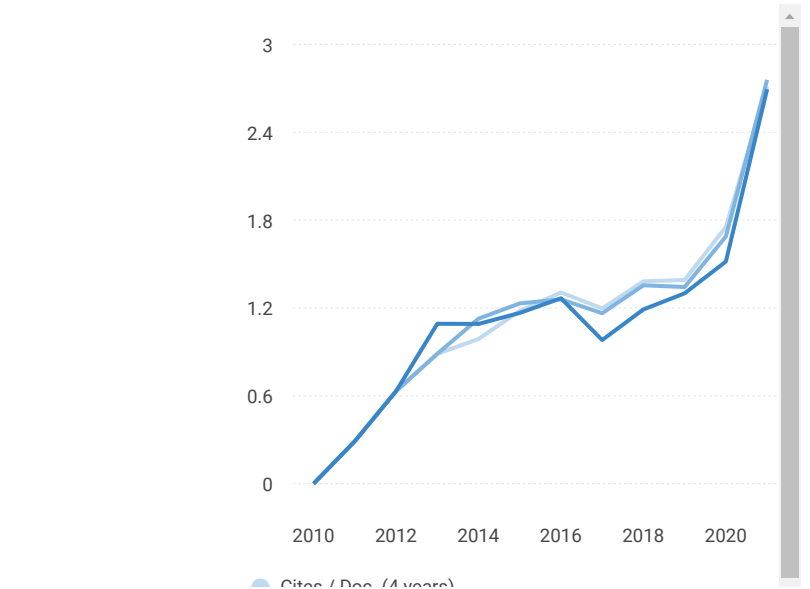
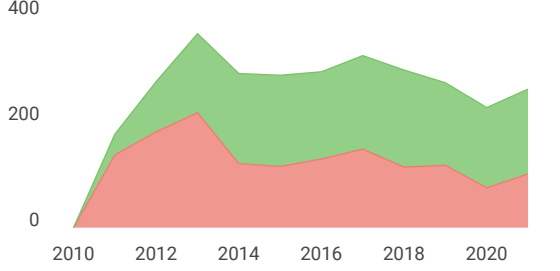
External Cites per Doc Cites per Doc



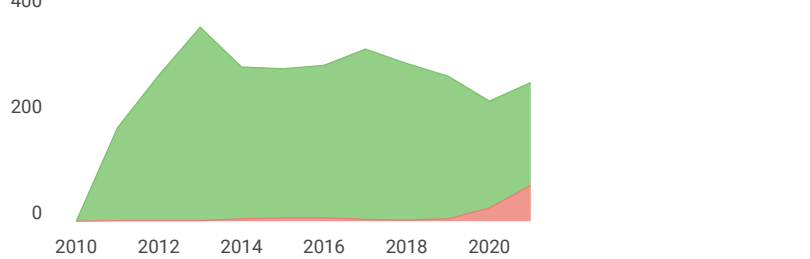
% International Collaboration



Cited documents Uncited documents



Citable documents Non-citable documents



**Korean Journal of Pediatrics**

Q1 Pediatrics

best quartile

SJR 2021 0.75

powered by scimagojr.com

Show this widget in your own website

Just copy the code below and paste within your html code:

```
<a href="https://www.scimaç
```

**SCImago Graphica**

Explore, visually communicate and make sense of data with our **new data visualization tool**.

