

ISSN 2602-2575 • EISSN 2618-6144

# EUROPEAN JOURNAL OF BIOLOGY

OFFICIAL JOURNAL OF ISTANBUL UNIVERSITY'S SCIENCE FACULTY

Volume: 81 • Issue: 2 • December 2022

<https://iupress.istanbul.edu.tr/en/journal/ejb/home>



**Indexing and Abstracting**

SCOPUS

TUBITAK ULAKBIM TR Index

Zoological Record - Clarivate Analytics

CAB Abstracts

DOAJ

CABI

- AgBiotechNet Database

- Animal Science Database

- VetMed Resource

- Environmental Impact Database

- Horticultural Science Database

- Nutrition and Food Sciences Database

Chemical Abstracts Service (CAS)

EBSCO Central & Eastern European Academic Source

SOBIAD

# EUROPEAN JOURNAL OF BIOLOGY

## Owner

Prof. Dr. Tansel AK

Istanbul University, Istanbul, Turkiye

## Responsible Manager

Prof. Dr. Sehnaz BOLKENT

Istanbul University, Istanbul, Turkiye

sbolkent@istanbul.edu.tr

## Correspondence Address

Istanbul University, Faculty of Science,  
Department of Biology,

34134 Vezneciler, Fatih, Istanbul, Turkiye

Phone: +90 (212) 455 57 00 (Ext. 20318)

Fax: +90 (212) 528 05 27

E-mail: [ejb@istanbul.edu.tr](mailto:ejb@istanbul.edu.tr)

<https://iupress.istanbul.edu.tr/en/journal/ejb/home>

## Publisher

Istanbul University Press

Istanbul University Central Campus,

34452 Beyazit, Fatih, Istanbul, Turkiye

Phone: +90 (212) 440 00 00

## Printed by

İlbey Matbaa Kağıt Reklam Org. Mc. San. Tic. Ltd. Őti.

2. Matbaacılar Sitesi 3NB 3 Topkapı / Zeytinburnu,

Istanbul, Turkiye

[www.ilbeymatbaa.com.tr](http://www.ilbeymatbaa.com.tr)

Certificate No: 51632

---

Authors bear responsibility for the content of their published articles.

The publication language of the journal is English.

This is a scholarly, international, peer-reviewed and open-access journal published biannually in June and December.

---

**Publication Type:** Periodical

---

## EDITORIAL MANAGEMENT BOARD

### Editor-in-Chief

Prof. Dr. Sehnaz BOLKENT

Istanbul University, Faculty of Science, Department of Biology, Istanbul, Turkiye – [sbolkent@istanbul.edu.tr](mailto:sbolkent@istanbul.edu.tr)

### Co-Editor-in-Chief

Prof. Dr. Fusun OZTAY

Istanbul University, Faculty of Science, Department of Biology, Istanbul, Turkiye – [fusoztay@istanbul.edu.tr](mailto:fusoztay@istanbul.edu.tr)

### Guest Editor

Prof. Dr. Elif Damla ARISAN

Gebze Technical University, Institute of Biotechnology, Kocaeli, Turkiye – [d.arisan@gtu.edu.tr](mailto:d.arisan@gtu.edu.tr)

### Editorial Management Board Members

Prof. Dr. Fusun OZTAY

Istanbul University, Faculty of Science, Department of Biology, Istanbul, Turkiye – [fusoztay@istanbul.edu.tr](mailto:fusoztay@istanbul.edu.tr)

Prof. Dr. Gulriz BAYCU KAHYAOGU

Istanbul University, Faculty of Science, Department of Biology, Istanbul, Turkiye – [gulrizb@istanbul.edu.tr](mailto:gulrizb@istanbul.edu.tr)

Assoc. Prof. Dr. Aysegul MULAYIM

Istanbul University, Faculty of Science, Department of Biology, Istanbul, Turkiye – [aysegulm@istanbul.edu.tr](mailto:aysegulm@istanbul.edu.tr)

### Section Editors

Prof. Dr. Filiz GUREL

University of Maryland, Department of Plant Science & Landscape Architecture, Maryland, USA – [filiz@umd.edu](mailto:filiz@umd.edu)

Prof. Dr. Gulriz BAYCU KAHYAOGU

Istanbul University, Faculty of Science, Department of Biology, Istanbul, Turkiye – [gulrizb@istanbul.edu.tr](mailto:gulrizb@istanbul.edu.tr)

Prof. Dr. Bekir KESKIN

Ege University, Faculty of Science, Department of Biology, Izmir, Turkey – [bekir.keskin@ege.edu.tr](mailto:bekir.keskin@ege.edu.tr)

Assoc. Prof. Dr. Aysegul MULAYIM

Istanbul University, Faculty of Science, Department of Biology, Istanbul, Turkiye – [aysegulm@istanbul.edu.tr](mailto:aysegulm@istanbul.edu.tr)

Assoc. Prof. Dr. Pinar CAGLAYAN

Marmara University, Department of Biology, Istanbul, Turkiye – [pinar.caglayan@marmara.edu.tr](mailto:pinar.caglayan@marmara.edu.tr)

### Language Editors

Elizabeth Mary EARL

Istanbul University, School of Foreign Languages (English), Istanbul, Turkiye – [elizabeth.earl@istanbul.edu.tr](mailto:elizabeth.earl@istanbul.edu.tr)

Alan James NEWSON

Istanbul University, School of Foreign Languages (English), Istanbul, Turkiye – [alan.newson@istanbul.edu.tr](mailto:alan.newson@istanbul.edu.tr)

### Statistics Editor

Prof. Dr. Ahmet DIRICAN

Istanbul University-Cerrahpasa, Faculty of Cerrahpasa Medicine, Department of Biostatistics, Istanbul, Turkiye – [adirican@iuc.edu.tr](mailto:adirican@iuc.edu.tr)

### Publicity Manager

Dr. Ozgecan KAYALAR

Koç University, Research Center for Translational Medicine, Istanbul, Turkiye – [okayalar@ku.edu.tr](mailto:okayalar@ku.edu.tr)

### Editorial Assistant

Oykum GENÇ

Istanbul University, Faculty of Science, Department of Biology, Istanbul, Turkiye – [oykumgenc@istanbul.edu.tr](mailto:oykumgenc@istanbul.edu.tr)

## EDITORIAL BOARD

**Hafiz AHMED**

University of Maryland, Maryland, USA – [hahmed@som.umaryland.edu](mailto:hahmed@som.umaryland.edu)

**Elif Damla ARISAN**

Gebze Technical University, Istanbul, Turkiye – [d.arisan@gtu.edu.tr](mailto:d.arisan@gtu.edu.tr)

**Ahmet ASAN**

Trakya University, Edirne, Turkiye - [ahasan@trakya.edu.tr](mailto:ahasan@trakya.edu.tr)

**Meral BIRBIR**

Marmara University, Istanbul, Turkiye – [mbirbir@marmara.edu.tr](mailto:mbirbir@marmara.edu.tr)

**Ricardo Antunes DE AZEVEDO**

Universidade de Sao Paulo, Sao Paulo, Brazil – [raa@usp.br](mailto:raa@usp.br)

**Kasim BAJROVIC**

University of Sarajevo, Sarajevo, Bosnia – [kasim.bajrovic@ingeb.unsa.ba](mailto:kasim.bajrovic@ingeb.unsa.ba)

**Levent BAT**

Sinop University, Sinop, Turkiye – [leventb@sinop.edu.tr](mailto:leventb@sinop.edu.tr)

**Mahmut CALISKAN**

Istanbul University, Istanbul, Turkiye – [mahmut.caliskan@istanbul.edu.tr](mailto:mahmut.caliskan@istanbul.edu.tr)

**Carmela CAROPPO**

Institute for Coastal Marine Environment, Rome, Italy – [carmela.caroppo@iamc.cnr.it](mailto:carmela.caroppo@iamc.cnr.it)

**Cihan DEMIRCI**

Istanbul University, Istanbul, Turkiye – [cihan@istanbul.edu.tr](mailto:cihan@istanbul.edu.tr)

**Mustafa DJAMGOZ**

Imperial College, London, United Kingdom – [m.djamgoz@imperial.ac.uk](mailto:m.djamgoz@imperial.ac.uk)

**Mehmet Haluk ERTAN**

The University of New South Wales (UNSW), Sydney, Australia – [hertan@unsw.edu.au](mailto:hertan@unsw.edu.au)

**Rafael Ruiz De La HABA**

University of Sevilla, Sevilla, Spain – [rrh@us.es](mailto:rrh@us.es)

**Onder KILIC**

Istanbul University, Istanbul, Turkiye – [okilic@istanbul.edu.tr](mailto:okilic@istanbul.edu.tr)

**Ayten KIMIRAN**

Istanbul University, Istanbul, Turkiye – [kimiran@istanbul.edu.tr](mailto:kimiran@istanbul.edu.tr)

**Armagan KOCER**

University of Twente, Enschede, The Netherlands – [a.kocer@utwente.nl](mailto:a.kocer@utwente.nl)

**Domenico MORABITO**

Université d'Orléans, Orléans, France – [domenico.morabito@univ-orleans.fr](mailto:domenico.morabito@univ-orleans.fr)

**Michael MOUSTAKAS**

Aristotle University, Thessaloniki, Greece – [moustak@bio.auth.gr](mailto:moustak@bio.auth.gr)

**Gokhan M. MUTLU**

University of Chicago, Chicago, USA – [gmutlu@medicine.bsd.uchicago.edu](mailto:gmutlu@medicine.bsd.uchicago.edu)

**Maxim NABOZHENKO**

Dagestan State University, Dagestan, Russia – [nalassus@mail.ru](mailto:nalassus@mail.ru)

## EDITORIAL BOARD

**Selda OKTAYOGLU**

Istanbul University, Istanbul, Turkiye – *selgez@istanbul.edu.tr*

**Nesrin OZOREN**

Bogazici University, Istanbul, Turkiye – *nesrin.ozoren@boun.edu.tr*

**Majeti Narasimha VARA PRASAD**

University of Hyderabad, Hyderabad, India – *mnvsl@uohyd.ernet.in*

**Thomas SAWIDIS**

Aristotle University, Thessaloniki, Greece – *sawidis@bio.auth.gr*

**Jaswinder SINGH**

McGill University, Quebec, Canada – *jaswinder.singh@mcgill.ca*

**Lejla PAŠIĆ**

University Sarajevo School of Science and Technology, Sarajevo, Bosnia and Herzegovina – *lejla.pasic@ssst.edu.ba*

**Nico M. Van STRAALLEN**

Vrije Universiteit, Amsterdam, The Netherlands – *n.m.van.straalen@vu.nl*

**Ismail TURKAN**

Ege University, Izmir, Turkiye - *ismail.turkan@ege.edu.tr*

**Refiye YANARDAG**

Istanbul University-Cerrahpasa, Istanbul, Turkiye – *yanardag@iuc.edu.tr*

**Argyro ZENETOS**

Hellenic Centre for Marine Research, Anavyssos, Greece – *zenetos@hcmr.gr*

## Aims and Scope

European Journal of Biology (Eur J Biol) is an international, scientific, open access periodical published in accordance with independent, unbiased, and double-blinded peer-review principles. The journal is the official publication of Istanbul University Faculty of Science and it is published biannually on June and December. The publication language of the journal is English. European Journal of Biology has been previously published as IUFS Journal of Biology. It has been published in continuous publication since 1940.

European Journal of Biology aims to contribute to the literature by publishing manuscripts at the highest scientific level on all fields of biology. The journal publishes original research and review articles, and short communications that are prepared in accordance with the ethical guidelines in all fields of biology and life sciences.

The scope of the journal includes but not limited to; animal biology and systematics, plant biology and systematics, hydrobiology, ecology and environmental biology, microbiology, cell and molecular biology, biochemistry, biotechnology and genetics, physiology, toxicology, cancer biology, developmental and stem cell biology.

The target audience of the journal includes specialists and professionals working and interested in all disciplines of biology.

The editorial and publication processes of the journal are shaped in accordance with the guidelines of the International Committee of Medical Journal Editors (ICMJE), World Association of Medical Editors (WAME), Council of Science Editors (CSE), Committee on Publication Ethics (COPE), European Association of Science Editors (EASE), and National Information Standards Organization (NISO). The journal is in conformity with the Principles of Transparency and Best Practice in Scholarly Publishing ([doaj.org/bestpractice](http://doaj.org/bestpractice)).

European Journal of Biology is currently indexed by Web of Science Zoological Record, CAB Abstracts (CABI), Chemical Abstracts Service (CAS), TUBITAK-ULAKBIM TR Index, Scopus, DOAJ, EBSCO Central & Eastern European Academic Source and SOBIAD.

Processing and publication are free of charge with the journal. No fees are requested from the authors at any point throughout the evaluation and publication process. All manuscripts must be submitted via the online submission system, which is available at [dergipark.gov.tr/iufsjb](http://dergipark.gov.tr/iufsjb). The journal guidelines, technical information, and the required forms are available on the journal's web page.

All expenses of the journal are covered by the Istanbul University.

Statements or opinions expressed in the manuscripts published in the journal reflect the views of the author(s) and not the opinions of the Istanbul University Faculty of Science, editors, editorial board, and/or publisher; the editors, editorial board, and publisher disclaim any responsibility or liability for such materials.

All published content is available online, free of charge at <https://dergipark.org.tr/tr/pub/iufsjb>. Printed copies of the journal are distributed free of charge.



**Editor in Chief:** Prof. Dr. Sehnaz BOLKENT

**Address:** Istanbul University, Faculty of Science, Department of Biology, 34134 Vezneciler, Fatih, Istanbul, Turkiye

**Phone:** +90 212 4555700 (Ext. 20318)

**Fax:** +90 212 5280527

**E-mail:** [sbolkent@istanbul.edu.tr](mailto:sbolkent@istanbul.edu.tr)

## Instructions to Authors

European Journal of Biology (Eur J Biol) is an international, scientific, open access periodical published in accordance with independent, unbiased, and double-blinded peer-review principles. The journal is the official publication of Istanbul University Faculty of Science and it is published biannually on June and December. The publication language of the journal is English. European Journal of Biology has been previously published as IUFS Journal of Biology. It has been published in continuous publication since 1940.

European Journal of Biology aims to contribute to the literature by publishing manuscripts at the highest scientific level on all fields of biology. The journal publishes original research and review articles, and short communications that are prepared in accordance with the ethical guidelines in all fields of biology and life sciences.

The scope of the journal includes but not limited to; animal biology and systematics, plant biology and systematics, hydrobiology, ecology and environmental biology, microbiology, cell and molecular biology, biochemistry, biotechnology and genetics, physiology, toxicology, cancer biology, developmental and stem cell biology.

The editorial and publication processes of the journal are shaped in accordance with the guidelines of the International Council of Medical Journal Editors (ICMJE), the World Association of Medical Editors (WAME), the Council of Science Editors (CSE), the Committee on Publication Ethics (COPE), the European Association of Science Editors (EASE), and National Information Standards Organization (NISO). The journal conforms to the Principles of Transparency and Best Practice in Scholarly Publishing ([doaj.org/bestpractice](http://doaj.org/bestpractice)).

Originality, high scientific quality, and citation potential are the most important criteria for a manuscript to be accepted for publication. Manuscripts submitted for evaluation should not have been previously presented or already published in an electronic or printed medium. Manuscripts that have been presented in a meeting should be submitted with detailed information on the organization, including the name, date, and location of the organization.

Manuscripts submitted to European Journal of Biology will go through a double-blind peer-review process. Each submission will be reviewed by at least three external, independent peer reviewers who are experts in their fields in order to ensure an unbiased evaluation process. The editorial board will invite an external and independent editor to manage the evaluation processes of manuscripts submitted by editors or by the editorial board members of the journal. The Editor in Chief is the final authority in the decision-making process for all submissions.

An approval of research protocols by the Ethics Committee in accordance with international agreements (World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects," amended in October

2013, [www.wma.net](http://www.wma.net)) is required for experimental, clinical, and drug studies. If required, ethics committee reports or an equivalent official document will be requested from the authors.

For manuscripts concerning experimental research on humans, a statement should be included that shows the written informed consent of patients and volunteers was obtained following a detailed explanation of the procedures that they may undergo. Information on patient consent, the name of the ethics committee, and the ethics committee approval number should also be stated in the Materials and Methods section of the manuscript. It is the authors' responsibility to carefully protect the patients' anonymity. For photographs that may reveal the identity of the patients, signed releases of the patient or of their legal representative should be enclosed.

European Journal of Biology requires experimental research studies on vertebrates or any regulated invertebrates to comply with relevant institutional, national and/or international guidelines. The journal supports the principles of Basel Declaration ([basel-declaration.org](http://basel-declaration.org)) and the guidelines published by International Council for Laboratory Animal Science (ICLAS) ([iclas.org](http://iclas.org)). Authors are advised to clearly state their compliance with relevant guidelines.

European Journal of Biology advises authors to comply with IUCN Policy Statement on Research Involving Species at Risk of Extinction and the Convention on the Trade in Endangered Species of Wild IUCN Policy Statement on Research Involving Species at Risk of Extinction and the Convention on the Trade in Endangered Species of Wild Fauna and Flora.

All submissions are screened by a similarity detection software (iThenticate by CrossCheck).

In the event of alleged or suspected research misconduct, e.g., plagiarism, citation manipulation, and data falsification/fabrication, the Editorial Board will follow and act in accordance with COPE guidelines.

Each individual listed as an author should fulfil the authorship criteria recommended by the International Committee of Medical Journal Editors (ICMJE - [www.icmje.org](http://www.icmje.org)). The ICMJE recommends that authorship be based on the following 4 criteria:

- 1 Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- 2 Drafting the work or revising it critically for important intellectual content; AND
- 3 Final approval of the version to be published; AND
- 4 Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.



In addition to being accountable for the parts of the work he/she has done, an author should be able to identify which co-authors are responsible for specific other parts of the work. In addition, authors should have confidence in the integrity of the contributions of their co-authors.

All those designated as authors should meet all four criteria for authorship, and all who meet the four criteria should be identified as authors. Those who do not meet all four criteria should be acknowledged in the title page of the manuscript.

European Journal of Biology requires corresponding authors to submit a signed and scanned version of the authorship contribution form (available for download through the journal's web page) during the initial submission process in order to act appropriately on authorship rights and to prevent ghost or honorary authorship. If the editorial board suspects a case of "gift authorship," the submission will be rejected without further review. As part of the submission of the manuscript, the corresponding author should also send a short statement declaring that he/she accepts to undertake all the responsibility for authorship during the submission and review stages of the manuscript.

European Journal of Biology requires and encourages the authors and the individuals involved in the evaluation process of submitted manuscripts to disclose any existing or potential conflicts of interests, including financial, consultant, and institutional, that might lead to potential bias or a conflict of interest. Any financial grants or other supports received for a submitted study from individuals or institutions should be disclosed to the Editorial Board. To disclose a potential conflict of interest, the ICMJE Potential Conflict of Interest Disclosure Form should be filled and submitted by all contributing authors. Cases of a potential conflict of interest of the editors, authors, or reviewers are resolved by the journal's Editorial Board within the scope of COPE and ICMJE guidelines.

The Editorial Board of the journal handles all appeal and complaint cases within the scope of COPE guidelines. In such cases, authors should get in direct contact with the editorial office regarding their appeals and complaints. When needed, an ombudsperson may be assigned to resolve cases that cannot be resolved internally. The Editor in Chief is the final authority in the decision-making process for all appeals and complaints.

When submitting a manuscript to European Journal of Biology, authors accept to assign the copyright of their manuscript to Istanbul University Faculty of Science. If rejected for publication, the copyright of the manuscript will be assigned back to the authors. European Journal of Biology requires each submission to be accompanied by a Copyright Transfer Form (available for download at the journal's web page). When using previously published content, including figures, tables, or any other material in both print and electronic formats, authors must obtain permission from the copyright holder. Legal, financial and criminal liabilities in this regard belong to the author(s).

Statements or opinions expressed in the manuscripts published in European Journal of Biology reflect the views of the author(s) and not the opinions of the editors, the editorial board, or the publisher; the editors, the editorial board, and the publisher disclaim any responsibility or liability for such materials. The final responsibility in regard to the published content rests with the authors.

## MANUSCRIPT SUBMISSION

European Journal of Biology endorses ICMJE-Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (updated in December 2015 - <http://www.icmje.org/icmje-recommendations.pdf>). Authors are required to prepare manuscripts in accordance with the CONSORT guidelines for randomized research studies, STROBE guidelines for observational original research studies, STARD guidelines for studies on diagnostic accuracy, PRISMA guidelines for systematic reviews and meta-analysis, ARRIVE guidelines for experimental animal studies, TREND guidelines for non-randomized public behaviour, and COREQ guidelines for qualitative research.

Manuscripts can only be submitted through the journal's online manuscript submission and evaluation system, available at the journal's web page. Manuscripts submitted via any other medium will not be evaluated.

Manuscripts submitted to the journal will first go through a technical evaluation process where the editorial office staff will ensure that the manuscript has been prepared and submitted in accordance with the journal's guidelines. Submissions that do not conform to the journal's guidelines will be returned to the submitting author with technical correction requests.

During the initial submission, authors are required to submit the following:

- Copyright Agreement Form,
- Author Contributions Form, and

ICMJE Potential Conflict of Interest Disclosure Form (should be filled in by all contributing authors). These forms are available for download at the journal's web page.

## Preparation of the Manuscript

Title page: A separate title page should be submitted with all submissions and this page should include:

- The full title of the manuscript as well as a short title (running head) of no more than 50 characters,
- Name(s), affiliations, and highest academic degree(s) of the author(s),
- Grant information and detailed information on the other sources of support,
- Name, address, telephone (including the mobile phone number) and fax numbers, and email address of the corresponding author,
- Acknowledgment of the individuals who contributed to the preparation of the manuscript but who do not fulfil the authorship criteria.

**Abstract:** Abstract with subheadings should be written as structured abstract in submitted papers except for Review Articles and Letters to the Editor. Please check Table 1 below for word count specifications (250 words).

**Keywords:** Each submission must be accompanied by a minimum of three to a maximum of six keywords for subject indexing at the end of the abstract. The keywords should be listed in full without abbreviations.

### Manuscript Types

**Original Articles:** This is the most important type of article since it provides new information based on original research. A structured abstract is required with original articles and it should include the following subheadings: Objective, Materials and Methods, Results and Conclusion. The main text of original articles should be structured with Introduction, Materials and Methods, Results, Discussion, and Conclusion subheadings. Please check Table 1 for the limitations of Original Articles.

Statistical analysis to support conclusions is usually necessary. Statistical analyses must be conducted in accordance with international statistical reporting standards. Information on statistical analyses should be provided with a separate subheading under the Materials and Methods section and the statistical software that was used during the process must be specified.

Units should be prepared in accordance with the International System of Units (SI).

**Short Communications:** Short communication is for a concise, but independent report representing a significant contribution to Biology. Short communication is not intended to publish preliminary results. But if these results are of exceptional interest and are particularly topical and relevant will be considered for publication.

Short Communications should include an abstract and should be structured with the following subheadings: "Introduction", "Materials and Methods", "Results and Discussion".

**Editorial Comments:** Editorial comments aim to provide a brief critical commentary by reviewers with expertise or with high reputation in the topic of the research article published in the journal. Authors are selected and invited by the journal to provide such comments. Abstract, Keywords, and Tables, Figures, Images, and other media are not included.

**Review Articles:** Reviews prepared by authors who have extensive knowledge on a particular field and whose scientific background has been translated into a high volume of publications with a high citation potential are welcomed. These authors may even be invited by the journal. Reviews should describe, discuss, and evaluate the current level of knowledge of a topic in clinical practice and should guide future studies. The main text should contain Introduction, Experimental and Clinical Research Consequences, and Conclusion sections. Please check Table 1 for the limitations for Review Articles.

**Letters to the Editor:** This type of manuscript discusses important parts, overlooked aspects, or lacking parts of a previously published article. Articles on subjects within the scope of the journal that might attract the readers' attention, particularly educative cases, may also be submitted in the form of a "Letter to the Editor." Readers can also present their comments on the published manuscripts in the form of a "Letter to the Editor." Abstract, Keywords, and Tables, Figures, Images, and other media should not be included. The text should be unstructured. The manuscript that is being commented on must be properly cited within this manuscript.

### Tables

Tables should be included in the main document, presented after the reference list, and they should be numbered consecutively in the order they are referred to within the main text. A descriptive title must be placed above the tables. Abbreviations used in the tables should be defined below the tables by footnotes (even if they are defined within the main text). Tables should be created using the "insert table" command of the word processing software and they should be arranged clearly to provide easy reading. Data presented in the tables should not be a repetition of the data presented within the main text but should be supporting the main text.

### Figures and Figure Legends

Figures, graphics, and photographs should be submitted as separate files (in TIFF or JPEG format with 1200 dpi for graphic and 600 dpi for colour images) through the submission system. The files should not be embedded in a Word document or the main document. When there are figure subunits, the subunits should be labeled merged to form a single image. Each subunit should be submitted separately through the submission system. Images

**Table 1.** Limitations for each manuscript type

Type of manuscript	Word limit	Abstract word limit	Reference limit	Table limit	Figure limit
Original Article	4500	250 (Structured)	No limit	6	Maximum 10
Short Communication	2500	200	30	3	4
Review Article	5500	250	No limit	5	6
Letter to the Editor	500	No abstract	5	No tables	No media

should be labeled (a, b, c, etc.) to indicate figure subunits. Thick and thin arrows, arrowheads, stars, asterisks, and similar marks can be used on the images to support figure legends. Like the rest of the submission, the figures too should be blind. Any information within the images that may indicate an individual or institution should be blinded. The minimum resolution of each submitted figure should be 300 DPI. To prevent delays in the evaluation process, all submitted figures should be clear in resolution and large in size (minimum dimensions: 100 × 100 mm). Figure legends should be listed at the end of the main document.

All acronyms and abbreviations used in the manuscript should be defined at first use, both in the abstract and in the main text. The abbreviation should be provided in parentheses following the definition.

When a drug, chemical, product, hardware, or software program is mentioned within the main text, product information, including the name of the product, the producer of the product, and city and the country of the company (including the state if in USA), should be provided in parentheses in the following format: "Discovery St PET/CT scanner (General Electric, Milwaukee, WI, USA)".

All references, tables, and figures should be referred to within the main text, and they should be numbered consecutively in the order they are referred to within the main text.

Limitations, drawbacks, and the shortcomings of original articles should be mentioned in the Discussion section before the conclusion paragraph.

## References

While citing publications, preference should be given to the latest, most up-to-date publications. If an ahead-of-print publication is cited, the DOI number should be provided. Authors are responsible for the accuracy of references. Journal titles should be abbreviated in accordance with the journal abbreviations in Index Medicus/ MEDLINE/PubMed. When there are six or fewer authors, all authors should be listed. If there are seven or more authors, the first six authors should be listed followed by "et al." In the main text of the manuscript, references should be cited using Arabic numbers in parentheses. The reference styles for different types of publications are presented in the following examples.

Journal Article: Rankovic A, Rancic N, Jovanovic M, Ivanović M, Gajović O, Lazić Z, et al. Impact of imaging diagnostics on the budget – Are we spending too much? *Vojnosanit Pregl* 2013; 70: 709-11.

Book Section: Suh KN, Keystone JS. Malaria and babesiosis. Gorbach SL, Barlett JG, Blacklow NR, editors. *Infectious Diseases*. Philadelphia: Lippincott Williams; 2004.p.2290-308.

Books with a Single Author: Sweetman SC. *Martindale the Complete Drug Reference*. 34<sup>th</sup> ed. London: Pharmaceutical Press; 2005.

Editor(s) as Author: Huizing EH, de Groot JAM, editors. *Functional reconstructive nasal surgery*. Stuttgart-New York: Thieme; 2003.

Conference Proceedings: Bengissson S, Sothemin BG. Enforcement of data protection, privacy and security in medical infor-

matics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. *MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics*; 1992 Sept 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. pp.1561-5.

Scientific or Technical Report: Cusick M, Chew EY, Hoogwerf B, Agrón E, Wu L, Lindley A, et al. Early Treatment Diabetic Retinopathy Study Research Group. Risk factors for renal replacement therapy in the Early Treatment Diabetic Retinopathy Study (ETDRS), *Kidney Int*: 2004. Report No: 26.

Thesis: Yılmaz B. Ankara Üniversitesindeki Öğrencilerin Beslenme Durumları, Fiziksel Aktiviteleri ve Beden Kitle İndeksleri Kan Lipidleri Arasındaki İlişkiler. H.Ü. Sağlık Bilimleri Enstitüsü, Doktora Tezi. 2007.

Epub Ahead of Print Articles: Cai L, Yeh BM, Westphalen AC, Roberts JP, Wang ZJ. Adult living donor liver imaging. *Diagn Interv Radiol*. 2016 Feb 24. doi: 10.5152/dir.2016.15323. [Epub ahead of print].

Manuscripts Published in Electronic Format: Morse SS. Factors in the emergence of infectious diseases. *Emerg Infect Dis* (serial online) 1995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: [http:// www.cdc.gov/ncidod/EID/cid.htm](http://www.cdc.gov/ncidod/EID/cid.htm).

## REVISIONS

When submitting a revised version of a paper, the author must submit a detailed "Response to the reviewers" that states point by point how each issue raised by the reviewers has been covered and where it can be found (each reviewer's comment, followed by the author's reply and line numbers where the changes have been made) as well as an annotated copy of the main document. Revised manuscripts must be submitted within 30 days from the date of the decision letter. If the revised version of the manuscript is not submitted within the allocated time, the revision option may be cancelled. If the submitting author(s) believe that additional time is required, they should request this extension before the initial 30-day period is over.

Accepted manuscripts are copy-edited for grammar, punctuation, and format. Once the publication process of a manuscript is completed, it is published online on the journal's webpage as an ahead-of-print publication before it is included in its scheduled issue. A PDF proof of the accepted manuscript is sent to the corresponding author and their publication approval is requested within 2 days of their receipt of the proof.

**Editor in Chief:** Prof. Dr. Sehnaz BOLKENT

**Address:** Istanbul University, Faculty of Science, Department of Biology, 34134 Vezneciler, Fatih, Istanbul, Türkiye

**Phone:** +90 212 4555700 (Ext. 20318)

**Fax:** +90 212 5280527

**E-mail:** sbolkent@istanbul.edu.tr

## Contents

### Research Articles

- 117 Investigation the Cytotoxic and Anti-Proliferative Effects of Crude Venom of *Euscorpis mingrelicus* (Scorpiones: Euscorpiidae) Scorpion**  
Nazife Yigit Kayhan, Ilkay Corak Ocal, Mustafa Akdeniz
- 125 In Silico Analysis of BMAL1 and CLOCK SNPs in the Ensembl Database**  
Seref Gul
- 136 Inflammation Parameters, Xanthine Oxidase and Anti-Xanthine Oxidase Antibodies in Synovial Fluid of Patients Suffering from Arthritis**  
Nadjet Hanachi, Lekhmici Arrar
- 144 New Records for Microalgae Species of the Turkish Seas Under the Effect of Intense Mucilage in the Sea of Marmara**  
Turgay Durmus, Neslihan Balkis-Ozdelice, Seyfettin Tas, Fatma Bayram-Partal, Muharrem Balci, Cem Dalyan, Mustafa Sari 144
- 163 Phenolic Extracts of *Zizyphus lotus* L. (Rhamnaceae) and *Ruta chalepensis* L. (Rutaceae) as Alternatives to Antibiotics and their Antimicrobial Effects on Clinical Multidrug-Resistant Pathogens**  
Nour El Houda Bekkar, Boumediene Meddah, Yavuz Selim Cakmak, Bahadir Keskin, Pascal Sonnet
- 184 The Role of Gamma-Amino Butyric Acid in Short-Term High Temperature Acclimation in Lichen *Pseudevernia furfuracea***  
Nihal Goren-Saglam, Fazilet Ozlem Albayrak, Dilek Unal
- 190 Strigolactone and Auxin Applications on Cotyledon Senescence in Sunflower Seedlings under Salt Stress**  
Humeyra Ozel, Serap Saglam
- 197 The Role of rs4626 and rs7221352 Polymorphisms on the *TOB1* Gene in Turkish Relapsing-Remitting Multiple Sclerosis Patients**  
Fulya Basoglu Koseahmet, Candan Eker, Musa Ozturk, Sebnem Ozdemir, Ayhan Koksal, Sevim Baybas, Tuba Gunel
- ### Review Article
- 206 Emergence, Evolution and Economics of Coronaviruses**  
Sidhant Jain, Meenakshi Rana, Pooja Jain

## Contents

**Theme:** The aspects of cellular signalling pathways of different disease models

---

### Research Articles

**217** *Myrtus communis* L. Extract Ameliorates High Fat Diet Induced Kidney and Bladder Damage by Inhibiting Oxidative Stress and Inflammation

Fatma Kanpalta Mustafaoglu, Busra Ertas, Ali Sen, Dilek Akakin, Goksel Sener, Feriha Ercan

**231** Effects of Apocynin against Monosodium Glutamate-Induced Oxidative Damage in Rat Kidney

Merve Acikel Elmas, Gokcen Ozgun, Ozlem Bingol Ozakpinar, Zozan Guleken, Serap Arbak

**240** Epibrassinolide Triggers Apoptotic Cell Death in SK-N-AS Neuroblastoma Cells by Targeting GSK3 $\beta$  in a ROS Generation-Dependent Way

Pinar Obakan Yerlikaya, Shafaq Naxmedova<sup>240</sup>

**251** Anti-Cancer Effects of *Trigonella foenum* in Neuroblastoma Cell Line

Irem Urkmez, Hatice Ilayhan Karahan Coven, Asli Eldem, Melek Pehlivan

**257** *In silico* Evaluation of WWC1 in Melanoma Using Bioinformatic Analyses

Dilara Kamer Colak, Ufuk Unal, Sema Bolkent

### Review Articles

**267** Personalized Medicine: A Solution for Today and Tomorrow

Basak Dalbayrak, Mustafa Dogukan Metiner

**274** Thioredoxin-Interacting Protein: The Redoxosome Complex in Glomerular Lesion

Gabriel Pereira, Emily Pereira dos Santos, Maria Augusta Ruy-Barbosa, Sofia Tomaselli Arioni, Thabata Caroline de Oliveira Santos, Débora Tavares de Resende e Silva, Juan Sebastian Henao Agudelo, Maria do Carmo Pinho Franco, Ricardo Fernandez, Rafael Luiz Pereira, Danilo Cândido de Almeida

