



EUROPEAN CONFERENCE

Conference Proceedings

**I International Science Conference
«Prospects for the development
of modern digital technologies»**

January 05-07, 2026

Bilbao, Spain

UDC 01.1

ISBN – 979-8-90070-288-9

The I International scientific and practical conference «Prospects for the development of modern digital technologies», January 05-07, 2026, Bilbao, Spain, 191 p.

Text Copyright © 2026 by the European Conference (<https://eu-conf.com/>).

Illustrations © 2026 by the European Conference.

Cover design: European Conference (<https://eu-conf.com/>).

© Cover art: European Conference (<https://eu-conf.com/>).

© All rights reserved.

No part of this publication may be reproduced, distributed, or transmitted, in any form or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher. The content and reliability of the articles are the responsibility of the authors. When using and borrowing materials reference to the publication is required. Collection of scientific articles published is the scientific and practical publication, which contains scientific articles of students, graduate students, Candidates and Doctors of Sciences, research workers and practitioners from Europe, Ukraine and from neighboring countries and beyond. The articles contain the study, reflecting the processes and changes in the structure of modern science. The collection of scientific articles is for students, postgraduate students, doctoral candidates, teachers, researchers, practitioners and people interested in the trends of modern science development.

The recommended citation for this publication is: Chekalina N.I., Dihtyar N.M. The evolution of materials and artistic techniques of the portrait genre in a historical context from antiquity to the Renaissance. Abstracts of I International Scientific and Practical Conference. Bilbao, Spain. Pp. 10-13.

URL: <https://eu-conf.com/en/events/prospects-for-the-development-of-modern-digital-technologies/>

MARKETING		
27.	Даценко В.В., Лопушанська Ю.В. ВИКОРИСТАННЯ НЕЙРОМАРКЕТИНГУ В SMM-СТРАТЕГІЯХ БРЕНДІВ	104
28.	Даценко В.В., Самброс Л.В. РОЗРОБКА СТРАТЕГІЇ ФОРМУВАННЯ ПОЗИТИВНОГО ІМІДЖУ ПІДПРИЄМСТВА	107
29.	Даценко В.В., Тараненко В.М. УДОСКОНАЛЕННЯ СИСТЕМИ УПРАВЛІННЯ МАРКЕТИНГОВОЮ КОМУНІКАЦІЄЮ ПІДПРИЄМСТВА	110
30.	Міщенко Д.А., Малієнко М.К. ОБГРУНТУВАННЯ СТРАТЕГІЧНОГО МАРКЕТИНГОВОГО ПЛАНУ ПІДПРИЄМСТВА	112
MEDICINE		
31.	Goncharova O.A., Dubovik V.M., Ashurov E.M. THE LEVEL OF ACTIVITY OF SULFHYDRYL GROUPS AS AN INDICATOR OF OXIDATIVE STRESS IN THE PRESENCE OF GRAVES' DISEASE	115
32.	Баранова Н.В., Черкашина М.В., Ільченко Н.О. РОЛЬ ПЕРЕДОПЕРАЦІЙНОЇ ПІДГОТОВКИ ПАЦІЄНТА У ЗНИЖЕННІ АНЕСТЕЗІОЛОГІЧНИХ РИЗИКІВ	118
33.	Катюха Д.О. ЛАБОРАТОРНЕ ДОСЛІДЖЕННЯ ЛІПІДНОГО ОБМІНУ У ХВОРИХ НА ЦУКРОВИЙ ДІАБЕТ	121
34.	Кірієнко О.М., Дьяков М.О., Рзаєва А.А.К. СУЧАСНІ АСПЕКТИ ПРОФІЛАКТИКИ СЕРЦЕВО-СУДИННИХ ЗАХВОРЮВАНЬ	125
35.	Майборода М.В. ДОСЛІДЖЕННЯ БІОХІМІЧНИХ ПОКАЗНИКІВ КРОВІ У ХВОРИХ НА ЖОВЧНОКАМ'ЯНУ ХВОРОБУ	128
36.	Присяжнюк С.Т., Попович Ю.І. АНТИАМІЛОЇДНІ ПРЕПАРАТИ В ЛІКУВАННІ ХВОРОБИ АЛЬЦГЕЙМЕРА	132

THE LEVEL OF ACTIVITY OF SULFHYDRYL GROUPS AS AN INDICATOR OF OXIDATIVE STRESS IN THE PRESENCE OF GRAVES' DISEASE

Goncharova Olga Arkadiivna

Doctor of Medical Sciences, Professor, Professor of the Department of
Endocrinology and Pediatric Endocrinology
Kharkiv, National Medical University, Ukraine

Dubovik Viktor Mykolayovych

Candidate of Medical Sciences, leading researcher of the surgical department of the
SI "V. Danilevsky Institute for Endocrine Pathology Problems of the National
Academy of Medical Sciences of Ukraine», Kharkiv, Ukraine

Ashurov Eldar Mogerovich

Doctor-Immunologist of the clinical and diagnostic laboratory of the State Institution
"Institute of Endocrine Pathology named after V.Ya. Danylevskiy of the National
Academy of Medical Sciences of Ukraine", Kharkiv

Graves' disease (GD) is an antibody-mediated autoimmune disease characterized by diffuse goiter and hyperthyroidism [1]. Hyperthyroidism causes an acceleration of basal metabolism and increases cellular oxygen utilization, which, in turn, increases the formation of reactive oxygen species and disrupts the oxidant-antioxidant balance.

The dynamic SH-SS balance plays a crucial role in antioxidant defense, detoxification, apoptosis, and regulation of enzyme activity, transcription, and cellular signaling mechanisms [2]. Reactive oxygen species (ROS) are the main molecules that cause oxidative damage when their content exceeds physiological levels [3]. Thiol (SH) is an organic compound containing a sulfhydryl group that plays a crucial role in preventing the formation of any oxidative stress in cells. Under the action of ROS, SH groups in the environment are oxidized and converted into reversible disulfide (SS) bonds. This conversion is considered a sign of radical-mediated protein oxidation [4]. The formed SS bond structures can be restored to the previous SH group, thus maintaining the SH-SS balance [5].

Choi W et al., investigating markers of oxidative stress in tears of patients with thyrotoxic ophthalmopathy (TO), found that the values of sulfhydryl SH-groups were higher in patients with TO, which proves the role of oxidative stress in the development of TO against the background of DTZ [6]. However, in the study of Agan V. et al., the levels of sulfhydryl SH-groups in patients with Graves' disease were lower than in controls [7]. Similar data were obtained in the work of Ademoğlu E, et al. [8].

Goal. To investigate the features of oxidative stress in Graves' disease based on the levels of sulfhydryl SH-groups.

Materials and methods. The content of sulfhydryl SH-groups, as indicators of oxidative stress, was investigated in 85 patients with Graves' disease aged 31–73 years

(53.45 ± 2.37), who were undergoing treatment at the clinic of the State Institution "IPEP named after V.Ya. Danylevskiyi of the National Academy of Medical Sciences of Ukraine". Patients were divided into groups depending on the presence of: 1. TO: group 1 - patients with CG with TO (n=17) and group 2 - patients with CG without TO (n=68); depending on gender - a group of men (n=31) and a group of women (n=54). The control group consisted of 22 people without thyroid pathology aged 53.77 ± 2.31 years.

The study of the content of sulfhydryl SH groups was carried out by the photometric method on the AIF Stat Fax apparatus using Ellman's reagent (5,5'-dithiobis-(2-nitrobenzoic acid). Ellman's reagent or 5,5'-dithiobis-(2-nitrobenzoic acid) (DTNB) is a chemical compound used for the quantitative analysis of thiol groups in a sample. It is widely used in biochemistry to determine the content of cysteines in proteins and peptides. The method was proposed by George L. Ellman in 1959 [9].

Statistical processing of the obtained data was carried out by methods of variational statistics using the standard statistical calculation package Microsoft Excel and Statistica 6.0. The probability of differences in mean values was determined by the Student's t test. The difference was considered significant at P<0.05.

Results. When examining patients with CG, no significant difference in the content of sulfhydryl groups (SH-groups) was found between the group with CG (17.02 ± 0.24 nmol/mg) and the control group (17.08 ± 0.17 nmol/mg). When considering the groups with and without TO, no significant difference was obtained (Table 1).

Table 1.

The effect of the presence of thyrotoxic ophthalmopathy on the level of sulfhydryl groups (SH-groups), nmol/mg in patients with Graves' disease

Group	n	SH-groups, nmol/mg	P
GD + GO	17	17,48 ± 0,53	>0,05
GD without GO	68	17,13 ± 0,27	>0,05

Evaluating the oxidative stress index (sulfhydryl groups (SH-groups)) from the perspective of gender, we obtained significant differences both between subgroups of men with CG and the control group, and between men and women with CG (Table 2).

Table 2.

Gender characteristics of the content of sulfhydryl groups (SH-groups), nmol/mg in Graves' disease

Group	Men		Women		P
	n	M±m	n	M±m	
GD	31	17,75±0,34 ¹	54	16,88±0,27	<0,05
Control	6	19,23±0,27 ¹	16	16,59±0,47	<0,001

Note: ¹p<0,01;

Conclusions.

1. In the group without autoimmune thyroid pathology, there are gender differences due to a significant excess of the content of sulfhydryl SH-groups in men ($p < 0.001$).
2. In men with Graves' disease, the content of sulfhydryl SH-groups significantly exceeds this indicator in women ($p > 0.05$).
3. The presence of thyrotoxic ophthalmopathy on the background of Graves' disease is not accompanied by significant differences in the content of sulfhydryl SH-groups.

References:

1. Acibucu F, Öztürk DD, Kizildag C, Aslan MZ, Gulumsek E, Sumbul MS, Neselioglu S, Erel O, Sen S, Bankir M, Sumbul HE. Proptosis is associated with thiol-disulfide in patients with Graves' ophthalmopathy. *Arch Endocrinol Metab.* 2022 Apr 28;66(2):191-197. doi: 10.20945/2359-3997000000448.
2. Biswas S, Chida AS, Rahman I. Redox modifications of protein-thiols: emerging roles in cell signaling. *Biochem Pharmacol.* 2006;71:551–564. doi: 10.1016/j.bcp.2005.10.044.
3. Rashid K, Sinha K, Sil PC. An update on oxidative stress-mediated organ pathophysiology. *Food Chem Toxicol.* 2013;62:584–600. doi: 10.1016/j.fct.2013.09.026.
4. Cremers CM, Jakob U. Oxidant sensing by reversible disulfide bond formation. *J Biol Chem.* 2013;288:26489–26496. doi:10.1074/jbc.R113.462929
5. Jones DP, Liang Y. Measuring the poise of thiol/disulfide couples in vivo. *Free Radic Biol Med.* 2009;47:1329–1338. doi:10.1016/j.freeradbiomed.2009.08.021.
6. Choi W, Li Y, Ji YS, Yoon KC. Oxidative stress markers in tears of patients with Graves' orbitopathy and their correlation with clinical activity score. *BMC Ophthalmol.* 2018 Nov 21;18(1):303. doi: 10.1186/s12886-018-0969-x.
7. Agan V, Celik H, Eren MA, Agan FZ, Erel O, Neselioglu S, et al. An Investigation of Oxidative Stress and Thiol/Disulphide Homeostasis in Graves' Disease. *Medicina (Kaunas)* 2019;55(6):275–275. doi: 10.3390/medicina55060275.
8. Ademoğlu E, Ozbey N, Erbil Y, Tanrikulu S, Barbaros U, Yanik BT, et al. Determination of oxidative stress in thyroid tissue and plasma of patients with Graves' disease. *Eur J Intern Med.* 2006;17(8):545–550. doi: 10.1016/j.ejim.2006.04.013.
9. Riener C. K., Kada G., Gruber H. J. Quick measurement of protein sulfhydryls with Ellman's reagent and with 4,4'-dithiodipyridine (англ.) // *Anal Bioanal Chem*[англ.] : journal. — 2002. — Vol. 373, no. 4—5. — P. 266—276. — doi:10.1007/s00216-002-1347-2