Busta n. 1

Domanda GENERALE

Descrivere i principi dell'analisi lipidomica e formulare una strategia analitica per la determinazione estesa di lipidi superficiali cutanei.

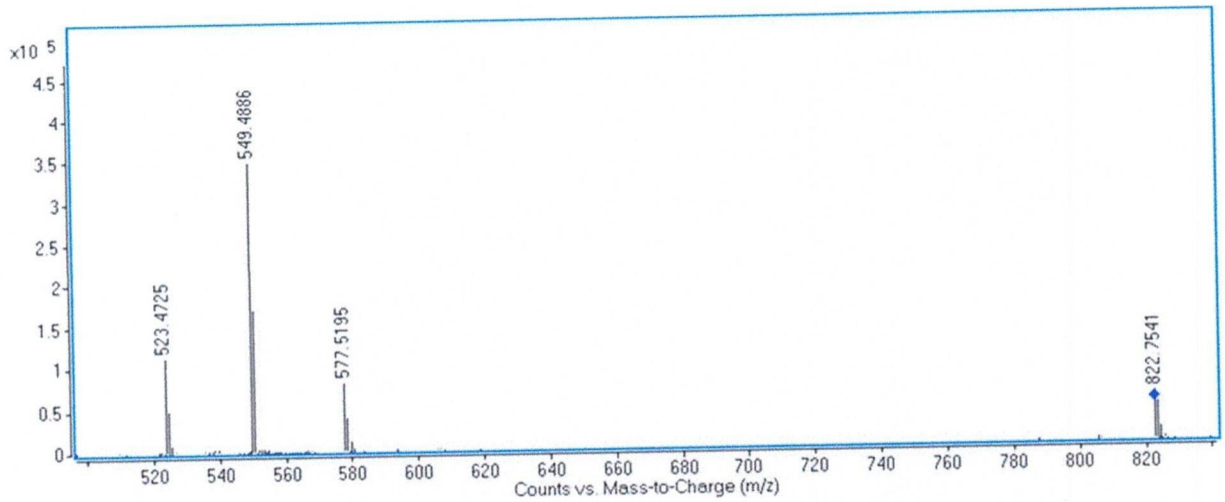
Domanda SPECIFICA

Esercizio: Dallo spettro fornito del trigliceride con composizione elementare C51H96O6, fornire la descrizione delle specie osservate e proporre la composizione in acidi grassi sulla base dei dati ricavabili dallo spettro MS tandem (MSMS).

Ionizzazione in modalità 'ioni positivi' con sorgente electrospray (+ESI)

Lo ione precursore 822.7541 corrisponde all'addotto con ammonio [M+NH4]+. La frammentazione MSMS è avvenuta in cella di collisione (CE) con energia di collisione dopo filtrazione dello ione precursore [M+NH4]+ nel quadrupolo. Lo spettro 'product ion' è stato acquisito con analizzatore di massa time-of-flight (TOF).

(Nello spettro sono presenti i soli frammenti utili per il riconoscimento)



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Prova estratta Busta n. 2

Domanda GENERALE:

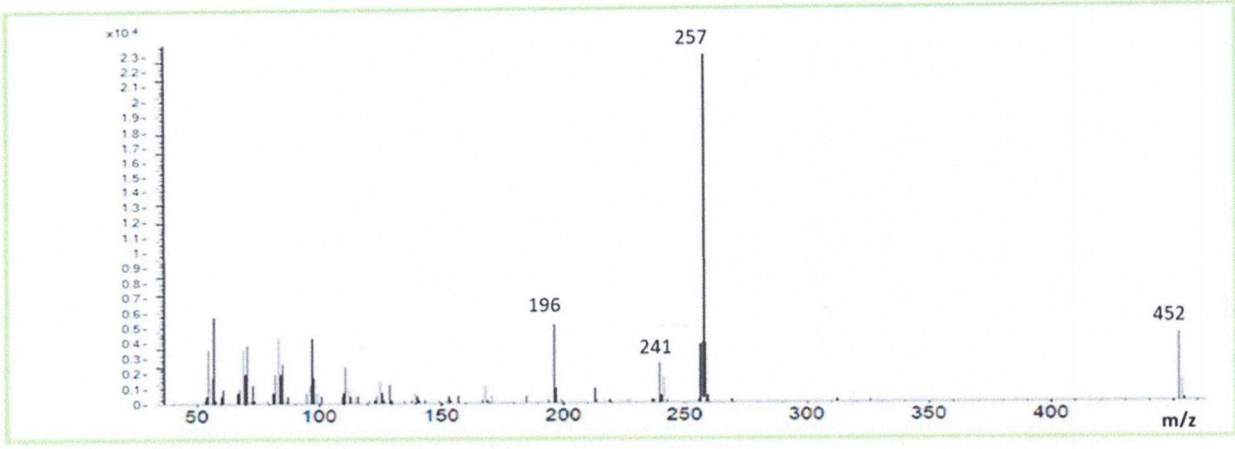
Descrivere la funzione e i fattori di controllo della barriera di impermeabilità nell'epidermide, la composizione biochimica dei lipidi della barriera di impermeabilità cutanea e le vie biosintetiche principali coinvolte nella sintesi di ceramidi, le principali patologie dermatologiche associate ad alterazioni della barriera di impermeabilità cutanea e le strategie analitiche per caratterizzare la composizione dei lipidi della barriera epidermica.

Domanda SPECIFICA:

Esercizio: Dallo spettro fornito dell'estere della cera con composizione elementare C30H60O2, fornire la descrizione degli ioni osservati e la struttura sulla base dei dati ricavabili dallo spettro MS.

Separazione ottenuta mediante gas cromatografia accoppiata a spettrometria di massa (GCMS) e frammentazione in ionizzazione elettronica EI. Lo ione molecolare M°+ ha massa 452.

(Nello spettro sono presenti i soli frammenti utili per il riconoscimento)



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Busta n. 3

Domanda GENERALE:

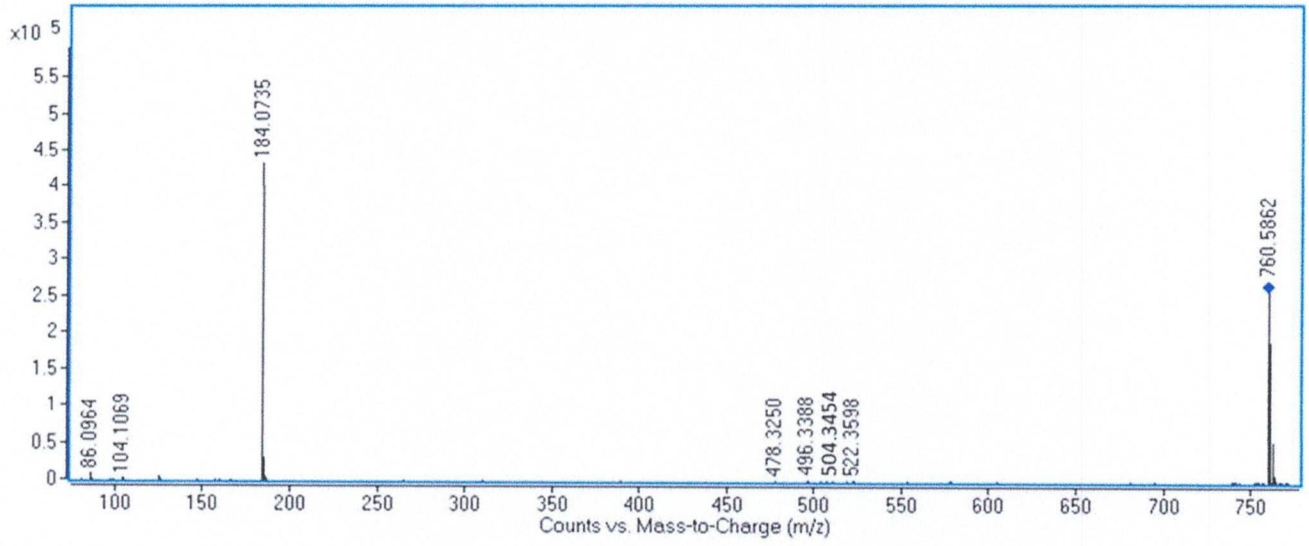
Descrivere la funzione e i fattori di controllo dell'attività della ghiandola sebacea, la composizione biochimica del sebo e le vie biosintetiche principali coinvolte nella sua sintesi nell'uomo, le principali patologie dermatologiche che interessano la ghiandola sebacea e le strategie analitiche per caratterizzare la composizione sebacea e le sue alterazioni.

Domanda SPECIFICA:

Esercizio: Dallo spettro fornito del fosfolipide con composizione elementare C42H82NO8P, fornire la descrizione delle specie osservate e indicare la classe di appartenenza del fosfolipide e la composizione in acidi grassi sulla base dei dati ricavabili dallo spettro MS tandem (MSMS).

Ionizzazione in modalità 'positiva' con sorgente electrospray (+ESI)

Lo ione precursore 760.5862 corrisponde all'addotto protonato [M+H]+. La frammentazione MSMS è avvenuta in cella di collisione (CE) con energia di collisione dopo filtrazione dello ione precursore [M+H]+ nel quadrupolo. Lo spettro 'product ion' è stato acquisito con analizzatore di massa time-of-flight (TOF).



PROVA INGLESE

ABSTRACT N. 1

Accepted: 4 April 2018
DOI: 10.1111/exd.13558

METHODS REVIEW

WILEY Experimental Dermatology

Lipidomics for translational skin research: A primer for the uninitiated

Alexandra C. Kendall[1] | Marta M. Koszyczarek[1] | Emrys A. Jones[2] | Philippa J. Hart[2] | Mark Towers[2] | Christopher E. M. Griffiths[3] | Michael Morris[2] | Anna Nicolaou[1]

Abstract

Healthy skin depends on a unique lipid profile to form a barrier that confers protection and prevents excessive water loss, aids cell-cell communication and regulates cutaneous homoeostasis and inflammation. Alterations in the cutaneous lipid profile can have severe consequences for skin health and have been implicated in numerous inflammatory skin conditions. Thus, skin lipidomics is increasingly of interest, and recent developments in mass spectrometry-based analytical technologies can deliver in-depth investigation of cutaneous lipids, providing insight into their role and mechanism of action. The choice of tissue sampling technique and analytical approach depends on the location and chemistry of the lipid of interest. Lipidomics can be conducted by various mass spectrometry approaches, including different chromatography and ionisation techniques. Targeted mass spectrometry is a sensitive approach for measuring low-abundance signalling lipids, such as eicosanoids, endocannabinoids and ceramides. This approach requires specific extraction, chromatography and mass spectrometry protocols to quantitate the lipid targets. Untargeted mass spectrometry reveals global changes and allows analysis of hundreds of complex lipids across a range of lipid classes, including phospholipids, glycerophospholipids, cholesteryl esters and sphingolipids. Mass spectrometry lipid imaging, including matrix-assisted laser desorption ionisation mass spectrometry and desorption electrospray ionisation mass spectrometry, can reveal information about abundance and anatomical distribution of lipids within a single skin sample. Skin lipidomics can provide qualitative and quantitative data on hundreds of biologically relevant lipid species with different properties and activities, all found within a single skin sample, and support translational studies exploring the involvement of lipids in skin health and disease.

KEYWORDS

ceramides, chromatography, mass spectrometry, mass spectrometry imaging, skin lipids

PROVA INGLESE

ABSTRACT N. 2

Accepted: 4 April 2018
DOI: 10.1111/exd.13558

METHODS REVIEW

WILEY Experimental Dermatology

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Abstract

Healthy skin depends on a unique lipid profile to form a barrier that confers protection and prevents excessive water loss, aids cell-cell communication and regulates cutaneous homoeostasis and inflammation. Alterations in the cutaneous lipid profile can have severe consequences for skin health and have been implicated in numerous inflammatory skin conditions. Thus, skin lipidomics is increasingly of interest, and recent developments in mass spectrometry-based analytical technologies can deliver in-depth investigation of cutaneous lipids, providing insight into their role and mechanism of action. The choice of tissue sampling technique and analytical approach depends on the location and chemistry of the lipid of interest. Lipidomics can be conducted by various mass spectrometry approaches, including different chromatography and ionisation techniques. Targeted mass spectrometry is a sensitive approach for measuring low-abundance signalling lipids, such as eicosanoids, endocannabinoids and ceramides. This approach requires specific extraction, chromatography and mass spectrometry protocols to quantitate the lipid targets. Untargeted mass spectrometry reveals global changes and allows analysis of hundreds of complex lipids across a range of lipid classes, including phospholipids, glycerophospholipids, cholesteryl esters and sphingolipids. Mass spectrometry lipid imaging, including matrix-assisted laser desorption ionisation mass spectrometry and desorption electrospray ionisation mass spectrometry, can reveal information about abundance and anatomical distribution of lipids within a single skin sample. Skin lipidomics can provide qualitative and quantitative data on hundreds of biologically relevant lipid species with different properties and activities, all found within a single skin sample, and support translational studies exploring the involvement of lipids in skin health and disease.

KEYWORDS

ceramides, chromatography, mass spectrometry, mass spectrometry imaging, skin lipids

PROVA INGLESE

ABSTRACT N. 3

Lipids and the Permeability and Antimicrobial Barriers of the Skin

Philip W. Wertz

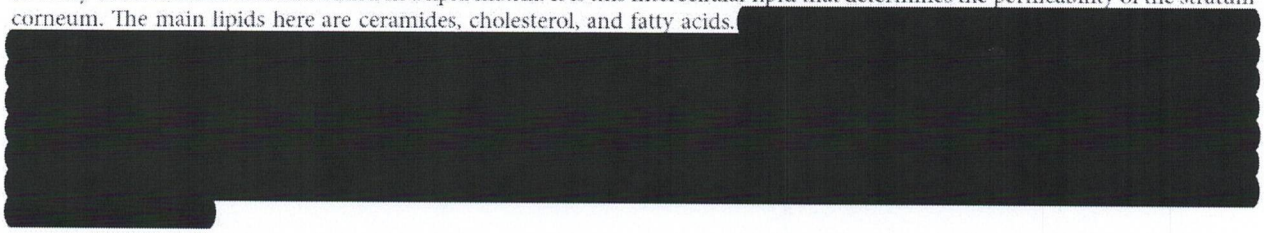
Professor Emeritus, University of Iowa, Iowa City, IA 52240, USA

Correspondence should be addressed to Philip W. Wertz; philipwwertz@gmail.com

Received 10 May 2018; Accepted 26 July 2018; Published 2 September 2018

Academic Editor: Xian-Cheng Jiang

The primary purpose of the epidermis of terrestrial vertebrates is to produce the stratum corneum, which serves as the interface between the organism and the environment. As such, the stratum corneum provides a permeability barrier which both limits water loss through the skin and provides a relatively tough permeability barrier. This provides for a degree of resistance to mechanical trauma and prevents or limits penetration of potentially harmful substances from the environment. The stratum corneum consists of an array of keratinized cells embedded in a lipid matrix. It is this intercellular lipid that determines the permeability of the stratum corneum. The main lipids here are ceramides, cholesterol, and fatty acids.



PROVA INGLESE

ABSTRACT N. 4

Review Article

Lipids and the Permeability and Antimicrobial Barriers of the Skin

Philip W. Wertz

Professor Emeritus, University of Iowa, Iowa City, IA 52240, USA

Correspondence should be addressed to Philip W. Wertz; philipwwertz@gmail.com

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[redacted]In addition, the skin surface of mammals, including humans, is coated by a lipid film produced by sebaceous glands in the dermis and secreted through the follicles. Human sebum consists mainly of squalene, wax monoesters, and triglycerides with small proportions of cholesterol and cholesterol esters. As sebum passes through the follicles, some of the triglycerides are hydrolyzed by bacteria to liberate free fatty acids. Likewise, near the skin surface, where water becomes available, some of the ceramides are acted upon by an epithelial ceramidase to liberate sphingosine, dihydrosphingosine, and 6-hydroxysphingosine. Some of the free fatty acids, specifically lauric acid and sapienic acid, have been shown to have antibacterial, antifungal, and antiviral activity. Also, the long-chain bases have broad spectrum antibacterial activity.

PROVA INGLESE

ABSTRACT N. 5

Research Article

Variation of Biophysical Parameters of the Skin with Age, Gender, and Body Region

Alireza Firooz,[1] Bardia Sadr,[1] Shahab Babakoohi,[1] Maryam Sarraf-Yazdy,[1] Ferial Fanian,[1] Ali Kazerouni-Timsar,[1] Mansour Nassiri-Kashani,[1] Mohammad Mehdi Naghizadeh,[2] and Yahya Dowlati[1]

[1] *Center for Research and Training in Skin Diseases and Leprosy, Tehran University of Medical Sciences, 415 Taleghani Avenue, Tehran 14166 13675, Iran*
[2] *Fasa University of Medical Sciences, Fasa, Iran*

Correspondence should be addressed to Bardia Sadr, bsadr@farabi.tums.ac.ir

Received 26 October 2011; Accepted 17 November 2011

Background. Understanding the physiological, chemical, and biophysical characteristics of the skin helps us to arrange a proper approach to the management of skin diseases. *Objective.* The aim of this study was to measure 6 biophysical characteristics of normal skin (sebum content, hydration, transepidermal water loss (TEWL), erythema index, melanin index, and elasticity) in a normal population and assess the effect of sex, age, and body location on them. *Methods.* Fifty healthy volunteers in 5 age groups (5 males and females in each) were enrolled in this study.

PROVA INGLESE

ABSTRACT N. 6

Research Article

Variation of Biophysical Parameters of the Skin with Age, Gender, and Body Region

Alireza Firooz,[1] Bardia Sadr,[1] Shahab Babakoohi,[1] Maryam Sarraf-Yazdy,[1] Ferial Fanian,[1] Ali Kazerouni-Timsar,[1] Mansour Nassiri-Kashani,[1] Mohammad Mehdi Naghizadeh,[2] and Yahya Dowlati[1]

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[2] *Fasa University of Medical Sciences, Fasa, Iran*

Correspondence should be addressed to Bardia Sadr, bsadr@farabi.tums.ac.ir

Received 26 October 2011; Accepted 17 November 2011

A multifunctional skin physiology monitor (Courage & Khazaka electronic GmbH, Germany) was used to measure skin sebum content, hydration, TEWL, erythema index, melanin index, and elasticity in 8 different locations of the body. *Results.* There were significant differences between the hydration, melanin index, and elasticity of different age groups. Regarding the locations, forehead had the highest melanin index, where as palm had the lowest value. The mean values of erythema index and melanin index and TEWL were significantly higher in males and anatomic location was a significant independent factor for all of 6 measured parameters. *Conclusion.* Several biophysical properties of the skin vary among different gender, age groups, and body locations.

PROVA INGLESE

ABSTRACT N. 7

Progress in Lipid Research 74 (2019) 160–185

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journal homepage: www.elsevier.com/locate/plipres

Review

Ceramide synthases in cancer therapy and chemoresistance

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Institute of Clinical Pharmacology, Faculty of Medicine, Goethe University Frankfurt, Theodor-Stern Kai 7, Frankfurt 60590, Germany

ABSTRACT

Drug resistance is one major reason for failure of cancer therapy. In the past 10 years, evidence emerged showing that ceramides of specific chain length, generated by six different ceramide synthases (CerS), are deregulated in different cancer types thereby influencing chemosensitivity. In this review we sum up the cellular mechanisms regulated by CerS and the respective ceramides of specific chain length contributing to chemoresistance and how we can interfere with these mechanisms to overcome drug resistance by targeting CerS. We compile an overview of the different cellular effects influenced by CerS in dependency of the used drug and cancer type. Finally, the potential of CerS as new drug targets in chemotherapy or as biomarkers for the prediction of therapeutic response rates is discussed.

PROVA INGLESE

ABSTRACT N. 8

Metabolomics (2012) 8:422–432
DOI 10.1007/s11306-011-0316-1

ORIGINAL ARTICLE

Between Metabolite Relationships: an essential aspect of metabolic change

Jeroen J. Jansen · Ewa Szymańska · Huub C. J. Hoefsloot · Doris M. Jacobs · Katrin Strassburg · Age K. Smilde

Received: 28 January 2011 / Accepted: 11 May 2011 / Published online: 24 May 2011

Abstract Not only the levels of individual metabolites, but also the relations between the levels of different metabolites may indicate (experimentally induced) changes in a biological system. Component analysis methods in current 'standard' use for metabolomics, such as Principal Component Analysis (PCA), do not focus on changes in these relations. We therefore propose the concept of 'Between Metabolite Relationships' (BMRs): common changes in the covariance (or correlation) between all metabolites in an organism. Such structural changes may indicate metabolic change brought about by experimental manipulation but which are lost with standard data analysis methods.

[redacted]

DOMANDE PROVA COLLOQUIO

1. In cosa consiste l'estrazione liquido-liquido?

2. Cosa si intende per grado di insaturazione dei lipidi, ad esempio degli acidi grassi?

3. Cosa si intende con l'acronimo CHONPS?

4. Come viene calcolata la massa di un composto CHONPS? Qual è utilità della massa accurata e del pattern isotopico?

5. In cosa consiste la regola dell'azoto?

6. Qual è il principio di purificazione attraverso 'solid phase extraction' SPE?

7. A quale superclasse di lipidi appartengono le ceramidi?

8. Di quali classi di ormoni è precursore il colesterolo?

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DOMANDE INFORMATICA

1. In cosa consiste lo strumento informatico open source chiamato LipidCreator?

2. Fornire una breve descrizione del portale web LIPIDMAPS?

3. Descrivere brevemente il portale web e database Human metabolome database (HMDB)?

4. Descrivere brevemente la sezione di PubChem?

5. In cosa consistono gli SMILES? Qual'è la differenza tra 'canonical SMILES' e 'isomeric SMILES'

6. Quali informazioni possono essere ricavate dalla kyoto encyclopedia of genes and genomes (KEGG)?

7. Cosa si intende per comma separated values (CSV)?

8. Quale simbolo occorre riportare in una casella di calcolo in Excel per effettuare un'operazione riferita ad una stessa casella o riga?

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