43° CONGRESSO NAZIONALE SIMLA
Verona
18-20 Settembre
2018

INTERDISCIPLINARITÀ NELLA ELABORAZIONE DELLA PROVA SCIENTIFICA

La ricerca avanzata in Patologia Forense: quali possibilità di trasferimento sul piano probatorio?

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SCIENTIFIC EVIDENCE

- **Science**
  Based on the scientific method
  – Reproducibility
  – Transferability
  – Falsifiability
  – Verifiability

- **Pseudoscience**
  Absence of the scientific method

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ADHERENCE OF THE SCIENTIFIC EVIDENCE TO SCIENTIFIC PRINCIPLES

- Use of validated methods and procedures
- Adherence to protocols defined by the scientific community
- Careful and adequate documentation
- Adoption of reliable precautions for avoiding and estimating errors
- Correct and unforced interpretation of the results

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STRENGTHENING
FORENSIC SCIENCE
IN THE UNITED STATES

A PATH FORWARD

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Committee on Identifying the Needs of the Forensic Science Community

Committee on Science, Technology, and Law
Policy and Global Affairs

Committee on Applied and Theoretical Statistics
Division on Engineering and Physical Sciences

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

Strengthening Forensic Sciences

National Research Council - 2009

Pattern/experience evidence

- Fingerprints
- Firearms examination
- Toolmarks
- Bite marks
- Impressions (tires, footwears)
- Bloodstain pattern analysis
- Handwriting
- Hair

Analytical evidence

- DNA
- Coatings
- Chemicals (including drugs)
- Materials (including fibers)
- Fluids
- Serology
- Fire and explosive analysis

Digital evidence

Determination of uniqueness

- measurements of objects attributes
- data collection on frequency and range of variation
- testing attributes indipendence
- calculations of probability of sharing of observable attributes

Sharing of the results of research

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Strengthening Forensic Sciences

National Research Council - 2009

Fingerprints

- Whether each person's fingerprints are permanent and unique (uniqueness is commonly assumed)
- Comparison of fingerprint left with an imperfect impression at a crime scene

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FINGERPRINTS

In October 2007, Baltimore County Circuit Judge Susan M. Souder refused to allow a fingerprint analyst to testify that a latent print was made by the defendant in a death penalty trial. In her ruling, Judge Souder found the traditional method of fingerprint analysis to be "a subjective, untested, unverifiable identification procedure that purports to be infallible".

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LEVEL OF INNOVATION OF SCIENTIFIC EVIDENCE

1- Extended use of techniques validated in forensics

2- Use of techniques acquired from other scientific fields

3- Research and development of known techniques

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ORIGINAL ARTICLE

Diagnosis of Vitality in Skin Wounds in the Ligature Marks Resulting From Suicide Hanging

Isabel Legaz Pérez, PhD,* María Falcón, PhD,* M. Gimenez, PhD,† F. Martínez Díaz, MD, PhD,* M.D. Pérez-Cárceles, MD, PhD,* E. Osuna, MD, PhD,* D. Nuno-Vieira, MD, PhD,‡ and A. Luna, MD, PhD*

Am J Forensic Med Pathol • Volume 00, Number 00, Month 2017

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TABLE 2. Analysis of Metallic Ion Concentrations in Noninjured and Injured Wound Skin of Ligature Mark Associated With Different Types of Neck Injury in Deaths by Suicidal Hanging

Metallic Ions*	Noninjured Skin	Injured Skin of LM		Types of Neck Injuries: Cutaneous Only	Cutaneous and Subcutaneous	Cutaneous, Subcutaneous, and Muscular
(Mean + SD)	N = 71	N = 71	P†	n = 6	n = 54	n = 11
Ca	372.1 ± 167.7	340.5 ± 248.4	0.373	429.1 ± 41.4	222.1 ± 103.3	122.8 ± 32.1
Mg	131.1 ± 110.1	117.9 ± 68.0	0.367	102.6 ± 69.4	95.69 ± 67.8	113.0 ± 50.3
Fe	50.8 ± 32.1	66.8 ± 46.9	**0.019**	47.2 ± 23.6	62.2 ± 47.5	72.5 ± 39.4
Zn	32.7 ± 29.1	56.3 ± 68.4	**0.009**	96.7 ± 77.4	48.5 ± 71.2	56.1 ± 47.2
Mg/Ca	0.38 ± 0.65	0.45 ± 0.95	0.612	0.30 ± 1.83	0.49 ± 0.53	0.51 ± 0.49
Fe/Ca	0.28 ± 0.22	0.32 ± 0.75	0.669	0.11 ± 0.57	0.28 ± 0.46	0.59 ± 1.23
Zn/Ca	0.12 ± 0.17	0.37 ± 0.94	**0.030**	0.24 ± 0.24	0.34 ± 1.27	0.53 ± 1.31
Fe/Mg	0.43 ± 0.34	0.66 ± 0.28	**0.005**	0.46 ± 0.34	0.65 ± 0.70	0.64 ± 0.70
Zn/Mg	0.36 ± 0.26	0.41 ± 0.56	0.499	0.88 ± 0.56	0.43 ± 0.57	0.43 ± 0.57

*Metallic ion concentration was quantified in parts per million. Means metallic ion concentrations were compared by the 2-sided Student *t* test.
†*P* value used to compare noninjured and injured skin of ligature mark. A level of $P < 0.05$ was accepted as statistically significant and are shown in bold.
LM, ligature mark.

Forensic Science International: Genetics Supplement Series 4 (2013) e190–e191

Contents lists available at ScienceDirect

Forensic Science International: Genetics Supplement Series

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

5 miRNA expression analyze in post-mortem interval (PMI) within 48 h

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

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RNA degradation as described by a mathematical model for postmortem interval determination

Ye-Hui Lv[a, b, c], Jian-Long Ma[d], Hui Pan[a], Heng Zhang[a, b], Wen-Can Li[d], Ai-Min Xue[a], Hui-Jun Wang[e], Kai-Jun Ma[f], Long Chen[a, *]

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LEVEL OF INNOVATION OF SCIENTIFIC EVIDENCE

1- Extended use of techniques validated in forensics

2- Use of techniques acquired from other scientific fields

3- Research and development of known techniques

4. Experimentation of new techniques

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QUALITY SYSTEMS

EFFECTIVE

- Adherence to g.l. promoted by scientific societies
- Participation in collaborative nat-intern exercises
- Scientific collaboration at nat-intern level
- Proficiency Testing
- ISO 9000-9001 Certification
- EN ISO/IEC 17025 Accreditation

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Published online 30 October 2009 | Nature | doi:10.1038/news.2009.1050

News

Lighter sentence for murderer with

European Journal of Human Genetics (2010) 18, 519–521
© 2010 Macmillan Publishers Limited All rights reserved 1018-4813/10 $32.00
www.nature.com/ejhg

POLICY

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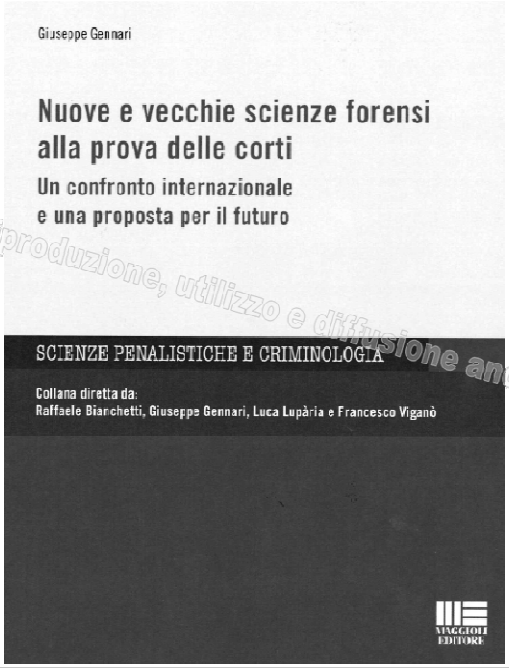
Italian appeal court: a genetic predisposition to commit murder?

Francesca Forzano[4,1], Pascal Borry[2], Anne Cambon-Thomsen[3], Shirley V Hodgson[4], Aad Tibben[5,6], Petrus de Vries[7,8], Carla van El[9] and Martina Cornel[9,10,11]

A few months ago, the controversial debate on connection between genetic variants and antisocial behaviour gained renewed prominence after the sentence of an Italian judge who decided to further reduce the prison sentence of a person convicted of murder by 1 year – from 9 to 8 years – because he was found to be a carrier of a few genetic variants thought to be associated with a predisposition to aggressiveness. We discuss the social implication of this view, the lack of evidence of the clinical utility of this test, and in particular the risks of offering susceptibility testing in the context of legal proceedings.
European Journal of Human Genetics (2010) **18**, 519–521; doi:10.1038/ejhg.2010.31; published online 10 March 2010

07 Sep 2011 15:33 BST | Posted by Brian Owens | Category: Policy

Posted on behalf of Emiliano Forosin.



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PERUGIA TRIAL

Sentence of the Court (Cassazione)
25 Marzo 2015

"E quando, poi, il momento centrale dell'attività di ricerca tecnico-scentifica è rappresentato dalle peculiari indagini genetiche, il cui contributo nell'attività investigativa è sempre più rilevante, affidabile parametro di correttezza non può che essere il rispetto degli *standards fissati dai protocolli internazionali* che compendiano le regole fondamentali di approccio prescritte dalla comunità scientifica, *sulla base dell'osservazione statistica ed epistemologica" (pag. 24).*

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PERUGIA TRIAL

Sentence of the Court (Cassazione)
25 Marzo 2015

- "Il rigoroso rispetto di tali canoni metodologici offre un coefficiente, convenzionalmente, ***accettabile*** di affidabilità delle acquisite risultanze, primariamente legata alla ***ripetitività*** delle stesse – ossia alla possibilità che quelle evidenze, e soltanto quelle, si riproducano in costanza di identica procedura di indagine e di identiche condizioni, secondo le leggi fondamentali della metodica empirica, e più in genere, ***della scienza sperimentale, fondata, a partire da Galileo Galilei***, sull'applicazione del "**metodo scientifico**" (procedura tipica volta a conseguire la conoscenza della realtà "**oggettiva**", ***affidabile, verificabile e condivisibile)" (pag. 24)***

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PERUGIA TRIAL

Sentence of the Court (Cassazione)
25 Marzo 2015

"Inoltre, le tracce rinvenute sui due reperti …erano di esigua quantità (low Copy Number) tali da non consentire di ripetere l'amplificazione …la ripetizione dell'analisi ("almeno due volte" Maggiore CC ...; tre volte secondo il ...) è assolutamente necessaria perché il risultato dell'analisi possa ritenersi affidabile…"

In buona sostanza, si tratta null'altro che della procedura di *validazione o falsificazione* propria del metodo scientifico" (pag 38)

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