Programme & Abstracts

4th European Congress on Tattoo and Pigment Research

26 - 28 March 2019
Bern · Switzerland

www.ectp2019.org

Sponsors

Platinum sponsor

VON BERG
PHARMA
intradermal pigments

Silver sponsors

Bepanthen®

CUTERA®
FACE + BODY AESTHETIC SOLUTIONS

INTENZE™

SYNERON CANDELA®

Index

ECTP Organisation

Local Organiser

Congress President
Maurice Adatto, MD.
University Hospital Bern, Switzerland

Congress Chairwoman
Kristine Heidemeyer, MD.
University Hospital Bern, Switzerland

ESTP Board

Society Chairman
Jørgen Serup, Professor,
DMSc, Bispebjerg University Hospital, Copenhagen, Denmark

Treasurer
Wolfgang Bäumler, Professor PhD.,
University of Regensburg, Germany

Board members
Maurice Adatto, Switzerland
Enzo Berardesca, Italy
Lucia Bonadonna, Italy
Katrina Hutton Carlsen, Denmark
Christa De Cuyper, Belgium
Michael Dirks, Germany
Christopher Hohl, Switzerland
Ines Schreiver, Germany
Sebastiaan van der Bent, The Netherlands
Thijs Veenstra, The Netherlands

Congress Secretariat

ECTP Congress Secretariat
c/o CAP Partner
info@cap-partner.eu
Tel: + 45 7020 0305

Objective of the European Society of Tattoo and Pigment Research (ESTP): The European Society of Tattoo and Pigment Research (ESTP) was inaugurated in 2013 in Copenhagen. ESTP is an open society and a forum, where researchers, tattooists, PMU-artists, the industry and the regulators meet, discuss and socialize.

The main objectives of the ESTP are to advance academic research on tattoos, to educate the medical community and other groups of professionals including the tattooists in any aspect of tattooing; furthermore, to advance the manufacturing, distribution and sales of safer tattoo inks, and to deliver independent expert advice, support research projects, guidelines and publications.

Find the statues at their full length on: www.estpresearch.org

Welcome

Dear Congress Participant, Dear ESTP member,

This congress is an important scene where people working with tattoos can meet face-to-face and discuss, socialize and feel the pulse of the tattoo world. People have backgrounds in research, ink manufacturing and tattoo practices, and in the regulatory business.

The pre-congress seminar includes keynote lectures by EU and other prominent speakers on the challenging situation of new regulations, which may change the tattoo industry dramatically. The ink industry and the tattooists may be given conditions they cannot ever meet. Regulations will meet a Europe with change and less coherence as exemplified by the Brexit becoming effective the day after the congress.

The core of the congress program is the scientific presentations but nearly any aspect of tattooing is covered. Speakers include professional tattooists, who have their own session. This time we have highlighted the work of permanent makeup artist, who also have their own session.

The industry has exhibits and a special industrial seminar, where tools and products are presented.

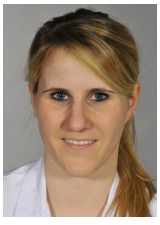
We do hope you also will find time to enjoy beautiful Bern and maybe other parts of Switzerland while you are here. UNESCO-nominated Bern is located on a peninsula, which on three sides is lined by the Aare River.

The congress would not be possible without your active participation and the economic support of exhibitors and sponsors. Thank you very much!
Good to see you in Bern!

On behalf of the congress organizers and
the European Society of Tattoo and Pigment Research

Maurice Adatto, MD
Congress President

Jørgen Serup, MD
Chairman of ESTP



Kristine Heidemeyer, MD
Congress Chairwoman

@mike_stout_tattoo

MAKE EVERY

FIRST

LAST

Original aftercare

With pro-vitamin B_5 to keep each new tattoo moisturised and protected.

Dermatologically tested on tattooed skin.

www.bepanthen.com

BAYER

Programme

Tuesday, 26th March 2019

Timing	Title	Speaker / Chair
12.00 - 13.00	**Registration, coffee and exhibition**	
13.00 - 17.30	**Pre-congress seminar: Coming European regulation of tattooing**	**Chairs: Jørgen Serup & Wolfgang Bäumler**
13.00 - 13.10	**O1:** The new scene of European regulation of the tattoo industry; hygiene, devices and tattoo inks	Jørgen Serup, Chairman of ESTP, DK
13.10 - 13.20	**O2:** Personal view on the upcoming regulations.	Wolfgang Bäumler, Treasurer of ESTP, DE
13.20 - 13.35	**O3:** The European Committee for Standardization (CEN) guideline on practices to improve tattoo hygiene	Andy Schmidt, Chairman, CEN standardization committee, CH
13.35 - 13.50	**O4:** The Netherlands, early bird in regulation of the tattoo business: customized interventions to increase compliance with hygiene rules	Thijs Veenstra, RIVM, Amsterdam, NL
13.50 - 14.05	**O5:** New regulation of devices in Europe, MDR replacing MDD in 2020, consequences for the tattoo industry	Andreas Pachten, MT. Derm, Berlin, DE
14.05 - 14.20	**O6:** Public health evaluation of carcinogenic tattoo ink ingredients	Milena Foerster et al. Agency research cancer, FR
14.20 - 14.35	**O7:** Tattoo and cancer - is there an association? The first steps towards scientific evidence	Christel Nielsen, Lund University, SE
14.35 - 15.00	**Coffee break**	
15.00 - 15.30	**O8:** EU regulation on chemicals in tattoo inks under REACH: background and next steps	Guiseppina Luvarà, EU, DG ENV, BE
15.30 - 15.45	**O9:** EU Tattoo and permanent make-up regulation under REACH - the ESTP opinion	Ines Schreiver, Board of ESTP, DE
15.45 - 16.00	**O10:** The REACH Regulation will deal with risks related to chemicals in tattoo inks; beyond this, how can EU countries guarantee, at a national level, the health of citizens regarding the risks of tattooing other than those covered by REACH? The Italian approach	Alberto Renzoni, Instituto Superiore di Sanitá, IT
16.00 - 16.15	**O11:** Enforceability of the new REACH restriction on substances in tattoo and PMU inks: an Italian initiative	Maria Letizia Polci et al. Health Ministry, IT
16.15 - 16.30	**O12:** Quantification of phthalates in tattoo inks in the framework of REACH official controls	Marco Famele et al. Istituto Superiore di Sanità, IT
16.30 - 16.45	**O13:** How to adapt in-house quality control of tattoo ink production to coming REACH requirements	Ralph Michael, Tattoo Ink Manufacturers of Europe (TIME), DE
16.45 - 17.00	**O14:** How to produce tattoo inks in USA and organize export to the European market after start of the REACH regulation	Mario Barth, Intenze Inc. USA
17.00 - 17.30	Discussion, Q & A	

Programme

Wednesday, 27th March 2019

Timing	Title	Speaker / Chair
08.00 - 08.30	**Registration and coffee**	
08.30 - 09.00	**Opening**	**Chairs: Maurice Adatto & Kristine Heidemeyer**
08.30 - 08.40	Professor Luca Borradori, Inselspital Bern, CH	
08.40 - 08.50	Congress President Maurice Adatto and Chairlady of Local Organization Dr. Kristine Heidemeyer, CH	
08.50 - 09.00	Professor Jørgen Serup, Chairman of ESTP and the scientific committee, DK	
09.00 - 10.30	**SESSION: The world of tattoos, tattooing and tattooists**	**Chairs: Christa de Cuyper & Katrina Hutton Carlsen**
09.00 - 09.15	**O15:** Tattooing and tattooists on the move into the future, when, where, why, how, whom?	Andy Schmidt, Chairman of European Tattooists, CH
09.15 - 09.30	**O16:** Tattoo customers: expectations and the type of tattoo they request	Mel Dredd Poudroux, DK
09.30 - 09.45	**O17:** The demographics and rates of tattoo complications, regret and unsafe tattooing practices: a cross-sectional study	Walter Liszewski, USA
09.45 - 10.00	**O18:** Present state of local or systemic infections by tattooing, sources of infection and bacterial strains causing problem	Lucia Bonadonnna, Institute of Health, IT
10.00 - 10.15	**O19:** What future in training for dermopigmentation? The Italian case and the high specialization course at the university of Ferrara	Rita Molinaro, IT
10.15 - 10.30	**O20:** Technical failures and tattoo studio related conditions causing tattoo complications.	Jørgen Serup, Katrina Hutton Carlsen & Mitra Sepehri, DK
10.30 - 11.00	**Coffee, exhibition and poster viewing**	
11.00 - 12.30	**SESSION: Permanent make-up and medical tattooing, a rapidly growing field**	**Chairs: Jørgen Serup & Maya Ercegovac**
11.00 - 11.15	**O21:** Cosmetic and medical tattoos back in time	Alberto Renzoni and Antonia Pirrera, Istituto Superiore di Sanità, IT
11.15 - 11.30	**O22:** The international growth of cosmetic tattoos into a mainstream business	Maya Ercegovac, AU
11.30 - 11.45	**O23:** Tattooing by microblading and other special techniques	Diana Hvas, DK
11.45 - 12.00	**O24:** State of art of medical tattooing, indications, techniques, refinements, outcomes	Ina Bennoun, IL
12.00 - 12.15	**O25:** Inorganic and organic PMU colors	Cornelia Hildebrandt, DE
12.15 - 12.30	**O26:** Importance of medical and scientific research in dermopigmentation treatments: underestimated and recurrent problems in eyelid tattoos	Michela Fortunato, IT
12.30 - 13.30	**Lunch, exhibition & poster viewing**	

Programme

Wednesday, 27th March 2019

Timing	Title	Speaker / Chair
13.30 - 15.30	**SESSION: Cutting edge in tattoo and pigment research**	**Chairs: Ines Schreiver & Sebastiaan van der Bent**
13.30 - 13.45	**O27:** Quantitative versus qualitative assessment of pigments in tattoo inks, feasibility in relation to product labelling and control	Urs Hauri, CH
13.45 - 14.00	**O28:** Analysis of tattoo inks: do we need harmonized methods?	Christopher Hohl, CH
14.00 - 14.10	**O29:** Measurement of pigment agglomeration in skin samples; association between carbon black agglomerates and sarcoidosis	Katrina Hutton Carlsen, Georg Larsen, Jørgen Serup, DK
14.10 - 14.20	**O30:** Measurement of pigment agglomeration in commercial ink stock products; new versus old products	Katrina Hutton Carlsen, Georg Larsen, Jørgen Serup, DK
14.20 - 14.35	**O31:** High-frequency (20MHz) focused ultrasound (HIFU), a novel method for tattoo removal: pre-clinical experience and first experience in man	J. Serup, T. Bove and T. Zawada, DK
14.35 - 14.50	**O32:** Allergic reaction to a new temporary black tattoo dye, an extract from the jagua fruit (Genipa americana L)	Andreas Bircher, CH
14.50 - 15.05	**O33:** Impurity issues of raw materials used in the tattoo ink production	Michael Dirks, AT
15.05 - 15.20	**O34:** Organs-on-chips: human emulation for tattoo pigment safety	Daniel Levner, USA
15.20 - 15.30	Discussion, Q & A	
13.30 - 15.30	**PARALLEL SESSION IN ANNEX AUDITORIUM: Tattooist's own session**	**Chairs: Liz Kierstein, Andy Schmidt, Luc Grossenbacher & Michael Dirks**
13.30 - 13.45	**O35:** Association of Swiss professional tattoo artists (VST)	Fabio Colombo, CH
13.45 - 14.00	**O36:** The German Federal Association for tattooing and the recent political activities aiming towards a regulation of the tattoo industry	Urban Slamal, DE
14.00 - 14.15	**O37:** How to become a Tattoo Artist in Austria – the regulation/access control for tattooists via qualifying certificate	Erich Mähnert, AT
14.15 - 14.30	**O38:** Relying on the wrong information	Jens Bergström, SE
14.30 - 14.45	**O39:** An analysis of tattoo aftercare instructions in the United States	Walter Liszewski, USA
14.45 - 15.00	**O40:** "Inkbase", a new tool for color registration in studios developed by a tattoo artist	Liz Kierstein, DK
15.00 - 15.15	**O41:** Mystery tattoo allergy – who bears the risk?	Steffen Schubert, DE
15.15 - 15.30	Discussion, Q & A	
15.30 - 16.00	**Coffee, exhibition and poster viewing**	
16.00 - 17.00	**Industrial afternoon seminar: Exhibitor's introduction of products**	**Chairs: Enzo Berardesca & Thijs Veenstra**
16.15 - 16.30	Intenze tattoo ink products - now and in the future	Intenze Inc. Mario Barth
16.30 - 16.45	Working on High Level Q-Switched technology. Topic: Fotona Starwalker Ultraperformance Q-switch laser system for Tattoo Removal and FracTat technic as innovative Tattoo Removal procedure	Fotona: Dr. Jernej Kukovic
16.45 - 17.00	Color registration - nuisance or benefit?	Ink Base: Bjørn Severin & Esben Hammershøy
19.30 -	**CONFERENCE DINNER at Kornhaus Keller, Bern**	

Programme

Thursday, 28th March 2019

Timing	Title	Speaker / Chair
08.30 - 09.00	**Registration and coffee**	
09.00 - 10.45	**SESSION: Clinical complications, prevention and treatment**	**Chairs: Sebastiaan van der Bent & Marie Leger**
09.00 - 09.10	**O42:** Brief updates from the tattoo clinic in Copenhagen	Jørgen Serup, DK
09.10 - 09.20	**O43:** Brief updates from the tattoo clinic in Amsterdam	Sebastiaan van der Bent, NL
09.20 - 09.30	**O44:** Establishing a tattoo center and pro bono tattoo removal service in New York City	Marie Leger, USA
09.30 - 09.45	**O45:** Quantification of tattoo ink allergic reactions using 3D optical imaging	Mark den Blanken et al., NL
09.45 - 10.00	**O46:** Patch test panel for epidemiological surveillance of tattoo allergens in tattoo products	Steffen Schubert, DE
10.00 - 10.15	**O47:** Tattoos and psoriasis; embracing one stigma to conquer another: How individuals suffering from psoriasis, utilize tattoos as a catalyst to reclaim and anchor their self-identity	Mads Wedel Kristensen, DK
10.15 - 10.30	**O48:** My skin - A study of the emotional-cognitive representation of skin among people who have tattoos	Patrycja Rogowska et al., PL
10.30 - 10.45	**O49:** No changes of age-dependent differences in human lymph nodes with or without tattoo pigments	Vivien Schacht et al., DE
10.45 - 11.15	**Coffee, exhibition and poster viewing**	
11.15 - 13.15	**SESSION: Measurement and new research on tattoo inks**	**Chairs: Wolfgang Bäumler, Urs Hauri & Christopher Hohl**
11.15 - 11.30	**O50:** Tattoo needle wear containing nickel and chromium is deposited in skin and lymph nodes of healthy and allergic donors	Ines Schreiver et al., BfR, DE
11.30 - 11.45	**O51:** Effects of tattoo pigments and ultraviolett radiation on tattooed human skin models	Henrik Hering et al., BfR, DE
11.45 - 12.00	**O52:** Encapsulation of the colorant, acid RED 51 (C.I. 45430) in lipid microparticles: effect on photodegradation	Santo Scalia et al., IT
12.00 - 12.15	**O53:** Laser synthesys of black titanium oxide	Nikolay Alekseev et al., RU
12.15 - 12.30	**O54:** Development of an analytical method for analysis of azo-dyes in tattoo inks based on the UNI EN ISO 16373 (TEXTILE) using liquid chromatography coupled to high resolution mass spectrometry (ORBITRAP)	Flavio Ciesa et al., IT
12.30 - 12.45	**O55:** A comparison of different methods for the determination of primary aromatic amines (PAAs) in tattoo inks	Marco Fontana et al., IT
12.45 - 13.00	**O56:** Identification and quantification of abietic acid in U.S.-certifiable red pigments found in tattoo inks	Marianita Perez-Gonzalez et al., FDA, USA
13.00 - 13.15	Discussion, Q & A	
13.15 - 14.15	**Lunch, exhibition & poster viewing & ESTP general assembly 13.25 -14.10 (ESTP members)**	

Programme

Thursday, 28th March 2019

Timing	Title	Speaker / Chair
14.15 - 16.30	**SESSION: Tattoo removal by lasers and novel methods**	**Chairs: Maurice Adatto, Kristine Heidemeyer & Christa de Cuyper**
14.15 - 14.30	**O57:** Sequels of various tattoo removal practices: Lasers, lactic acid, excision, water tattooing and self-treatment	Mitra Sepheri et al., DK
14.30 - 14.45	**O58:** Treatment of periorbital hyperpigmentation with Erbium: YAG Laser	Natasa Teovska Mitrevska, MK
14.45 - 15.00	**O59:** Pico-second laser removal of tattoos in tattoo regret, practical experience and clinical studies referenced to Q-switched (nanosecond) lasers, the pros and cons of the two methods	Maurice Adatto, CH
15.00 - 15.15	**O60:** "Iron" tattoo removal with Q-Switched lasers	Kristine Heidemeyer, CH
15.15 - 15.30	**Coffee, exhibition and poster viewing**	
15.30 - 15.45	**O61:** Ablative laser surgery for allergic tattoo reactions	Sebastiaan van der Bent et al., NL
15.45 - 16.00	**O62:** Selection and pretesting of candidates for laser removal: who may benefit from treatment, or not?	Christa de Cuyper, BE
16.00 - 16.15	**O63:** How to improve results of laser removal of tattoos, need for technical innovation or need for better practice?	Wolfgang Bäumler, DE
16.15 - 16.30	Discussion, Q & A	
14.15 - 16.30	**PARALLEL SESSION IN ANNEX AUDITORIUM: PMU-artist's own session**	**Chairs: Diana Hvas, Ina Bennoun & Maya Ercegovac**
	Interactive session with Q & A moderated by the panel of organizers	
	The auditorium is encouraged to ask questions and suggest themes, examples: - *Which type of ink for which purpose?* - *Longevity of the tattoo, how do you inform your client?* - *How many times can you tattoo on the same area?* - *What makes a tattoo turn blue, or red?*	
15.15 - 15.30	**Coffee, exhibition and poster viewing**	
	- *Preferred needles and techniques for different modalities?* - *How to identify difficult personalities who should not be tattooed on?* - *How to read the true wishes of the client to optimize outcomes and avoid dissatisfaction?* - *The problem of amateurism?* - *Qualification and certification as professional PMU artist?*	
16.30 - 16.45	**Closing of the congress with announcement of coming events**	
	POSTER PRESENTATIONS	
	P1: Acceptability, tolerability and performance of a dexpanthenol water-in-oil formulation in tattoo aftercare	Sonja Trapp, CH
	P2: Overview of tattoo complications	Mitra Sepehri, DK
	P3: Caustic products for tattoo removal cause serious complications	Katrina Hutton Carlsen, DK
	P4: Color registration - nuisance or benefit?	Bjørn Severin, DK
	P5: A rare case of B-cell follicular lymphoma in a skin tattoo	Antonella Tammaro, IT
	P6: Introducing TatS - a novel in vitro model for tattoo research	Henrik Hering, GE
	P7: Finding the cause of tattoo allergies - an interdisciplinary brainteaser	Mana Kaveh et al. BfR, DE

Exhibitor overview

	Company details
Bringing the world to you ADDOBIO	**AddoBio Co., Ltd.** Tel: +82-2-6267-5117 marketing@addobio.com www.addobio.com AddoBio Co., Ltd., established in 2015, has developed GriMii, the world first needleless, painless and convenient tattoo machine for the scalp micropigmentation market.
BAYER	**Bayer Consumer Care AG** Basel, Switzerland +41 58 272-7272 www.bayer.com At Bayer's Consumer Health division, our vision is to make self-care for a better life a reality for billions of people around the world through everyday healthcare. Through our broad geographic footprint and portfolio of leading and trusted brands, people can get well, be well and stay well by taking charge of their everyday health, and the health of those they love. We touch billions of lives, helping provide them with safe, convenient and effective daily health solutions to treat minor illness and improve their lives.
VON BERG PHARMA intradermal pigments	**von Berg Pharma GmbH** Tel: +49 02247 9689881 vonbergpharma@web.de www.vonbergpharma.com Manufacture and development of preparations for the PMU and the tattoo industry. intradermal colors pigment purification & coating technology private label production
CUTERA®	**CUTERA Switzerland** Tel: +41 79 590 7803 events-emea@cutera.com www.cutera.com Cutera is a leading provider of laser and energy-based aesthetic systems for a wide range of medical and aesthetic indications.
CYNOSURE® A Hologic Company	**Cynosure GmbH, Germany** +49 6103 20111-0 infogermany@cynosure.com www.cynosure.de Cynosure is a leader, innovator, developer, and best-in-class creator of energy-based aesthetic and medical treatment systems. As the medical aesthetic division of Hologic, Cynosure develops and manufactures a diverse range of leading treatment applications for hair removal, skin revitalization, scar reduction, gynecological health, body contouring, and more. Our innovative products are used worldwide by practitioners, physicians, and aesthetic business owners to help enhance their offerings while providing the latest treatments to patients.

	Company details
Fotona choose perfection	**FOTONA d.d.** Tel: +38615009100 info@fotona.com www.fotona.com Fotona is a world-class medical laser company recognized for its innovative, award-winning laser systems for applications in aesthetics & dermatology, dentistry, surgery and gynecology. At Fotona, lasers are the heart of our business. With more than 50 years of experience in the laser industry, Fotona's global network provides comprehensive clinical training to more than 60 countries. In addition, Fotona is a founding partner of the Laser and Health Academy, providing a complete educational platform for medical laser practitioners to continue their professional growth. Commited to designing, manufacturing and delivering: Highest Performance, Best Made Laser Systems in the World.
FOR YOUR SAFETY AND SECURITY INKBASE Color Registration System	**Inkbase** E Hammershøy, Kejlstrupparken 33, 8660 Skanderborg bjorn@inkbase.dk www.inkbase.dk +45 40522693 InkBase - Denmarks leading Color Registration System. InkBase is providing Color Registration for more 80 tattoo studios in Denmark. 300+ tattoo artists use InkBase on a daily basis. InkBase is ready for use in English, French, German, Spanish, Swedish and Danish This is just the begining of a pan-European community with one aim: Use only the best colors - Customer safety is our highest priority !
INTENZE™	**Intenze** Tel: +43 (316) 225923 michi@intenzeproducts.eu www.intenzeproducts.eu Intenze Products is a revolutionary leader in the global tattoo community and strives to create the world's safest and highest performing tattoo ink.
KARGER	**S. Karger AG Medical and Scientific Publishers** Tel: +41 61 306 11 11 karger@karger.com www.karger.com Karger Publishers in Basel, Switzerland, is a globally active medical and scientific publishing company. Independent, and family-run in the fourth generation, Karger Publishers is dedicated to serving the information needs of the scientific community with publications of high-quality content, covering all fields of medical science.

Tested in the Lab
Proven in the Skin

Intenze puts the health and safety of all of our clients and in turn their clients above anything else.

TAMPER SEAL
Prevents unauthorized access to bottle's contents and assures ease of tamper detection.

NARROW NOZZLE
Reduces surface for cross-contamination and facilitates steady ink flow.

MIXING AGITATOR
Assures product quality by up-keeping proper consistency and mixture of ingredients

EASY OPEN CAP
Patented ridges provide grip when opening bottle

PET PLASTIC
Reduces potential contaminants

Artists should know what goes into their ink. The same goes for customers. Both deserve to work with, and use, a product that creates the best tattoos in the safest formulations possible.

Harmful Ingredients Not Detected:

4,4'-Methylenebis, Mphenylenediamine, o-Anisidine, 4-Aminoazobenzene, Ethoxynaphthaline, 4-Amino-3-fluorophenol, 2,6-Xylidine, Pigment Red 53, Pigment Violet 3, Pigment Violet 39, Solvent Blue 35, Solvent Orange 7, Solvent Red 24, Solvent Red 49, Solvent Violet 9, Solvent Yellow 1, Solvent Yellow 2, Solvent Yellow 3, Arsenic (As), Barium (Ba), Cadmium (Cd), Cobalt (Co), Chromium (Cr) VI, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Benzo(k)fluoranthene, Chrysene, Benz(a)anthracene, Pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indo (1,2,3-cd)pyrene, Benzo(g,h,i)perylene, Benzo-a-pyrene (BaP), Copper (Cu) soluble, Mercury (Hg), Nickel (Ni), Lead (Pb), Selenium (Se), Antimony (Sb), Tin (Sn), Zinc (Zn), Naphthalene

WWW.INTENZETATTOOINK.EU

Exhibitor overview

	Company details
Lumenis Official Distributor	**LUMENIS Switzerland** V-Skin Medical Beauty AG +41 43 542 65 91 info@v-skin.ch www.v-skin.ch LUMENIS is a global innovator of laser, light-based, radio-frequency and ultrasound technologies for the aesthetic and surgical markets. V-Skin offers since more than 10 years diverse aesthetic systems from LUMENIS, LASEROPTEK, ZIMMER, DAEJU, ENSUNG and many.
SYNERON CANDELA	**Candela Germany** Tel: +49 6102 59985-0 info.de@syneron-candela.com www.syneron-candela.com Candela is a leading global non-surgical aesthetic device company with a comprehensive product portfolio and a global distribution footprint. The Company's technology enables physicians to provide advanced solutions for a broad range of medical-aesthetic applications including body contouring, hair removal, wrinkle reduction, tattoo removal, women's intimate health, improving the skin's appearance through the treatment of superficial benign vascular and pigmented lesions, and the treatment of acne, leg veins and cellulite. The Company has a wide portfolio of trusted, leading products including VelaShape, CO2RE, CO2RE Intima, GentleMax Pro, VBeam Prima, PicoWay, Profound, eTwo, Nordlys, Ydun and Sirius.
TOOsonix	**TOOsonix A/S** Tel: +45 2059 2999 info@toosonix.com, www.toosonix.com TOOsonix develops and manufactures high intensity focused ultrasound systems. The systems can be used for efficient tattoo removal of all colours and pigment types. The first systems for tattoo removal are currently under clinical evaluation with very encouraging results. The method is therefore suitable as a supplement or replacement of current lasers removal procedures.
ultrasun Professional Protection	**Ultrasun AG** Grubenstrasse 18 8045 Zürich Switzerland +41 79 309 38 33 info@ultrasun.ch Ultrasun are a Swiss company who sales professional protection Suncream with UV and Infrared A Protection WITHOUT Controversial Ingredients.

VON BERG
PHARMA

intradermal
colors

pigment purification
& coating technology

private label
production

vonbergpharma.com

General information

Venue
Inselspital Bern
Pathologisches Institut Inselspital
Auditorium Langhans
Entrance 43a
Murtenstrasse 31
3010 Bern

Congress hours

26 March:

Registration:	12.00 - 17.00
Exhibition:	14.30 - 15.00
Scientific programme:	13.00 - 17.00

27 March

Registration:	8.00 - 17.00
Exhibition:	8.00 - 17.00
Scientific programme:	8.30 - 17.00

28 March

Registration:	8.30-16.30
Exhibition:	8.30-16.30
Scientific programme:	8.30-16.30

Certificate of attendance
Certificates of attendance can be downloaded from the congress website under registration.

Lunch and coffee
Lunch and coffee is included in the registration fee. It is served in the exhibition area.

Internet
Free Wi-Fi is available in the congress area. A Wi-Fi code can be collected at the registration desk.

Entitlements
Registration for the congress includes admission to the full congress programme, coffee breaks and lunch, congress bag, programme- and abstract book.

Transport
For regular parking, please use the Insel Parking (car park – no special rate).

Information for speakers
Please bring your presentation on a USB stick. Please upload your presentation to the computer in the auditorium. A folder divided into each session will indicate where you should place the presentation. An assistant will be present to help you if you have any problems. Please upload your presentation before your session starts.

Please note that we do not allow use of personal laptops for presentations.

Information for poster presenters

Poster mounting:
Posters can be mounted 26 March 2019 from 12.00 when the registration starts.

The Congress Secretariat will provide all necessary equipment to mount the posters.

Poster removal:
Posters can be removed after the last session on 28 March.

Visit the poster area:
Participants are encouraged to visit the poster area in the coffee and lunch breaks. Participants can attach their business card to the poster and expect to be contacted by the author during the congress or later as appropriate.

PicoWay

The Complete Picosecond Platform

Now With
3 Wavelengths &
Resolve Fractional

Please visit the Candela booth

The Award Winning Complete PicoSecond Platform

THE Aesthetic Industry Awards
Aesthetic Winner
THE Aesthetic Guide

Now with 3 wavelengths: 532nm, 785nm, 1064nm

Treats all tattoo colors, pigment & signs of aging

PicoWay Resolve - Dual level fractional treatment with minimal downtime

Tattoo Removal

Before

After the 2nd treatment

Photos: Eric Bernstein, M.D.

Resolve for Signs of Aging

Before

After the 2nd treatment

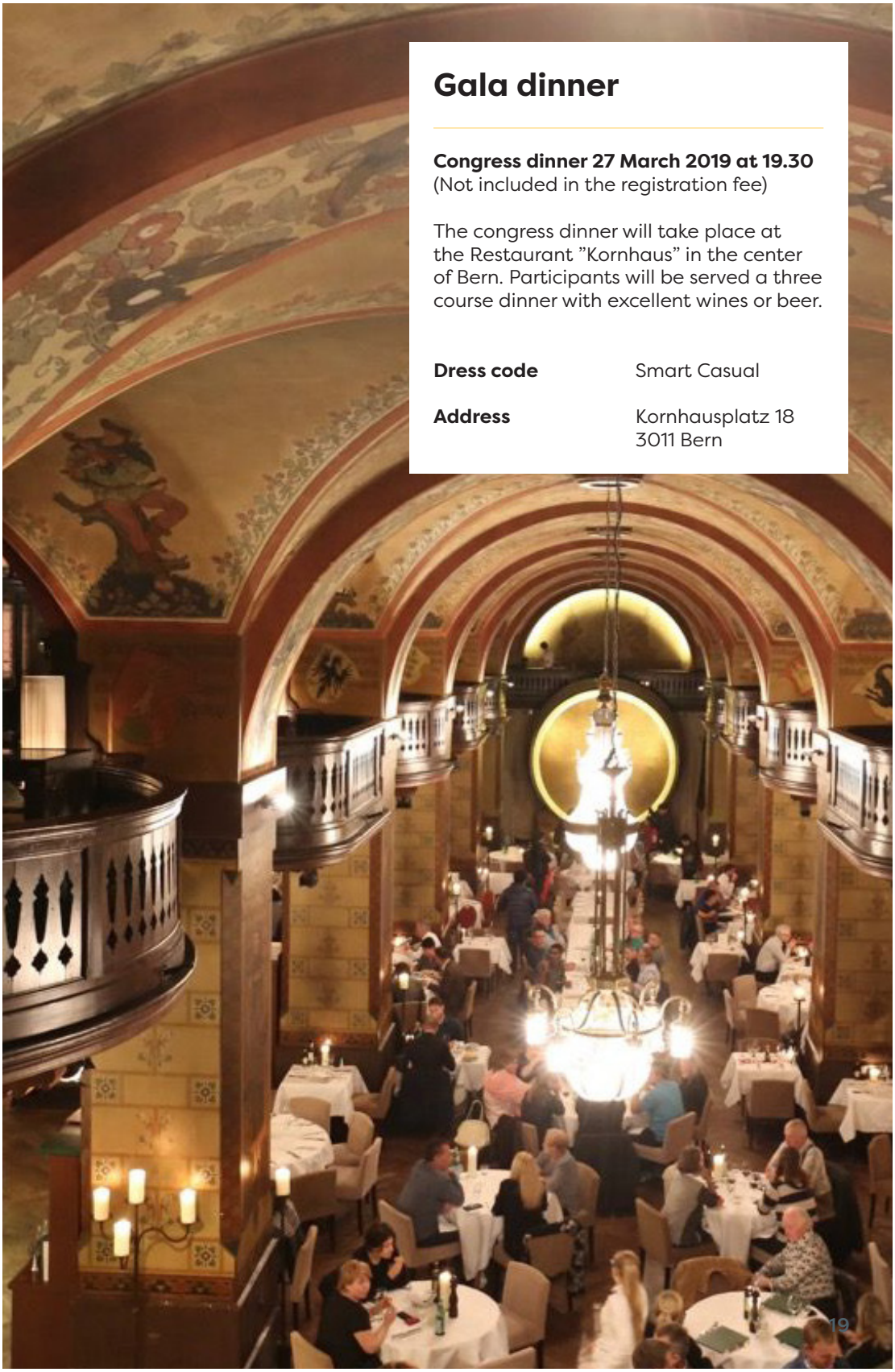
Photos: David Friedman, M.D.

CANDELA™

Science. Results. Trust.

www.syneron-candela.com

© 2019 Candela Corporation. This material contains registered trademarks, trade-names and brand names of Candela Corporation and its affiliates, including Syneron, Candela, and PicoWay. All other trademarks are the property of their respective owners. All rights reserved. PB88563EN



Gala dinner

Congress dinner 27 March 2019 at 19.30
(Not included in the registration fee)

The congress dinner will take place at the Restaurant "Kornhaus" in the center of Bern. Participants will be served a three course dinner with excellent wines or beer.

Dress code	Smart Casual
Address	Kornhausplatz 18 3011 Bern

enLIGHTen®
LASER TATTOO REMOVAL

PICO Revolutionized

THE MOST ADVANCED LASER SYSTEM FOR
SAFE AND EFFECTIVE
TATTOO REMOVAL

Powerful Delivery
Combination of high power ultra-short pulses & large spot sizes

Full Customization
3 fully-intagrated wavelengths, independent control of specifications

Maximum return
No disposables, fast 2-minutes warm up & multiple treatment options

COME and VISIT CUTERA BOOTH

@cutera.switzerland
@Cutera EU

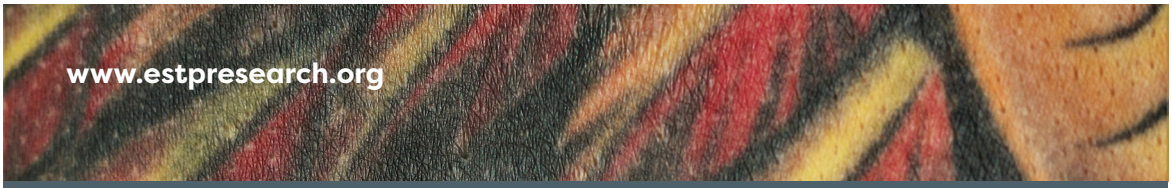
CUTERA®

Floor plan

Exhibitors

1	Medplies
2	V-Skin
4	Bayer
5	Alma Lasers
6	TOOsonic
7	Ink Base
9	Von Berg Pharma

10	Syneron Candela
12	Karger
13	Fotona
14	Cynosure
15	Cutera
16	Ultrasun



Become a member of ESTP

Invitation

The most important aspect of becoming a member of ESTP is that you support the improvement and development of tattoo and pigment research in Europe.

Furthermore, a membership of ESTP will give you influence on this development. As an ESTP member you can vote for board members, and dependent of your membership category stand for election to the board.

ESTP RESEARCH

Register today!

Please fill-in the membership form and send it to the ESTP Secretariat for approval by the ESTP Board.

Find the form in your congress bag or on the ESTP website:
www.estpresearch.org

Benefits of your ESTP Membership

- Congress fee reduction at the biannual ESTP congress
- Free electronic subscription of the peer-reviewed scientific journal named Dermatology (Karger AG, Switzerland)
- All members are encouraged to submit dermatology articles to this journal, section “tattoo and body art” (J. Serup section Editor)
- Mailings for your update with invitation to contribute to public hearings: Members shall receive membership mails on new regulations, recently published research, relevant new information for the tattoo business including the tattooists and ink manufacturers. Members are invited by mail to give comments when ESTP shall respond to public hearings initiated by EU and other organisations. ESTP will make your voice heard.
- Download area/ library of forms and official documents etc.: Exemplified by the CEN regulation on tattoo and hygiene, consent form, tattoo customer info materials, EU reports and documents including relevant directives and other regulations, national regulations as available. Furthermore, scientific reports and books sponsored by ESTP and of special interest to ESTP members.
- Member to member contacts and friendships: promotion of contact, friendship and network across borders between ESTP members, who meet at the biannual congresses organised in different European cities, Copenhagen, Bruge, Regensburg, Bern, Amsterdam etc. ESTP is a living society that brings people together, clinical and experimental researchers, tattooists, PMU-artists, the tattoo ink industry and the regulators.
- New projects you have and wish to expand: ESTP helps to establish project groups and new research in various aspects of tattoos and pigments. Bring your proposal and receive advices from ESTP with relevant contacts to members, who may join your project.

Oral abstracts

O1. THE NEW SCENE OF EUROPEAN REGULATION OF THE TATTOO INDUSTRY; HYGIENE, DEVICES AND TATTOO INKS

Jørgen Serup[1].

[1]*Bispebjerg University Hospital, the Tattoo Clinic, Denmark*

European Society of Tattoo and Pigment Research, Registered in Denmark

It is since long time recognized that scattered and limited national regulations in Europe and in the world are unsatisfactory from the point of view of consumer safety. The Council of Europe in 2008 published a recommendation on tattoo inks, which was implemented by some countries in Europe in different modifications thus not universally accepted.

The European Union has approached the tattoo business along three different lines, namely*

- The EU/CEN institution for standardization has developed a new guideline on tattooing and hygiene; to be published in June 2019. The guideline is not binding for countries. All stakeholders including ESTP were involved; the guideline is expected to become widely accepted.

- The EU has decided a new regulation of medical devices, MDR replacing the previous MDD from May 2020. MDR is obligatory and includes devices such as tattoo machines.

- The EU Commission is in near future deciding on a new regulation of tattoo inks as chemicals following the REACH regulation of chemical substance, a system presently including some 40.000 individual chemicals. The REACH proposal was delegated to the ECHA chemical agency in Helsinki; the draft proposal is 500 pages and includes about 4000 chemicals that manufacturers, the tattoo business and the authorities having the police function shall deal with. It is the first time REACH is applied to final products. The regulation shall be obligatory, if decided. It was considered in early stage to regulate inks as consumer products. It remains a highly relevant consideration to make a separate regulation of tattoo inks parallel to the regulations of cosmetics and pharmaceuticals, and many other issues having their own rules. ESTP has been involved in the process and expressed serious criticism in public hearings in June 2018 and in February 2019, summarized in a position statement. These ESTP documents were recently send to all ESTP members.

*The Joint Research Centre of EU, Ispra, Italy on behalf of DG JUST described the state of art of tattooing in Europe in four extensive reports (Administrative Arrangement N. 2014-33617)

1. Safety of tattoos and permanent make-up. Compilation of information and legislative framework and analytical methods. WP1. EUR 27394 EN; 2015

2. Safety of tattoos and permanent make-up. State of play and trends in tattoo practices. WP2. EUR 27528; 2015.

3. Safety of tattoos and permanent make-up. Adverse health effects and experience with the Council of Europe Resolution (2008)1. WP3. EU 27672 EN; 2016.

4. Safety of tattoos and permanent make-up. FINAL REPORT. EU 27947 EN; 2016.

O2. PERSONAL VIEW ON THE UPCOMING REGULATIONS

Wolfgang Bäumler[1].

[1]*Treasurer of ESTP, DE*

Tattooing comprises manifold problems which should be solved at the same time. Tattooing touches diverse fields such as chemistry, hygiene, medicine and epidemiology. Different national authorities and EU institutions try to tackle the different issues for more than 15 years.
The regulation process is still running without seeing the light at the end of the tunnel.

03. THE EUROPEAN COMMITTEE FOR STANDARDIZATION (CEN) GUIDELINE ON PRACTICES TO IMPROVE TATTOO HYGIENE

Andreas Schmidt[1]

[1] *Chairman of European Tattooists, CEN standardization committee, Switzerland*

In 2013 the German tattoo artists' association, DOT, initiated an - „the"- international, Europe wide tattoo standard on hygiene in tattoo studios.

Idea behind it, was, that sine tattooing is in our days a very European, international business, that a common standard for all European countries is as necessary as a common currency, laws etc.

The effect would be, that every European artists knows about standards, working conditions etc., wherever he might be working. That is also the case for tattoo conventions.

Nevertheless, we knew that there are countries that have a lot of national regulations already, like France, and others that have almost nothing yet.

After five years of national and most of all international work, dozens of hours of meetings all over Europe we finally made it to a hygiene standard good enough to be the guideline for complete European tattoo business (and maybe over the borders of Europe in future, who knows) The main question will be, how effective this standard will be in the future. It can remain „just a standard" or can become an effective and well working tool for health authorities, if only it will be used by them the way we artists hope it will. That will be the most important part of this standard: The authorities have to activate enough manpower to put this standard through.

We in Germany are very satisfied that the politics is willing to establish regulations to achieve access to tattoo business before being allowed to open to the public. Since we believe that it is necessary BEFORE working on clients, we think that against maybe all expectations that nobody in our business likes too many rules, we think, that some laws are necessary to protect the spirit, quality and integrity of our beloved business.

O4. THE NETHERLANDS, EARLY BIRD IN REGULATION OF THE TATTOO BUSINESS: CUTOMIZED INTERVENTIONS TO INCREASE COMPLIENCE WITH HYGIENE RULES

Thijs Veenstra[1]

[1] *National Institute for Public Health and the Environment,RIVM, Amsterdam, The Netherlands*

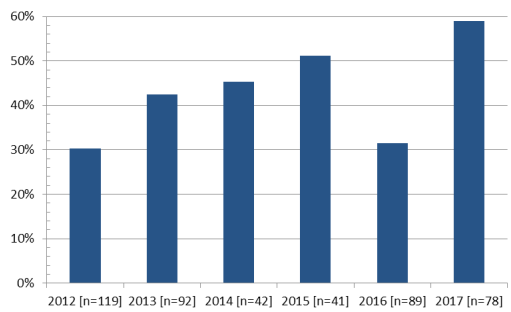
Introduction
Since the introduction of regulation of tattooing in 2007, and the associated inspections of tattooist premises, compliance (no deficiencies) has reached only 45% in 2018. An awareness campaign on hygienic tattooing among clients did not contribute to improvement. Renewed methods for enhancing guideline compliance in this minimally organized branch were needed.

Methods
A research was carried out among public health inspectors familiar with tattooists inspections, about the motives of tattoo artists to (not) comply with guidelines. The inspectors were also asked to propose parlors for joining a tattooist advisory panel.

Results
The survey showed that parlors generally have a positive attitude toward the guidelines, and that they consider hygiene and safety as important aspects of their work. The parlors however underestimate the risk of and overestimate their own competences in reducing risks. In general, the knowledge regarding the content of the guidelines is considered low, and guidelines seem difficult to understand. Another outcome was that tattooists are very intrinsic motivated to deliver good service. They are independent artists, proud of their profession and do not feel represented by a branch.

We concluded that to improve guideline compliance it would be promising to increase risk awareness, knowledge and compliance by referring to the craftsmanship, pride and professional responsibility of the individual artists. We established an advisory panel of tattooist to advise us on how to design five instructional videos based on the CEN-standard.

Discussion
The panel will be involved in future actions to implement more customized interventions. The expected release of the CEN-standard will create more opportunities for accessibility of information and training of tattooist.



Percentage of premises showing hygiene deficiencies when inspected unannounced

O5. NEW REGULATION OF DEVICES IN EUROPE, MDR REPLACING MDD IN 2020, CONSEQUENCES FOR THE TATTOO INDUSTRY

Andreas Pachten[1]

[1]*MT.DERM GmbH, Director QM/ Regulatory, Berlin, Germany*

Although tattooing has entered the mainstream, a specific regulation on dermally injectable tattoo inks in the European Union is still missing. The European Commission (EC) has recognized the need for a harmonized regulation to improve the safety of tattoo inks and market surveillance by regulatory authorities. Beside the official *Plan A* to regulate tattoo and permanent makeup inks in future with a restriction dossier under Annex XV of REACH regulation (see current draft of ECHA), EC has initiated an additional *Plan B* to regulate tattoo inks under the new Medical Device Regulation (MDR).

In contrast to the former Medical device directive (MDD) the scope of the MDR includes products without an intended medical purpose that are listed in Annex XVI. This annex includes substances or combinations of substances intended to be used for intradermal injection or other introduction, *excluding those for tattooing.* Also tattoo inks are currently explicitly excluded from the MDR's scope, this indicates that they were at least considered for inclusion. In addition, the EC has the right to review Annex XVI any time, indicating that the current exclusion of tattoo inks might be just temporally.

In contrast to ECHA's approach to regulate tattoo inks and permanent makeup colors on the grade of chemicals, MDR regulates the assessment of the risk/benefit balance of injectable products. Beside third-party certification/inspection, this also address application of risk management and might include biocompatibility testing and clinical evaluation regarding safety. An overview of potential MDR requirements on tattoo inks is given.

O6. PUBLIC HEALTH EVALUATION OF CARCINOGENIC TATTOO INK INGREDIENTS

Milena Foerster[1], **Joachim Schuez**[1]

[1]*International Agency for Research on Cancer, Section of Environment and Radiation, France*

There is rising public awareness on carcinogenic substances contained in tattoo inks. Depending on pigment receipt and production process, tattoo inks may contain inorganic and organic chemicals classified by the International Agency for Research on Cancer (IARC) as (possibly/probably) carcinogenic to humans. Substances of concern are metals, polycyclic aromatic hydrocarbons (PAHs) bound to carbon black pigment particles and primary aromatic amines (PAAs) as ingredients and cleavage products of bright coloured inks. In numerous studies their respiratory or dermal uptake has evoked different types of cancer, amongst them lung, bladder, kidney, liver, skin and lymphomas. To date, it is unknown, whether the subcutaneous exposure and subsequent lymphatic uptake as seen with tattooing might have similar effects e.g. through slow constant release and thus bioavailability of carcinogenic substances from the pigment particles.

The abstract provides an overview of carcinogens in tattoo inks. For this purpose the IARC monographs and relevant studies for the classification of the respective metals, PAH and PAAs was reviewed to complement the sparse literature published on the topic. Exposure levels of carcinogenic substances in tattoo inks will be set into relation to their occupational exposures found in the literature to evaluate the potential carcinogenicity of tattoos from an environmental epidemiological perspective.

O7. TATTOOS AND CANCER - IS THERE AN ASSOCIATION? THE FIRST STEPS TOWARDS SCIENTIFIC EVIDENCE

Christel Nielsen[1], **Anna Jöud** [1]

[1]*Lund University, Occupational and Environmental Medicine, Lund, Sweden*

Aim: To investigate the potential link between tattoos and malignant melanoma, squamous cell carcinoma and non-Hodgkin lymphoma.

Methods: We will take an epidemiological approach and utilize Swedish registers with full coverage of the general population. A nested case-control design will be applied and incident cases, 2000 per cancer type, will be identified in the Swedish Cancer Registry. Inclusion will be restricted to individuals aged 20 to 60 years at the time of diagnosis as this age group is more likely 1) to have tattoos and 2) to have been tattooed since the introduction of azo pigments into the inks. Three random controls per case will be drawn from the Swedish Population Register using incidence density sampling. We will use a structured questionnaire distributed by Statistics Sweden to collect information on exposure (i.e. tattoos) and other variables that might be relevant for the association including socioeconomics, laser removal and sun exposure. We will use several different approaches to assess exposure to get a feel for which level of detail that is possible to obtain without impairing the response rate. If cases are deceased, the questionnaire will be distributed to next-of-kin to avoid survivorship bias. Data will be analyzed using multivariable logistic regression that will provide incidence rate ratios between tattooed and untattooed individuals.

Results: The first results will be available in 2020.

Conclusions: For the first time ever, epidemiological studies of the potential association between tattoos and cancer are about to be initiated.

O8. EU REGULATION ON CHEMICALS IN TATTOO INKS UNDER REACH: BACKGROUND AND NEXT STEPS

Giuseppina Lavarà[1]

[1] *Policy Officer, EU Commission-DG Environment, Belgium*

The composition of tattoo inks raises numerous concerns for public health (e.g. allergies caused by substances used in inks and possible carcinogenicity). Several Member States in EU already have national legislation in place that regulates, among other issues, the chemical composition of tattoo inks.

Studies have reported a large number of mild skin complications requiring medical treatment because of tattoo or permanent make-up (PMU) inks injected into the skin. Moreover, tattoo inks do not remain permanently at the tattoo site and are known to migrate from the application site. Studies have found colourant particles in different organs such as the lymph nodes and the liver.

The EU Commission asked the European Chemicals Agency (ECHA) to prepare a dossier to restrict the presence of hazardous chemicals (e.g. carcinogenic, mutagenic and toxic for the reproduction, skin sensitisers, skin and eye irritants and corrosive, heavy metals) in tattoos inks posing a risk to human health. The dossier has been prepared together with Norwegian Environment Agency, the Italian Istituto Superiore di Sanita, and the Danish Environmental Protection Agency. The German Federal Institute for Risk Assessment (BfR) and Federal Institute for Occupational Health and Safety (BAuA) also provided a contribution.

The dossier has been submitted to the evaluation of the ECHA's Committees, the risk assessment and the socio-economic analysis, following the restriction procedure under the EU Regulation, REACH.

The EU Commission expects to receive the opinions of the two Committees by April 2019. If it is considered that the risk of these chemicals in tattoos inks pose an unacceptable risk to human health that is not adequately controlled, the EU Commission will propose a Regulation to restrict the presence of these chemicals in tattoos inks and in permanent make-up which will be submitted to the opinion and vote of Member States.

O9. TATTOO AND PERMANENT REGULATION UNDER REACH – THE ESTP OPINION

Ines Schreiver[1]

[1] *Board of ESTP, Germany*

The current landscape of tattoo regulations varies strongly among the European Union. Most current national legislations rely on the non-binding resolution ResAP(2008)1. In addition, Spain requires an approval for pigments used in tattoo inks whereas Norway implemented a positive list for preservatives. Still, many countries lack a specific tattoo regulation. To ease trade of inks, a Union wide legislation was aimed for several years.

Therefore, the European Commission decided to implement a tattoo restriction under the REACH regulation for tattoo inks and permanent make up. The restriction dossiers were in public consultation in two consecutive periods for which the ESTP board submitted their comments. We raised many important pitfalls and drawbacks of this restriction in general and within certain restricted substances within. Main points included that no positive list is possible under REACH, the lack of full declaration, a potential ban of important pigments like C.I.74160, the link to the European biocide regulation and certain concentration limits of harmonized classified substances.

O10. THE REACH REGULATION WILL DEAL WITH RISKS RELATED TO CHEMICALS IN TATTTO INKS; BEYOND THIS, HOW CAN EU COUNTRIES GUARANTEE, AT A NATIONAL LEVEL, THE HEALTH OF CITIZENS REGARDING THE RISKS OF TATTOOING OTHER THAN THOSE COVERED BY REACH? THE ITALIAN APPROACH

Alberto Renzoni[1]

Instituto Superiore di Sanitá, Rome, Italy

The European Commission requested ECHA to assess the risk to human health of tattoo inks and to prepare a proposal to restrict the placing on the market of certain unsafe chemicals in tattoo inks.

When adopted by the Commission and when the new regulation of the chemical composition of tattoo inks has been enforced, we must then consider other risks of tattooing.

ECHA states that risks not related to chemicals (e.g. related to hygiene and other risks related to tattooing) can continue to be regulated at Member State level.

This is why Italy, which is one of the EU Member States currently lacking national legislative measures to cover tattooing, must now enact legislation.

In 1998, the Italian Ministry of Health issued an Order containing “Guidelines for the implementation of procedures for tattooing in safe conditions”. This has not been adopted by all the Italian regions. In some ways, this fragmented situation parallels the European scene, principally regarding the different training and hygiene standards required.

It is important to note that Italian regions have legislative power over health and professional training.

The first goal should be to pass a national law. However, if this is not possible, owing to conflicts of competence between Central and Regional Government, the Italian approach could be to reach an agreement before a body called the “State-Regions Conference”, through “Provisions regarding the safety of tattooing practices”, which could be voluntarily implemented as binding in each region. What such a document should contain will be illustrated.

O11. ENFORCEABILITY OF THE NEW REACH RESTRICTION ON SUBSTANCES IN TATTOO AND PMU INKS: AN ITALIAN INITIATIVE

Maria Letizia Polci[1], Mariano Alessi[1], Flavio Ciesa[2], Robert Burger[3], Luca D'Ambrosio[3], Manuela Agnello[4], Luana Lariccia[4], Marco Fontana[4], Marco Famele[5], Claudia Leoni[5], Carmelo Abenavoli[5], Roberta Lavalle[5], Sonia D'Ilio[5], Carolina Ferranti[5], Luca Palleschi[5], Luca Fava[5], Rosanna Maria Fidente[5], Rosa Draisci[5]

[1]Ministry of health, DG Health Prevention, Roma, Italy
[2]APPA Bolzano, Bolzano, Italy
[2]APPA Bolzano, Bolzano, Italy
[4]ARPA Piemonte, Grugliasco (Torino), Italy
[5]Istituto Superiore di Sanità, Centro nazionale sostanze chimiche, prodotti cosmetici e protezione del consumatore, Roma, Italy

The European Chemicals Agency (ECHA), under REACH restriction regulatory route, has recently prepared a proposal to restrict certain substances with hazardous properties such as carcinogenic, mutagenic, reprotoxic, skin sensitising/corrosive/irritant, eye damaging/irritant as well as other substances prohibited in cosmetic products and selected impurities in tattoo inks. This restriction would create obligations for tattoo ink manufacturers, importers and distributors to ensure that tattoo inks not meeting the requirements of the proposed restriction are not placed on the European (EU) market after its entry into force (assumed to be in 2021). For the sake of enforceability of the restriction, the authorities responsible for the enforcement, as well as companies, have to be able to check the compliance of products with the restriction conditions. The Italian Ministry of Health DG Health Prevention – REACH&CLP Competent Authority funded a research project in order to support the enforcement of upcoming restriction on substances in tattoo inks and relating activities of the Italian official laboratories network. Overall objective of the project is the development of analytical methods to be applied to tattoo inks, in cooperation with other EU Member States, which will allow to set up an efficient control of such products. Italian laboratories, involved in market surveillance activities on tattoo inks, are focused on the validation of a method to quantify primary aromatic amines (PAAs) and on a comparison study with different methods under validation in other EU laboratories. The project also covers the determination of phthalates and pigments in tattoo inks.

O12. QUANTIFICATION OF PHTHALATES IN TATTOO INKS IN THE FRAMEWORK OF REACH OFFICIAL CONTROLS

Marco Famele[1], Claudia Leoni[1], Carmelo Abenavoli[1], Roberta Lavalle[1], Sonia D'Ilio[1], Carolina Ferranti[1], Luca Palleschi[1], Luca Fava[1], Maria Letizia Polci[2], Rosa Draisci[1]

[1]Istituto Superiore di Sanità, National Centre for Chemicals, Cosmetic Products and Consumer Protection, Roma, Italy
[2]Ministry of Health, Roma, Italy

Some phthalates are classified as carcinogenic, mutagenic, or toxic for reproduction (CMR) under CLP Regulation and listed in Annex II of the Cosmetic Regulation as prohibited substances. Then, phthalates are of great interest at EU level and some studies showed that they can be found in a concentration interval of 0.1 - 691.0 µg/g in tattoo and permanent make-up (PMU) inks.

There are no international or national standard methods available for these matrices so far and only few methods are described in literature and fully validated. The development of reliable analytical methods in tattoo and PMU inks may be an analytical challenge due to the ink complex formulation (*i.e.*, a suspension of insoluble pigment particles in a mixture of solvents and several auxiliary ingredients) that leads to inhomogeneous samples.

In the framework of a research project funded by the Italian Ministry of Health, a method for the quantification of 11 phthalates in tattoo inks was developed and validated by using two different analytical techniques. Data obtained by High-Performance Liquid Chromatography–Diode Array Detector (HPLC-DAD) and Gas-Chromatography/Mass Spectrometry (GC/MS) was compared in order to evaluate performance characteristics and their applicability to this critical matrix.

The analytical method of choice will be applied in the official controls on tattoo inks placed on the Italian market in order to comply with the upcoming REACH restriction setting a concentration limit of 0.001% (w/w) for substances classified toxic to reproduction, as *bis(2-ethylhexyl) phthalate* (DEHP) and *dibutyl phthalate* (DBP).

O15. WHERE HAVE ALL THE PIRATES GONE?

Andy Schmidt[1]

[1] *Chairman of European Tattooists, CEN standardization committee, Switzerland*

Tattooing started as an art form for subcultures, criminals and sailors Meanwhile it changed to a moneymaking industry Technics and materials are much better, working conditions are almost surgery suitable DOT, German tattoo artists association started the project of a CEN norm, which is completed this year after 5 years of work Health authorities worldwide are involved in a business that was of absolute no interest 20 years before Lots of informations are still to be found Is tattooing still an art form or a simple business?

How do the artists feel about that situation?

Many people are in that business that do not belong there. So called artists, suppliers, so called tattoo schools We need the support of the old guys with all their experience, the power of the young ones and the innovation of medicine and science We have to lay down the balancing act to bring all of them at a table to talk, plan and act What will be necessary for the future? More laws, regulations?

The business needs at least regulations for running a tattoo business. BEFORE they start, because the lack of manpower on the authorities side makes an adequate control afterwards impossible.

All of us have to prove their sure instinct to keep it as an artform with heart and enthusiasm, otherwise it will get out of control. A certain part of the business may go underground, totally not desirable!

O16. TATTOO CUSTOMERS: EXPECTATIONS AND TYPES OF TATTOOS THEY

Mel "Dredd" Poudroux[1]

A large portion of the population in the world is now tattooed. In this study, we looked at some of the sociological and psychological sides to tattooing, particularly those relating to clients expectations and the type of tattoos they request. This study uses an online questionnaire and the population target is people between 17 and 50, all over the globe. The target number is 150 participants (105 so far).

These are some preliminary observations as the study is not fully concluded yet, and the final results will be presented during the Congress.

There seems to be a tendency for clients to get tattoos that both have an emotional and an esthetical value for them, with the personal and emotional side slightly more represented in the answers.

Most clients' preferences tend towards having a blend of several styles of tattooing, but an interesting side to it is that some people tend to separate the styles by location, for example one style per limb or body part.

When asked about the overall mental experience, surprisingly none of the first 45 interviewed persons regarded it as negative, while more than 83 % of answers regard it as a positive experience.

Interestingly, most of the interviewees didn't grow up in a community where tattooing is a tradition (Samoa, New Zealand...) yet a lot of the respondents have been exposed often to tattoos before getting one, through friends or media exposure.

Customers also have mixed expectations of the process of tattooing in itself. There are two main points of view : some expect and look forward to the pain and discomfort of the process, while some absolutely loathe the process and are only concerned with the finished result.

The overall trend in the type of tattooing requested seems to be a mix of personal meaning mixed with a blend of styles, particularly when heavily tattooed. The very interesting preliminary results indicate that the tattooing process actually brought a lot more positive to the tattooed person than expected, particularly in terms of self esteem, confidence, body image and coping with loss and trauma.

The final results will be presented during the congress, with a statistical analysis and breakdown of the results available if necessary.

O17. THE DEMOGRAPHICS AND RATES OF TATTOO COMPLICATIONS, REGRET, AND UNSAFE TATTOOING PRACTICES: A CROSS-SECTIONAL STUDY

Walter Liszewski[1], Andrea Murina[2]

[1]University Of Minnesota, Dermatology, Minneapolis, United States
[2]Tulane University, Dermatology, New Orleans, United States

Aim: It is estimated that nearly 30% of Americans have at least one tattoo, however, data on rates of tattoo complications and regret are limited. The purpose of this study was to investigate rates of infectious and allergic complications from tattoos, rates of tattoo regret, and the perception of dermatologists among tattooed individuals.

Methods: An 18-question cross-sectional survey was fielded in New Orleans, Louisiana in January 2015. Inclusion criteria included being at least 18 years old, having at least one tattoo, and residing within the United States.

Results: In total, 501 participants from 38 American states were enrolled. Of all participants, 3.2% had a history of an infected tattoo, 3.8% had a history of a painful tattoo, and 21.2% had a history of a pruritic tattoo. Tattoo regret was not uncommon: 16.2% of participants regretted at least one current tattoo and 21.2% were interested in having one or more tattoos removed. Tattoos were not always placed in safe situations or environments: 21.2% of participants had a tattoo placed while intoxicated and 17.6% had a tattoo placed somewhere other than at a tattoo parlor. In terms of perception, 78.9% of participants believed dermatologists were knowledgeable about the infectious and allergic complications of tattoos.

Conclusion: These findings demonstrate that a subset of tattooed individuals regret at least one tattoo. Although it is alarming that nearly one-fifth of all participants received a tattoo while intoxicated or somewhere other than a tattoo parlor, overall, rates of tattoo complications appear to be uncommon.

O18. PRESENT STATE OF LOCAL OR SYSTEMIC INFECTION BY TATTOOING, SOURCE OF INFECTION AND BACTERIAL STRAINS CAUSING PROBLEM

Lucia Bonadonna[1]

[1]*Italian National Institute of Health, Environmental and Health, Rome, Italy*

Aim: Tattoo infections are not always the first thing that most people think about after they have just gotten their tattoo. However, getting an infected tattoo after this practice is a real possibility. In fact, because the act of tattooing involves repeated injection of ink through the skin, although uncommon, a risk of contracting infections from contaminated tattooing equipment, ink and surrounding environment exists, notwithstanding progresses in infection control strategies.

This presentation describes the present state of local or systemic infections by tattooing, sources of infection and bacterial strains involved in infections.

Methods: An electronic literature examination in MEDLINE, Scopus, Web of Science, EMBASE and Google Scholar for studies addressing bacterial infections associated with tattooing was conducted.

Results: Less than 100 articles have described cases of bacterial infection after tattooing. The data collected covered cases recorded over a period of about 30 years, from the 1980s to the present day. Local skin infections and more severe systemic infections have been reported. The bacteria involved have been isolated from skin wounds and, for the most severe infections, from tissues and blood. Most of the bacteria responsible for the infections were opportunistic pathogenic bacteria that can pose a risk to debilitated individuals and can be easily find in environment.

Conclusions: As consumers may not be aware of the risk of infection with tattoos, tattooists should strictly adhere to hygiene rules; they and the physicians should also suggest to consumers the necessary and urgent health protection measures to be adopted after a tattoo.

O19. WHAT FUTURE IN TRAINING FOR DERMOPIGMENTATION? THE ITALIAN CASE AND THE HIGH SPECIALIZATION COURSE AT THE UNIVERSITY OF FERRARA

Rita Molinaro[1;2]

[1]*Ulss 2 Treviso, Prevention, Treviso, Italy*
[2]*Dermopigmentatori.it Association, Treviso, Italy*

The evolution of the profession requires more and more skills, but who are the trainers? Who is considered to be able to form and certify Trainers?

With the aim of obtaining professional recognition with different levels (PMU, Artistic, up to the medical tattoo, which requires the highest skills and competences) in Italy took place the first University course of high specialization in Dermopigmentation at the University of Ferrara.

In this course, University academics, tattoo professionals, national institutions (Istituto Superiore di Sanità), have coordinated to give specific knowledges to technically skilled operators in dermopigmentation.

The topics treated, indispensable in a so invasive treatment, have branched off from technical, artistic, scientific and cultural subjects.

EQF certification could be a possible answer, but just a few operators are concerned with certifying their skills, enabling them to work in health facilities too.

The pedagogy of the adult, the management of the group of learners, the training approach and the verification of real learning to make a professional who literally works “on the skin of others”.

We can no longer attend “one-day” medical tattoo courses, or two-days with practice on “models”, we can no longer agree that the work and commitment of a lot of us, can be spoiled by improvised “masters”.

We can no longer read social advice on mixing inks of different formulation, or creating anesthetic cocktails, nor tattooists suggesting therapies suspension.

Our Italian case history experienced an alternative way to create a training path and a profile of skills.

O20. TECHNICAL FAILURES AND TATTOO STUDIO RELATED CONDITIONS CAUSING TATTOO COMPLICATIONS

Jørgen Serup[1], Katrina Hutton Carlsen[1] & Mitra Sepehri[1],

[1]Dept. of Dermatology, the "Tattoo Clinic", Bispebjerg University Hospital, Copenhagen, Denmark

Background: Tattooing requires talent, training and experience. There is no formal education and many amateurs are actively competing with professionals. Technical failures were hitherto not studied or related to clinical complications.

Material: 574 patients with 702 tattoo complications referred to the "Tattoo Clinic" were studied. Patients were examined clinically and if necessary with skin biopsy and bacterial testing.

Results: 147 (21%) tattoo studio-related complications were recorded, i.e. tattoo needle trauma with "overworked tattoos" in 43 tattoos, pigment overload with too much pigment installed in 64 tattoos, contaminated ink causing infection in 20 tattoos, and other sources of infections related to 20 tattoos.

82% of tattoos were completed by professionals defined as tattooists working in a tattoo parlour, 17% by amateur tattooists working at home or in temporary premises, and 1% both by professional and amateur tattooists.

Needle trauma with "overworked tattoo" was predominantly complicated with prolonged healing, sometimes leaving scarring. Pigment overload was associated with black pigment and especially manifested as papulo-nodular swelling causing subjective complaints. Infection due to contaminated bottle contents was diagnosed when infection started in or was limited to one colour, sometimes spreading to the entire tattoo and occasionally leaving visible pigment deficit and scarring. Failures in many cases resulted in long-lasting or chronic problems with discomfort.

Conclusion: Technical failures of tattooing and studio related conditions causing tattoo complications occur. Contrary common belief, most cases originated from professional parlours, and not from amateurs' tattooing. Most common problems were pigment "overload", needle trauma and bacterial infections. The study indicates that formal education of tattooists should be established and regulations on ink production are needed.

O21. COSMETIC AND MEDICAL TATTOOS BACK IN TIME

Alberto Renzoni[1], **Antonia Pirrera**[1]

[1]*TISP National Center, Instituto Superiore di Sanità, Rome Italy*

The practice of tattooing has been present for centuries in our cultures for the purpose of body adornment. Intradermal implantation of pigments for cosmetic reasons (eyeliner, lip contour, ecc...) and/or medical purposes has its origins in the ancient art of tattooing. The history is fascinating and is as old as the history of ornamental tattooing. The signs found on the body of the Ötzi or Similaun Man Mummy naturally preserved from 3300 BC in a snowfield in the Tyrolean Alps, are bluish-black tattoos and the incisions were made with a pointed instrument. They may have been placed to help with the pain from his evident arthritis.

The Romans used tattooing to mark prisoners of war, captives, and criminals. At the same time, a class of physicians was maintained who specialized in the removal of these marks from the skin of those who were granted freedom from being slaves or gladiators.

Since the nineteenth century, several studies illustrated the medical applications of tattooing for camouflage of congenital vascular nevi and scars in ocular and reconstructive surgery.

In the following century, various social events, such as the two World Wars, allowed the development of plastic and aesthetic surgery in which the tattoo found a place.

Tattooing for cosmetic and medicinal purposes can guarantee the recovery of bodily integrity in a wide range of dermatological diseases. It can also be a valuable final step in different surgical procedures in the fields of craniofacial surgery, plastic and reconstructive operations, cosmetic surgery procedures and breast reconstruction.

O22. THE INTERNATIONAL GROWTH OF COSMETIC TATTOOS INTO A MAINSTREAM BUSINESS

Maya Ercegovac[1]

[1] *Holo Academy, Australia*

To familiarise audience with cosmetic tattoo profession, current industry trends, its recent global growth into a mainstream business and sudden popularity amongst masses. Prognosis and prospects of its fate, job opportunities and risks are observed. Cosmetic tattooing (permanent make up) was once a taboo, now an 'on point ' culture. This long lasting aesthetic enhancement for facial expression areas (eyes, lips and eyebrows) and remedial artistry for facial /bodily scaring and disfigurements is booming worldwide like never before. Waiting lists for most popular Artists can be as extensive as to a yearlong. Why do clients all of a sudden have urgent needs for cosmetic tattooing? Technological developments in machinery, needles and highest quality and clarity of pigments and auxiliaries is comprehensive . Manufacturers are improving quality, standards, compliance and are prioritising safety for the end consumer. Competition is on a rise and highest quality products are readily available nationwide. In mean time training and development, industry is producing novices after 3-4 day trainings, some courses are even a day long. Operations from home with council approvals are gained at ease. Prerequisites and professional standards aren't required in most of the states, or are minimal, mainly focused of OHS compliance and infection control prevention. Luck of support, skills, knowledge and experience are jeopardising consumer safety. Youth is an easy target and correspondingly tattoo removal business is soaring. Firsthand experience was used for comprehensive analysis. Evidence is readily available from online information supplied to consumer via sites, forums, social media and common marketing strategies. Primary data was gathered from information collected from Cosmetic Tattooing associations nationwide for a specific purpose, surveys, and observations.

O23. MICROBLADING AND OTHER SPECIAL TECHNIQUES. A RISE IN THE BUSINESS OF COSMETIC TATTOOING

Diana Hvas[1]

[1] *Perfecting Beauty, Copenhagen, Denmark*

Is Microblading a revolution or an old technique revived and polished to match todays trend?

The last 5 years the cosmetic tattoo industry has been undergoing huge transformation, at the same time, the popularity of cosmetic tattooing, has rised to a level, where it is now, just as normal to have your makeup tattooed, as going to the hairdresser for a haircut.

A big reason for the rise in popularity, is because of Microblading, a technique where you deposit the pigment manually, and make lines in the direction of the natural hair growth, to mimic real hair, the technique requires a certain level of skill, and knowledge about skin, before it can be performed on clients, this technique is absolutely the technique in cosmetic tattooing , which is the hardest to learn.

The level of skill in cosmetic tattooing has dramatically improved as microblading has gained its popularity, therefor the demands and expectations of high end work is now at its peak, which requires the artist to inform the clients very well before treatment, to set the clients expectations at a realistic level, according to skin quality, pigments, and the quality of the artists own work.

The artists are now, more than ever, experimenting with other manual techniques for shading, we will take a look into the tools offered on the market, and discuss the pros and cons, and take a look at the Asian market, where manual techniques has been widely used for many years.

There have also been a huge transformation in the market of pigments, what the artists want and need, not only for manual techniques, but for cosmetic tattooing in general.

The market has drastically improved, but are we there yet? And what would be “perfect pigment”, if an artist could choose, and is the wishes of the artist possible for the manufacturer, without compromising with quality and health?

What can we learn from tattoo artists?

Skin – pigments – the business – education – equipment – experience – quality.

O24. MEDICAL PIGMENTATION

Ina Bennoun[1]

[1] *Beauty Medic, Israel*

Recently, paramedical tattooing has become highly demanded. Medical tattooing combining advanced permanent make-up techniques enable us to camouflage abnormalities and accomplish visual improvements when the hands of medicine can't reach better result anymore.
Today, however, offers a variety of aesthetic solutions for those patients they want to repair a defect in the body, and so when there is no longer the conventional medicine to be a solution.
Micro-pigmentation is a para-medical procedure in which we inject pigments into the skin in a mechanical way in order to restore the different skin areas by using variety types of needles and configurations and pigments.
Due to cooperation of the dermatologists and plastic surgeons we have developed unique technique of medical tattooing by combination of physical, chemical and laser methods of treatment.

Physical
Skin Needling or Dry Needling is a technique used for the improvement of wrinkles, stretch marks, acne scars, surgery scars, burns, skin grafts and uneven skin tone. It helps relaxing contracted scar tissue formed from burns or accidents that has caused limited mobility or flexibility. Fine needles puncture the skin, resulting in increased dermal elastin and collagen, collagen remodeling, and thickening of the epidermis and dermis. Skin needling creates small channels, which increase the absorption of topically applied preparations, a property which has been used in various dermatological treatments such as micropigmentation.
Chemical
Using only high-quality pigments help to be precise in choosing the right color according to the patient's skin tone. Test the color on the treated area.
Hyaluronic acid is also have been used for improving visual imperfections of scars/burns. The acid that I using must be high quality and not injectable.

EBD
Including different kinds of medical lasers, such as PDS, CO2, QS-laser.

Aims
- To develop new non-surgical and non-invasive methods of treatment skin diseases, scars and burn
- To improve the quality of life of people suffering from breast cancer with areola-nipple reconstructive complex
- To create a system of legal and professional treatments of medical pigmentation with using of high quality of materials
- To increase the level of satisfaction of patients after different reconstructive surgeries

Summary
The purpose of my work is to make a change in the lives of the people that already raised their hands. The change in that moment when even doctors cannot really help, the change that will give them to believe in miracles again. The change that makes feel different, see this world different and enjoy it, to escape from the box full of fears and lack of self-confidence, finally make their dreams come true.

O25. INORGANIC AND ORGANIC PMU COLORS

Cornelia Hildebrandt[1]

[1]*MT.DERM GmbH, R&D Chemicals, Berlin, Germany*

Inorganic and organic PMU colors

PMU (permanent make-up) is an expanding business with a broad range of applications like eyebrow, lip or scalp pigmentations.

This presentation will give a general overview on PMU colors, their applications, and product safety from a manufacture's perspective. We will take a close look on different classes of pigments used in PMU colors, and their advantages and disadvantages for specific PMU applications and present pictures of selected cases.

To ensure the safety of tattoo and PMU colors for the consumer and to minimize possible health risks, the inks are regulated under the legislative European framework of the ResAP (2008)1 (resolution on requirements and criteria for the safety of tattoos and permanent make-up). Unfortunately, this resolution is legally non-binding, so not all European countries comply to it.

Most important potential risks arise from impurities in the raw materials, especially heavy metal impurities like residual nickel, which is found in some iron oxide pigments. I will discuss the implementation of the requirements described in the ResAP(2008)1 and its impact on the development of high quality PMU colors as well as the safety assessment of raw materials.

O26. THE IMPORTANCE OF MEDICAL AND SCIENTIFIC RESEARCH IN DERMOPIGMENTATION TREATMENTS: UNDERESTIMATED AND RECURRENT PROBLEMS IN EYELIDS TATOO

Michela Fortunato[1]

[1]*Dermopigmentatori, Treviso, Italy*

The reason for this research is the connection between the pharmacological knowledge of the collateral effects of drugs on the skin and their evident interference with dermopigmentation treatments, both during the eyelids tattooing procedure and the following phases. Dermopigmentators' adroitness is also very important. Many professionals seem to ignore the scientific publications or are not aware of the implications of the researchers' results.

Using combined topical anesthetics on eyes can cause alkaline chemical burns, besides increasing the risk of pigment migration due to the skin alkalinization, particularly with the Carbon Black pigment.

This research will also focus on:

- the inconsiderate use - with very serious side effects - of unauthorized anesthetic galenic preparations containing adrenalin/epinephrine;
- the alternative use of a non pharmacological antalgic treatment;
- problems connected with dermopigmentators' adroitness: there is a direct correlation between eyelids tattoos and dry eye in the long term, due to the damage caused to the Meibomian glands.

The increased number of medical and scientific publications in the last decades is the sign of an increasing interest of science people in tattoos, since its use is more and more widespread and can be potentially extended to people with an illness.

People are not well informed about the risks and medical complications associated with tattoos. It is then of extreme importance that trainers who teach dermopigmentators are qualified professionals with specific competences.

O27. QUANTITATIVE VERSUS QUALITATIVE ASSESSMENT OF PIGMENTS IN TATTOO INKS, FEASIBILITY IN RELATION TO PRODUCT LABELLING AND CONTROL

Urs Hauri[1]

[1]*Kantonales Laboratorium, Basel, Switzerland*

Current requirements for colorants in tattoo inks are based on negative lists. The upcoming ECHA regulation plans to set limits for these forbidden substances. In general, analysts and law enforcers alike favour limits for regulated substances as it simplifies their work dramatically and also guarantees a certain harmonisation in measures between different countries.

Why do we favour a regulation without limits for pigments?

Shortly, because of the virtual impossibility to quantify pigments and especially in the proposed range (0.00005 – 0.1%). The common factor of pigments is there insolubility. Solubility though is a key element for most quantitative analytical methods available, e.g. liquid chromatographical (LC) methods. It is difficult enough to get small amounts of pigments solubilized. To reliably quantify these pigments seems nearly impossible. At the moment, laser desorption time-of-flight mass spectrometry (LDI-Tof/MS) seems the only valid candidate method but with our present experience and instrumentation, we could not guarantee a supervision of a 0.1% limit, leave alone a limit of 0.00005%. But even if these analytical problems were solved, there is a lack of quantitative references for pigments available with only limited hope for such references in the future.

Today, the Swiss regulation allows for a pragmatic approach. The main pigments are identified unequivocally with several methods (LDI-ToF-MS, UV spectroscopy and LC) without the need of quantitation. Small amounts of colorants which are not necessarily below 0.1% and which don't seem to be responsible for the colour of the sample are tolerated – in tattoo inks as well as in cosmetic products. A general obligation to quantitate any given compound of a tattoo ink could pose an unnecessary major obstacle for authorities entrusted with market controls. On the other hand, for those compounds of concern, which are soluble in inks, we regard legal limits as indispensable.

O28. ANALYSIS OF TATTOO INKS: DO WE NEED HARMONIZED METHODS?

Christopher Hohl[1]

[1]*Kantonales Laboratorium, Basel, Switzerland*

When the topic of conversation comes to analyzing tattoo inks, the call for harmonized methods never is far away. How come, and, by the way:

What does „harmonized method“ mean? In this case „harmonized methods“ would be analytcal procedures, on which several laboratories have agreed upon them to be suitable for a specific task. Suitable meaning resulting in a.) contents of a compound, as close as possible to the true value and/or b.) data being on a comparable level regardless of which laboratory they stem from. Establishing a harmonized method is a multistep procedure:

- Find a laboratory with the necessary experience as analytical powerhouse to take over the lead (if you find more than one,fine!). This would be preferably a laboratory which already has an in-house validated method (validated meaning considered to be fit for purpose).
- Find other laboratories willing to familiarize themselves with the method proposed by the alpha laboratory.
- Perform interlaboratory testing of reference samples.
  Compare results: erradicate any unclear formulations and sources of error.
- Repeat if necessary, until results indicate that the method is fit for purpose.
- Publish amended version as the harmonized method

What are the benefits?: Harmonized methods can be adapted in rather short time by other laboratories. With the necessary due diligence, results will be
trustworthy for anyone and satisfy customers‘ needs resulting in less discussions, more well-founded decisions and less economic damage or safety
hazards due to analytical errors.

Where is the problem? Defining a harmonized method is a lengthy process requiring several years. If declared as mandatory, a harmonized method will cement
a state of technology and of scientific knowledge, which, at the moment of publishing, may already be obsolete. This is especially annoying in the case of mandatory
methods. In other words: the use of faster, easier or more powerful methods would not be accepted.

In discussing the pros and cons of introducing harmonized methods from different points of view, the answer to the question:

“ Analysis of tattoo inks: do we need harmonized methods?“ will not be only a simple„ Yes“ or “No“. Moreover, it will be a „Yes and No, it depends where and under which conditions.“
Harmonized methods are welcome but should not be mandatory for determining „true“ contents of a compound, as more than one method could be fit for this purpose.
Harmonized methods are, however, indispensable for legal limits based on a convention (examples: determination of amine release, nickel release),
because comparability of results depend on the method used.

O29. MEASUREMENT OF PIGMENT AGGLOMERATION IN SKIN SAMPLES; ASSOCIATION BETWEEN CARBON BLACK AGGLOMERATES AND SARCOIDOSIS

Katrina Hutton Carlsen[1], Georg Larsen[2] , Jørgen Serup[1]

[1]Department of Dermatology, The "Tattoo Clinic", Bispebjerg University Hospital, Copenhagen, Denmark.
[2]Bio-Science ApS, Gilleleje, Denmark.

Background: Agglomeration of tattoo pigment particles in the dermis has been suggested to be associated with complications, in particular granuloma formation and triggering of active sarcoidosis.

Aim: To measure size and shape of black and red pigment agglomerates in skin samples from tattoo reactions; black versus red, and correlation with clinical diagnoses.

Method: 161 unstained biopsies from patients with tattoo reactions in black or red, i.e. 64 black reactions and 97 red, were examined by light microscopy (Olympus BX51™). Photos were obtained from 2 representative locations of the biopsy utilising a 40x objective, and immersion oil (Jenoptic Gryphax RGB camera). Computerised analysis of agglomerates was performed using ImageJ software. Agglomerate count, area, width, height, circumference and circularity were measured, and statistics performed with Student t-test, chi-square test, Anova and Bonferroni.

Results: In total, black agglomerates were significantly more circular shaped compared to red whereas no significant differences were found in count, area, width, height or circumference.

Focusing on black reactions, the count of agglomerates was significantly higher in patients with sarcoidosis. Focusing on red reactions, agglomerates were significantly more circular in patients with severe allergy and allergic cross-reactivity versus patients with milder allergy. Count of red agglomerates was lower in patients with excessive hyperkeratosis compared with other clinical types of allergy.

Conclusion: The increased count of pigment agglomerates in patients with black tattoo reactions and associated sarcoidosis versus patients with no sarcoidosis indicates that multiple agglomerations are triggering sarcoid complication. Circular shape of agglomerates may code for stronger biological activity.

O30. MEASUREMENT OF PIGMENT AGGLOMERATION IN COMMERCIAL INK STOCK PRODUCTS; NEW VERSUS OLD PRODUCTS

Katrina Hutton Carlsen[1], Georg Larsen[2], Jørgen Serup[1]

[1]Department of Dermatology, The "Tattoo Clinic", Bispebjerg University Hospital, Copenhagen, Denmark.
[2]Bio-Science ApS, Gilleleje, Denmark.

Background: Tattoo ink stock products are supposed to undergo chemical and physical product ageing and therefore labelled with a suggested expiry date. Clinical research indicates that tattoo pigment forming foreign bodies in the dermis over time can cause disease seen as papules, nodules and sarcoidosis, particularly associated with the carbon black pigment.

Aim: Investigation of physical stability namely clustering (agglomeration) of pigment particles to form larger foreign bodies over time. New and old inks (black and red colours) were compared.

Method: New inks (21 black; 17 red) from different manufacturers were compared with old inks from the same manufacturers, shelf life over 2 years (5 black; 5 red). Ink agglomerates were studied by light microscopy (Olympus BX51) using 40x oil immersion objective. Representative photos were taken (Jenoptic Gryphax RGB camera) and analysed by computerised analysis (Image J); count, particle area, width, height, circularity and circumference of agglomerates were measured.

Results: Old black and red inks both showed higher numbers of agglomerates versus new inks. Agglomerates of black particles were significantly larger area-wise and more circular in comparison with red inks. New inks of both colours had more circular shaped agglomerates.

Conclusion: Tattoo ink products over time undergo physical changes i.e. clustering of pigment particles into agglomerates with formation of larger agglomerates in black inks versus red inks. Product ageing also involves change of shape. Agglomeration of pigment in ink products on stock and change of shape may influence the physico-chemical interaction with dermal tissue *in situ* and be associated with clinical complication. More detailed studies on product ageing and adverse events should be initiated. Labelled expiry dates of tattoo ink stock products need to be better substantiated.

O31. HIGH FREQUENCY (20 MHZ) FOCUSED ULTRASOUND (HIFU), A NOVEL METHOD FOR TATTOO REMOVAL: PRE-CLINICAL EXPERIENCE AND FIRST EXPERIENCE IN MAN

Jørgen Serup[1], Torsten Bove[2], Tomasz Zawada[2]

[1]Bispebjerg University Hospital, the Tattoo Clinic and
[2]TOOsonix A/S, Denmark

Background: High-intensity focused ultrasound applied at high-frequency in the dermis is a novelty. Temperatures about 65 degrees Celsius and an additional effect, i.e. cavitation, are dosed precisely in the skin wherever intended, guided by a camera.

Studies: *Preclinical evaluation in the laboratory and in skin equivalents* have shown that the sound energy (System ONE-R, TOOsonix, DK) can be dosed reproducibly in a highly controllable manner with different transducers defining the depth of the focal point, and at settings of the energy in the range 0.4 to 1.5 J, at selected shot duration of 150 ms. The geometry of the acoustic lesion is conical with a broader field of thermal effect over the focal point thus towards the surface of the treated object. This was confirmed in isolated liver and muscle samples from pigs. *Studies in anesthetized mini pigs with three months follow up* confirmed the reproducibility, linearity and precision of the method, with superficial crust formation of the epidermis occurring after 1-3 weeks. Dosing was immediately followed by a wheal and flare reaction. Histology demonstrated no fibrosis at the 3-month endpoint using high dose i.e. 1.2 J at single shot. Fields formed by 5x5 shots grouped together showed reproducible crust formation, and minor fibroid reaction in the very outer dermis only, leaving no or subclinical scarring. Crusts were epidermal tissue with no collagen on Masson stain. Ultrasound scanning (20MHz, Cortex Technology, DK) showed echo-lucent fields in the dermis depending on dosage and in agreement with histology and preclinical findings. *Human studies* included an initial case experiment using high dose applied to a black tattoo, which after one treatment and prominent crustation was removed. In an ongoing *clinical experiment on tattoo removal* it has been confirmed that tattoos can be removed after 1-3 treatments. Ultrasound is independent of optical properties and color of the pigment and can be applied to any tattoo. In the clinical experiment, skin diseases such as actinic keratosis, basal cell carcinoma and Kaposi sarcoma also have been addressed. Larger clinical protocols are under preparation. The system is primarily launched for tattoo removal.

Conclusion: This novel ultrasound HIFU method has passed initial animal safety studies. The system is ready for further application in various fields of dermatological therapy, primarily the indication tattoo removal. The method has the potential to supplement or replace lasers, depending on indication. The method offers new options such as removal of any tattoo with one system only; independent of tattoo color, using 1-3 treatments.

Bove T, Zawada T, Serup J, Jessen A, Poli M. High-frequency (20MHz) high-intensity focused ultrasound (HIFU) system for dermal intervention: preclinical evaluation in skin equivalents. Skin Research and technology 2019, DOI 10.1111/srt.12661, e-publication ahead of print.

O32. ALLERGIC REACTION TO A NEW TEMPORARY BLACK TATTOO DYE, AN EXTRACT FROM THE JAGUA FRUIT (GENIPA AMERICANA L.)

Andreas J. Bircher[1], Kathrin Scherer Hofmeier[1], Urs Schlegel[2], Urs Hauri[2]

[1] Allergy Unit, Department of Dermatology, University Hospital Basel, Basel , Switzerland
[2] Kantonales Laboratorium Basel-Stadt, Basel, Switzerland

Introduction: Application of black henna tattoos containing p-phenylenediamine (PPD) sensitizes about 1-2% of the exposed. Recently other black dyes, e.g. the sap of the fruit of the Jagua tree, have been marketed as natural and safe alternative. We report on two patients who were rapidly sensitized and had severe contact dermatitis upon use of Jagua dyes. The active substance genipin was identified as contact allergen.

Patients, materials and methods: Two females (39 and 16 years) had painted for the first time a temporary black tattoo with a reconstituted Jagua powder and a ready-to-use Jagua gel, respectively. In the first patient after the fifth, in the second after one application, severe allergic contact dermatitis developed. Patch tests were performed with the European standard series, PPD and other aminophenol compounds. All single components of the Jagua dyes and genipin 1 % were tested. Both Jagua dyes were analyzed for PPD, geniposide and genipin concentrations were determined by reverse phased liquid chromatography.

Results: In the patch tests genipin was positive, all other substances were negative. In both Jagua dyes genipin was found at concentrations of 0.5%, geniposide was below detection limit (LOD) of 0.001% to 0.006%. PPD was LOD of 0.002%.

Conclusion: So far five cases of severe allergic contact dermatitis after short exposures to Jagua tattoos have been reported. In our cases genipin was identified as responsible contact allergen, PPD was not detected. Genipin is used as oral drug in traditional Chinese medicine, in industrial processes, admitted as food dye, and is under investigation as drug. Exposure to genipin in patients sensitized through Jagua tattoos could result in systemic contact dermatitis.

O33. IMPURITY ISSUES OF RAW MATERIALS USED IN THE TATTOO INK PRODUCTION

Michael Dirks[1]

[1]*H-A-N-Gmbh, Esslingen, Germany*

Technically produced pigments contain impurities arising from the type of manufacturing process and from the impurities of the raw materials. The chemical nature of these impurities can be organic or inorganic. Inorganics are typically coming from catalysts used in the synthesis. These impurities can affect the application of pigments – both technically and regulatory.
Typically these impurities are seldom specified by the pigment industry, as their testing is done in the major applications, like paints, inks and plastics. Exceptions are sensitive applications where the limits are given by the legislation.

However, limits are always linked to a defined test method. These test methods are usually worked out between the involved parties – producers and users. This is very important because without these methods limits make no sense. In addition with pigments the sample preparation is as important as the test method. As an example, the undispersed pigment can entrap impurites which are then released when a pigment is dispersed. As a result one needs clearly define how the sample for testing is prepared and the test is performed. This is besides being a common understanding between producers and users of vital importance for the producers of „pure“ pigments. Without reliable test methods pigment production does not make sense.

The production of the “pure” pigments can be carried out by a suitable choice of raw materials and by an appropriate reaction steering either at the synthesis of the pigments or by a following cleaning of the technical pigments. It will depend which method is more suitable based on the chemistry and physics of the pigments.

O34. ORGANS-ON-CHIPS: HUMAN EMULATION FOR TATTOO PIGMENT SAFETY

Lian Leng[1], Christopher Hinojosa[1], Geraldine Hamilton[1], Daniel Levner[1], James Coon[1]

[1]EMULATE INC, Boston, United States

Organ-on-Chips recapitulate the tissue microenvironment of a variety of organs, including skin, lung, liver, intestine, blood-brain-barrier, and kidney. Each Organ-Chip, which is composed of a clear flexible polymer, is about the size of an AA battery and contains tiny hollow channels lined with living human cells. The chips are cultured under continuous flow within microengineered 3D environments that go beyond conventional 3D *in vitro* models. We recapitulate *in vivo* intercellular interactions, spatiotemporal gradients, vascular perfusion, and mechanical forces — all key drivers of cell architecture, differentiated function, and gene expression enabling us to recreate as accurately as possible human physiology and organ function.

Our system has the potential to be a more predictive, human-relevant alternative for safety testing of tattoo inks. In our human Skin-Chip, we have demonstrated the capability to study tattoo ink interactions with the immune system and recapitulate *in vivo*-relevant injury mechanisms. In addition, we have data from different Organ-Chips such as liver and kidney that demonstrate we can predict toxicity of drugs in humans via diverse mechanisms of action.

Our results support the use of the Organs-on-Chips technology for a wide range of studies aimed at detecting potential toxicity, understanding ink kinetics, uptake and degradation, bioavailability, and metabolic conversion into toxic substances, as well as the basic processes underlying tissue homeostasis and response to injury. We propose that the Organs-on-Chips offers a new approach to enable human relevant safety and risk assessment of tattoo inks.

O35. ASSOCIATION OF SWISS PROFESSIONAL TATTOO ARTISTS (VST)

Fabio Colombo[1], **Luc Grossenbacher**[1]

[1]*Verband Schweizerischer Berufstätowierer VST*

- Introduction of the Association of Swiss professional tattoo artists (VST)
- What has the VST done so far?
- Introduction of the HQ label. The high quality label of different professional organizations, found in cooperation with the BAG, the national health authorities
- Current laws relevant for tattooing, piercing, permanent make-up and similar practices
- Tattoo colors: position of VST and ideas to find a solution for legal provisions of tattoo colors

O37. HOW TO BECOME A TATTOO ARTIST IN AUSTRIA – THE REGULATION/ ACCESS CONTROL FOR TATTOOISTS VIA QUALIFYING CERTIFICATE

Erich Mähnert[1]

[1]*Öesterreicher Tätowierer und Piercer Verband (ÖTPV), Austria*

1.) Intro: Mähnert Erich Chairman of the Austrian Tattoo and Piercer Association (Vienna Section) & Chairman of the Vienna & Austrian Economic Chamber. Tattoo artist since 2003 in Vienna

2. The ÖTPV is an association for commercial tattoo machines and piercers. The aim of this association is to represent the interests of our professions as a single entity and to find solutions for any problems that arise in the future.
In September 2016, provincial groups were founded in all 9 federal states. An umbrella organization ensures direct contact, cooperation and coordination with the respective federal states.

Why was the ÖTPV founded?
Better cooperation with authorities, public officials, media, improving the public image of the tattoo & piercer industry.

How do you become a tattoo artist in Austria?
In Austria, tattooing is regulated by law.
Which training courses and prerequisites must be fulfilled in order to obtain the trade license.
Also, the workflow of a tattoo artist & piercer is ruled by the exercise rules.
The hygiene regulations in a tattoo and piercing studio are also legally regulated.

O38. RELYING ON THE WRONG INFORMATION

Jens Bergström[1]

[1]*Tattoo and Piercing Education Scandinavia, Tattoo and Piercing Education Scandinavia, Åkersberga, Sweden*

Getting the right information and knowledge is key for a practitioner. Studies and surveys done in Sweden and other countries clearly proves that the level of knowledge regarding hygiene and other aspects of the practice is very often on a dangerously low level. In 2010-2012 Sweden did a massive inspection program on tattoo and piercing and it was evident that a good educational program was needed. The same program also showed that the inspection model was based on very poor knowledge and understanding of the trade .The world of breaking the skin barrier is a changing one, so you cannot rely on old information or practice out of an outdated perspective. Looking in to the future, it's very clear that the way we continuously ignore the new risks with resistant bacteria and other related issues we will create massive problems for ourselves. As a trade we need to take responsibility to insure our own future as practitioners and not rely on outdated facts and methods. In the same manner governmental issues must take responsibility to not only be judge and executioner, but to base inspection and laws on actual facts and actual risks.

O39. AN ANALYSIS OF TATTOO AFTERCARE INSTRUCTIONS IN THE UNITED STATES

Walter Liszewski[1], Anne Laumann[2], Marie Leger[3], Ronda Farah[1]

[1]University of Minnesota, Dermatology, Minneapolis, United States
[2]Northwestern University, Dermatology, Chicago, United States
[3]Cornell University, Dermatology, New York City, United States

Aim: Tattoo aftercare instructions describe how to care for a new tattoo. Given that improper aftercare can negatively impact the healing and appearance of a tattoo, quality instructions are essential. The purpose of this study was to investigate the recommended aftercare practices of American tattoo artists.

Methods: 700 aftercare instructions from all 50 states were analyzed. Instructions were assessed for whether they described how to clean and moisturize a new tattoo, which products were and were not recommended, and when to contact a tattooist or physician if a complication occurs.

Results: 85.4% of instructions stated how long to leave on the initial bandage (mean 2.92 hours). 96.6% recommended the use of soap to clean a tattoo, of which 63.0% recommended an anti-bacterial soap. However, only 23.0% instructed individuals to wash their hands before touching a healing tattoo. The top five recommended aftercare moisturizers were Aquaphor, A&D ointment, unspecified "lotion," Lubriderm, and Bacitracin. The top three products to avoid were Vaseline, Neosporin, and A&D Ointment. Interestingly, 12.2% of instructions encouraged individuals to avoid petrolatum but inadvertently recommended products that contained it. Only 25.4% of instructions stated when a tattoo should be fully healed (mean 2.9 weeks). For complications, such as infection or rash, 50.7% and 19.5% instructed individuals to contact their tattooist or physician, respectively.

Conclusion: There is variation in the quality and thoroughness of aftercare instructions. The dermatology community, through its knowledge of wound care, has a unique opportunity to partner with tattooists to develop better aftercare practices.

O40. ”INKBASE”, A NEW TOOL FOR COLOR REGISTRATION IN STUDIOS DEVELOPED BY A TATTOO ARTIST

Liz Kierstein[1]

[1]*The Professional Independent Tattooers, Denmark*

Since Denmark was presented with a new law for tattooing including specific requirements towards both inspection of the premises, registration of tattoo design and ink used, a new colour registration system was launched and received with gratitude by shop owners and is now a great success and a tremendous help at the professional tattoo studio management.

While usually the trade were kind of suspicious when met with all kinds of new demands, rumours, misunderstandings and negative media coverage - Danish professional independent tattooers accepted the new law of tattooing. From the very strong relationship in The Professional Independent Tattoo Artists Organization and the super positive cooperation with the authorities, the trade managed to get a lot of influence regarding the content of the law and met with the demands of registrating the type of ink used and the specific design information the Danish Tattoo Scene were presented a Danish developed colour registration solution named “Ink Base”. Launched by the son of old time tattooer and legendary “Mik”’s son Bjørn (bear) from Mik’s Tattoo, Copenhagen. Some how it is our experience that efforts brought onto the scene by the trade by itself is easily accepted amongst the Danish tattooers.

O41. MYSTERY TATTOO ALLERGY – WHO BEARS THE RISK?

Steffen Schubert[1]

[1]*Informationsverbund Dermatologischer Kliniken - IVDK e.V., Germany*

The genesis of contact allergy is different to the etiology of the mostly perceived allergic reactions to pollen (“hay fever”), asthma or food. Contact dermatitis can be induced by a variety of sensitizing substances in every individual if either, a single large dose of an allergen is applied to the skin, or small doses are applied repeatedly. There is no cure or ability of desensitization. The only chance to stay asymptomatic is lifelong avoidance of contact with the respective allergen (or chemically similar structures). Contact allergy and other skin diseases can be triggered by tattooing; allergic reactions to already known sensitizers can be elicited by tattoos. Tattooist should talk with their clients about the risk of sensitization by tattooing, especially considering the individual allergy history of the customer. Connections between environmental and occupational allergens and substances found in tattoo inks will be presented.

O42. BRIEF UPDATE FROM THE TATTOO CLINIC IN COPENHAGEN

Jørgen Serup[1]

[1]*Bispebjerg University Hospital, the Tattoo Clinic, Copenhagen, Denmark*

The Tattoo Clinic was established in 2008 as a specialized service included in the Department of Dermatology, which has dedicated clinics with a laser clinic and a surgical unit specialized in wounds.

The Tattoo Clinic presently has treated about 900 patients with tattoo complications, referred from the capital region but also from other parts of Denmark. The diagnosis system developed by the clinic and published in 2016 is followed. The system is used internationally as a tool to harmonization of diagnoses.

Allergic reactions in red tattoos remain the commonest complication followed by papulo-nodular reactions in black tattoos with or without associated sarcoidosis, and bacterial infections. However, there is a large group of various special entities such as photosensitivity reactions, neuro-sensitive reactions, irritant and toxic reactions, eczema that can be generalized, urticaria, scars and sequels of laser removal, lymphopaties, viral infections, keratoacanthomas and miscellaneous events.

The diagnostic tools are skin biopsies for histology, supplemented with direct inspection of the biopsy cylinder by surface microscopy, 20MHz ultrasound scanning, allergy patch test and other methods.

Standard treatments include dermatome shaving of allergic and papulo-nodular reactions, and medical treatments such as antibiotics, local and systemic corticoids, immunosuppressives such as ciclosporin, and YAG-laser treatment.

High-frequency (20MHz) focused ultrasound (HIFU) especially developed for intradermal treatment is a novel technique developed in Denmark and presently under research, applied to tattoo removal.

The Tattoo Clinic has a range of research activities. The clinic is used as expert in the development of national regulations and international guidelines.

1. Serup J, Sepehri M, Hutton Carlsen K. Classification of tattoo complications in a hospital material of 493 adverse events. Dermatology 2016;232:668-678.
2. Sepehri M, Jørgensen B, Serup J. Introduction of dermatome shaving as first line treatment of chronic tattoo reactions. J Dermatol Treatment, 2015;26:451-55.
3. Serup J, Bäumler W. Diagnosis and Therapy of tattoo complications, with atlas of illustrative cases (monography). Current Problems in Dermatology volume 52, pp 1-234, 2017. Karger AG, Basel, Switzerland.
4. Bove T, Zawada T, Serup J, Jessen A, Poli M. High-frequency (20 MHz) high-intensity focused ultrasound (HIFU) system for dermal intervention: preclinical evaluation in skin equivalents. Skin Res Technol 2019, e-publication ahead of print, DOI 10.1111/srt.12661.

O43. AN UPDATE FROM THE ACADEMIC TATTOO CLINIC AMSTERDAM

Sebastiaan van der Bent[1], R. de Winter[1], A. Wolkerstorfer[2], T. Rustemeyer[1]

[1] Academic Tattoo Clinic Amsterdam, Department of dermatology, VU University Medical Center, Amsterdam, The Netherlands.
[2] Department of dermatology, Academic Medical Center, Amsterdam, The Netherlands.

On January 13th 2017 the 'Academic Tattoo Clinic Amsterdam' (Dutch: 'Tattoo poli') was opened as a part of the Dermatology Department of the VU University Medical Center in Amsterdam.

The clinic was opened because there was a great need for a clinic specialised in tattoo related skin diseases. Since then, many patients with tattoo complications were consulted. Also, clinical and laboratorial studies were, and currently are, conducted at the clinic. The opening was inspired by the first, successful, 'Tattoo Clinic' at Bispebjerg Hospital in Copenhagen. In our clinic, as in Copenhagen, solely complications in tattoos are treated.

In this presentation an update of the Academic Tattoo Clinic Amsterdam will be given. Complications such allergic reactions to red tattoos, papulo-nodular reactions in black tattoos, infections, auto-immune skin diseases and artistic complications will be discussed.

O44. ESTABLISHING A TATTOO CENTER AND PRO BONO TATTOO REMOVAL SERVICE IN NEW YORK CITY

Marie Leger[1]

[1]*Metro Dermatology, Elmhurst, USA*

This presentation discusses the author's experience starting a tattoo treatment and research center initially at Weill Cornell Medical Center, and then at Metro Dermatology, a private practice, in New York City. It will address building educational programs about tattoo complications and skin cancer detection with the tattoo artist community and New York Commission for Health and Hygiene. It also discusses the initiation of a pro-bono tattoo removal program for victims of human sex trafficking. Nearly 3,000 New York City youths were identified as either trafficked or at risk of trafficking in a 2017 report by the NYC Safe Harbour Program. In addition, in New York State, approximately 1000-2000 women are arrested yearly for prostitution, with an estimated 25-35% of these women with a history of being trafficked. It is not uncommon for these people to have been involuntarily tattooed with their traffickers' names, initials, or barcodes in visible areas. Currently, the center receives referrals from the Legal Aid Society, the oldest and largest provider of legal aid to the indigent in the US, and the New York City Administration for Children's Services.

O45. QUANTIFICATION OF TATTOO INK ALLERGIC REACTIONS USING 3D OPTICAL IMAGING

Mark den Blanken[1], Sebastiaan van der Bent[2], Niels Liberton[3], Mark Hofman[1], Matthijs Grimbergen[1], Thomas Rustemeyer[2]

[1]Amsterdam UMC, Radiologie en Nucleaire Geneeskunde, Amsterdam, Netherlands
[2]Amsterdam UMC, Dermatologie - Allergologie, Amsterdam, Netherlands
[3]Amsterdam UMC, 3D innovatielab, facilitair bedrijf, Amsterdam, Netherlands

Measurement and quantification of allergic reactions of the skin can help medical specialists to manage and evaluate the treatment of the tattoo ink allergic reactions, by comparing the severity of the allergic reactions before and after treatment.

Photographs (2D optical imaging) lose their quantitative power due to the loss of perspective. However, handheld 3D optical scanners are increasingly used for research in the medical environment, partly by their ability to measure in high accuracy (point accuracy in 3D space of 0.1 mm or better), and can therefore be used to quantify allergic reactions.

In our study on 17 patients with 83 affected tattoo's, we used a 3D optical scanner and developed a method to quantify maximum thickness, volume and surface area of the affected tattoo. We measured the lesions of 6 patients before and after treatment. The maximum thickness of the lesions ranged from 0.1 mm to 7 mm, and the volume of the lesions ranged up to 1000 mm^3. In addition, we printed a 3D model to mimic tattoo reactions and analyse the accuracy of our device and algorithms.

With this study we show the feasibility of using handheld 3D optical scanners for the quantification of tattoo-ink allergic reactions and objective follow-up controls.

O46. PATCH TEST PANEL FOR EPIDEMIOLOGICAL SURVEILLANCE OF TATTOO ALLERGENS IN TATTOO PRODUCTS

Steffen Schubert[1]

[1]*Informationsverbund Dermatologischer Kliniken - IVDK e.V., Germany*

The Information Network of Departments of Dermatology (IVDK) consists of 56 clinics in Germany, Austria and Switzerland and has the world's largest database of contact dermatitis patients' history and corresponding patch test results. The recently launched tattoo anamnesis was designed to track preceding (supposedly) allergic reactions, and to differentiate between complications due to temporary tattoos, permanent tattoos, and laser removal of pigments. The test recommendation for corresponding patients, given by the German Contact Dermatitis Research Group (DKG), consisting of the baseline series, preservatives and biocides, (textile) dyes, and a selection of tattoo ink constituents (82 substances in total) will be presented. The adoption of this compilation by the DKG constitutes the start of the largest epidemiological survey in the field of allergic tattoo reactions. The goal is to identify culprit allergens in tattoo inks and to distinguish between true allergic reactions and non- allergic diagnoses like inflammation, granulomas and infections. Issues with patch testing, which is the gold standard to diagnose contact dermatitis, namely the restricted selection of test allergens on the market or using an epicutaneous test to diagnose a dermally pronounced sensitization, will be discussed. Future developments as setting up large epidemiological studies with currently used tattoo pigments, and the possible role of the IVDK network will be evaluated.

O47. TATTOOS AND PSORIASIS; EMBRACING ONE STIGMA TO CONQUER ANOTHER: HOW INDIVIDUALS SUFFERING FROM PSORIASIS, UTILIZE TATTOOS AS A CATALYST TO RECLAIM AND ANCHOR THEIR SELF-IDENTITY

Mads Wedel Kristensen[1], **Jørgen Serup**[1]

[1]*Bispebjerg University Hospital, the Tattoo Clinic, Copenhagen, Denmark*

Psoriasis is well known to be a very dominating condition, for the people who suffer from it. There is a great sense of loss, when it comes to agency and bodily identity for those afflicted with it. This project seeks to investigate why some people with psoriasis, especially the younger generations, then utilize tattoos to reclaim their lost identity and agency. A choice they voluntarily make, despite the still present stigma of tattoos themselves and the risks that may be associated with getting a tattoo when you suffer from psoriasis, such as the "köbner" effect. This research project then, from a sociological and 'corporealist' /corporeal realism perspective, seeks to investigate why they embrace one stigma, to circumvent the stigma they already feel. We investigate this through qualitative methodology, by utilizing semi-structured individual interviews, focus groups and a thematic analysis. Seeking to clarify the therapeutic effect tattoos can have, for people that suffer from psoriasis (and similar conditions).

O48. "MY SKIN"- A STUDY OF THE EMOTIONAL-COGNITIVE REPRESENTATION OF SKIN AMONG PEOPLE WHO HAVE TATTOOS

Patrycja Rogowska[1], Karolina Wrzosek[1], Aneta Szczerkowska-Dobosz[1]

[1]Medical University of Gdańsk, Department of Dermatology, Venereology and Allergology, Gdańsk, Poland

Introduction
Tattoos give someone an opportunity to stand out from the crowd, emphasize one's uniqueness and belonging to various social groups. This in turn, may have a significant impact on self-esteem and self concept clarity.

Methods
The study was attended by a group of 539 people. In the group of respondents, the majority declared that they had a tattoo (N = 360). The respondents filled in the General Self-Assessment Scale, Clarity Scales and the questionnaire My Skin.

Results
The study confirms that people with tattoos show significantly higher satisfaction with their skin in all parts of the body, compared to those without tattoos. People with the largest number of tattoos showed the greatest satisfaction with the condition of their skin. By comparing the average values in the physiological, psychosocial and health-related functions of the skin, it can be concluded that people with tattoos were significantly different from those without tattoos only in one of the aspects of skin function awareness - psychological and social functions.

Discussion
People who have tattoos show greater focus on the condition of the skin and greater satisfaction with its condition than those without tattoos. Furthermore, there is a strong correlation between the number of tattoos and satisfaction with its condition. Nevertheless, people with tattoos do not show greater awareness of the physiological and health aspects of the skin than people without tattoos, which would be desirable in a group of people undergoing high-risk treatments.

O49. NO CHANGES OF AGE-DEPENDENT DIFFERENCES IN HUMAN LYMPH NODES WITH OR WITHOUT TATTOO PIGMENTS

Vivien Schacht[1], **Armin Shrifi**[1]

[1]*Department of Dermatology, Hannover Medical School, Germany*

Tattoo pigments applicated into the skin are drained via lymphatic vessels into regional and non-regional lymph nodes. Aggregates of pigments are deposited there inside of macrophages. Regularly, we find aggregates of tattoo pigments in sentinel lymph nodes of patients with potentially metastasized malignant tumors. Investigations on the influence of nodal pigmentation due to ornamental tattoos on progress-free and overall survival in patients with malignant melanoma showed no significant differences as compared to patients without any tattoos based on 388 patients included in that study. 38 of these patients had a tattoo and showed pigment aggregates in their sentinel lymph nodes. However, these tattoo pigments or their additives did not induce any difference in disease progression between patients with and without a tattoo.

Moreover, lymph nodes undergo alterations during aging. Studies have shown that the number of lymphocytes, high endothelial venules, the degree of fibrosis and lipomatosis correlate age-dependently. Therefore, we compared the degeneration scores of so far 25 sentinel lymph nodes with tattoo pigments to matched control nodes without tattoo pigments.

Corresponding to similar progression of malignancies we found no differences in age-dependent morphologic alterations between lymph nodes with and without tattoo pigments. This result suggests that tattoo pigments might not alter immunological functions of lymph nodes. On the other hand, the pigment aggregates vanish with increased lipomatosis of lymph nodes. They may enter the blood stream to accumulate in distant organs with high capillary networks. And the consequences of this accumulation might become obvious just in decades after tattoo application.

O50. TATTOO NEEDLE WEAR CONTAINING NICKEL AND CHROMIUM IS DEPOSITED SKIN AND LYMPH NODES OF HEALTHY AND ALLERGIC DONORS

Ines Schreiver[1,*], Bernhard Hesse[2,3,*], Christian Seim[3,4,5], Hiram Castillo-Michel[2], Lars Anklamm[6], Julie Villanova[2], Nadine Dreiack[1], Adrien Lagrange[3,7], Randolph Penning[8], Christa De Cuyper, Remi Tucoulou[2], Wolfgang Bäumler[9], Marine Cotte[2,10], Andreas Luch[1]

[1]German Federal Institute for Risk Assessment (BfR), Department of Chemical and Product Safety, Berlin, Germany
[2] The European Synchrotron, France
[3] Xploraytion GmbH, Berlin, Germany
[4] Physikalisch-Technische Bundesanstalt, Department of X-ray Spectrometry, Berlin, Germany.
[5]Technical University Berlin, Institute for Optics and Atomic Physics, Berlin, Germany
[6] Helmut Fischer GmbH Institut für Elektronik und Messtechnik, Sindelfingen Germany
[7] Technical University Berlin, Institute of Materials Science and Technologies, Berlin, Germany
[8] Ludwig-Maximilians University, Institute of Forensic Medicine, Munich, Germany
[9] University of Regensburg, Department of Dermatology, Regensburg, Germany
[10]Sorbonne University, Laboratory of Molecular and Structural Archaeology (LAMS), CNRS, Paris, France

So far, the health impact of tattoo equipment has been the focus of neither research nor medical diagnoses. Although tattoo needles contain high amounts of sensitizing elements like nickel (Ni) and chromium (Cr), their influence on metal deposition in skin has never been investigated.

Here, we analyzed skin and lymph node specimens of five donors without known medical conditions related to their tattoos. Also, 50 ink samples and one biopsy of a patient with a tattoo allergy were included in the study.

We found iron particles to be transported from skin to lymph nodes alongside tattoo pigments both in nano- and micrometer size ranges. These particles contained mostly metallic Ni and Cr and were nonexistent in tattoo inks. All tattoo needles investigated contained 6 – 8% Ni and 15 – 20% Cr. Analysis of pig skin tattooed with the suspected abrasive titanium dioxide (TiO_2) white pigment proved the deposition of steel particles into skin by tattoo needles. Scanning electron microscopy of the tattoo needle revealed metallic wear after tattooing with TiO_2. The investigation of a skin biopsy of a human donor known to suffer from an allergic tattoo reaction and diagnosed Ni sensitivity showed both steel debris and Fe pigment particles.

Until now, Fe pigments were usually suspected to be responsible for Ni tattoo allergy due to their almost inevitable contamination with Ni. Based on the evidence obtained in our study, a release of Ni ions is likely to occur from tattoo needle wear with as yet unknown impact on tattoo allergy formation and systemic sensitization.

O51. EFFECTS OF TATTOO PIGMENTS AND ULTRAVIOLETT RADIATION ON TATTOOED HUMAN SKIN MODELS

Henrik Hering[1], Christian Zoschke[2], Markus Kühn[1], Guenther Weindl[2], Andreas Luch[1], Ines Schreiver[1]

[1]German Federal Institute for Risk Assessment, Department of Chemical and Product Safety, Berlin , Germany
[2]Free University of Berlin, Institute of Pharmacy, Berlin, Germany

Human skin is the main barrier against all kinds of environmental factors including ultraviolet radiation (UVR). Recently, interactions of tattoos – composed of dermally located pigments – and UVR have been postulated.

We irradiated 'tattooed' human skin models (TatS) with UVA and UVB and measured UV-induced cytokine release and DNA double strand breaks by γ-H2AX staining. TatS were produced containing carbon black ($TatS_{CB}$) or titanium dioxide in its anatase ($TatS_{A}$) or rutile ($TatS_{R}$) crystal structure and irradiated with UVA or UVB. After 8 h, they were frozen and cryosectioned. The γ-H2AX levels were assessed by immunohistochemistry and flow cytometry. Cytokine concentration in TatS supernatants were measured with a bead-based multiplex assay for interleukin (IL)-1α, IL-6, IL-8, IL-18, granulocyte macrophage colony-stimulating factor (GM-CSF), granulocyte-colony stimulating factor (G-CSF) and transforming growth factor alpha (TGFα).

Levels for γ-H2AX after UVB treatment were slightly reduced in epidermal cells of $TatS_{CB}$ as compared to non-pigmented skin models. Cytokine release after UVA treatment was reduced in TatS after UVA irradiation as compared to not pigmented skin models.

In conclusion, our data suggest small photo protective effects of carbon black in epidermal cells for UVB. However, we see a more pronounced protection of skin cells from UVA in TatS in terms of cytokine release. Since some pigments (anatase or azo pigments) are likely to create reactive oxygen species upon UVA exposure, the detailed influence of these interactions on human cells has to be addressed in future experiments, for which TatS are a suitable model system.

O52. ENCAPSULATION OF THE COLORANT, ACID RED 51 (C.I. 45430) IN LIPID MICROPARTICLES : EFFECT ON PHOTODEGRADATION

Santo Scalia[1], Annachiara Dozzo[2], Giuseppe Scarcella[3]

[1]University of Ferrara, Department of Life Sciences and Biotechnology, , Ferrara, Italy
[2]University of Ferrara, Ferrara, Italy
[3]Ospedale Girolamo Fracastoro, San Bonifacio (Verona), Italy

Aim: In order to ensure the safety of tattoos and permanent make-up (PMU), microbiological contaminations and the presence of harmful substances must be avoided. Moreover, the pigment stability under UV light and laser radiation is of paramount importance since its photodecomposition, in addition to colour fading, can cause the formation of potentially toxic photoproducts. In this study, microencapsulation was investigated as a strategy to reduce the photo-instability of colorants used in the formulation of tattoo and PMU products. Lipid microparticles (LMs) loaded with the red dye C.I. 45430 (Acid red 51) were prepared and their influence on the photo-stability of the encapsulated pigment was examined.

Methods: LMs were prepared by the melt dispersion technique using behenic acid as lipidic material and phosphatidylcholine as the surfactant. Photolysis experiments were performed by irradiation of the samples with a solar simulator and the extent of photodegradation was measured by high-performance liquid chromatograhy.

Results: The obtained LMs exhibited a colorant loading of 12.1% (w/w) and particle size in the range 12-36 µm. The light-induced decomposition of C.I. 45430 in collagen medium was markedly decreased by its incorporation in LMs, from 87.1% ±1.9 for the non-encapsulated colorant to 38.4%±3.2 (n=9) for the C.I. 45430-loaded microparticles. Further studies will be performed to examine the effect of microencapsulation under laser treatment.

Conclusions: The obtained data indicated that incorporation of C.I. 45430 in LMs significantly reduced *in vitro* the photodegradation of the colorant, which should enhance its safety for its use in tattoo and PMU inks.

O53. LASER SYNTHESYS OF BLACK TITANIUM OXIDE

Vladimir Oleshko[1], Vladimir Tsipilev[1], Nikolay Alekseev[1], Olga Nozdrina[1]

[1]Tomsk Polytechnic University, Tomsk, Russian Federation

The successful implementation of laser removal of titanium dioxide-based tattoos requires detailed information on the physicochemical processes in pigments induced by laser radiation, including the chemical and phase composition of synthesized black titanium oxide. Black titanium oxide is in the focus of research interest of many scientists. Despite the significant number of works on this subject, the cause of laser-induced irreversible darkening of cosmetic titanium dioxide tattoos has not been determined. The reasons for the complications while TiO_2-based tattoos removing by laser radiation are not fully understood.

Objective: to expand the understanding of the mechanism of laser-induced formation of black titanium oxide.

The method of pulsed optical spectrometry is used as the main method. Samples are obtained from pressed white TiO_2. YAG: Nd laser (1.064 μm, 14 ns) is used as an excitation source.

In the work, threshold, spectral-temporal, amplitude and spatial characteristics of the glow of white TiO2 induced by laser radiation and the concomitant process of black titanium oxide formation are measured. It was found that the effect of laser radiation on TiO_2 samples at $H \geq 0.1$ J / cm^2 is accompanied by the formation of local microplasmas and adjacent black zones, the number of which increases with increasing of H and the number of irradiation pulses.

It is assumed that plasma-chemical synthesis of the black Ti_2O_3 phase occurs during the irradiation of TiO_2. The nature of absorbing optical inhomogeneities leading to the formation of local microplasmas is discussed.

O54. DEVELOPMENT OF AN ANALYTICAL METHOD FOR ANALYSIS OF AZO-DYES IN TATTOO INKS BASED ON THE UNI EN ISO 16373 (TEXTILE) USING LIQUID CHROMATOGRAPHY COUPLED TO HIGH RESOLUTION MASS SPECTROMETRY (ORBITRAP)

Flavio Ciesa[1], Luca D'Ambrosio[1], Robert Burger[1], Marco Fontana[2], Manuela Agnello[2], Luana Lariccia[2]

[1]Appa Bz
[2]Arpa Piemonte, Italy

The Italian project *"Development and validation of analytical methods to detect substances in tattoo and PMU inks"* promoted by the Italian Ministry of Health, started in the beginning of 2018 with the purpose of a cooperation between Italian Public Health Laboratories (Istituto Superiore di Sanità, ARPA Piemonte and APPA Bolzano) and other Member State Laboratories with the aim of sharing best practices and comparing analytical methods that can be used for the enforcement of the restriction on substances in tattoo inks and PMU in REACH REGULATION (EC) No 1907/2006, currently under the opinion development by ECHA Committees.

The UNI EN ISO 16373 method is a general method for the determination of extractable dyestuffs including allergenic and carcinogenic dyestuffs.

The extraction process is performed in a microwave oven at 100°C using pyridine-water solution, which is, based on the data of the UNI EN ISO 16373, the most efficient solution to dissolve a large range of dyestuffs.

After dilution, the extracted solution is directly analyzed without further purification using an ultra high performance liquid chromatographer (UHPLC) coupled with an LTQ Orbitrap XL detector. With full-scan high-resolution accurate-mass (HRAM) capability, and the ability to perform MS/MS experiments and check isotopic abundance patterns, the Orbitrap system delivers more than high-capacity high-confidence screening and quantification. Using the Orbitrap LC-MS/MS system, it is possible to perform retrospective data analysis to identify compounds not detected using traditional targeted analyses, and to go back through data months or even years later to check for substances not previously targeted.

O55. A COMPARISON OF DIFFERENT METHODS FOR THE DETERMINATION OF PRIMARY AROMATIC AMINES (PAAS) IN TATTOO INKS

Marco Fontana[1], Manuela Agnello[1], Luana La Riccia[1], Flavio Ciesa[2], Robert Burger[2], Luca D'Ambrosio[2]

[1]Arpa Piemonte, Laboratorio Specialistico Nord Ovest, Grugliasco (Turin), Italy
[2]Appa Bolzano, Bolzano, Italy

The italian project *"Development and validation of analytical methods to detect substances in tattoo and PMU inks"* promoted by the Italian Ministry of Health, started in the beginning of 2018 with the purpose of a cooperation between Italian Public Health Laboratories (Istituto Superiore di Sanità, ARPA Piemonte and APPA Bolzano) and other Member State Laboratories with the aim of sharing best practices and comparing analytical methods that can be used for the enforcement of the restriction on substances in tattoo inks and PMU in REACH REGULATION (EC) No 1907/2006, currently under the opinion development by ECHA Committees.

The Italian method in use before the restriction process includes also a cleavage step with sodium dithionite that allows the determination of all the amines in tattoo inks (both free and generated by the reduction of azo-pigments).

The program includes elimination of the cleavage step and the extension to 29 PAAs under REACH restriction proposal. In the same study also the extraction at high temperature (70°C) and at room temperature has been performed, both without derivatization. High percentages of not compliant products are present with both methods applied, and a detailed discussion on occurrence of single analytes is reported.

Results of the comparison study performed by ARPA Piemonte and APPA Bolzano are reported, the comparison between the two labs was very good. Similar concentration were found with the same PAAs profile.

O56. IDENTIFICATION AND QUANTIFICATION OF ABIETIC ACID IN U.S.-CERTIFIABLE RED PIGMENTS FOUND IN TATTOO INKS

Marianita Perez-Gonzalez[1], **Adrian Weisz**[1]

[1]*U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Cosmetics and Colors, College Park, MD, United States*

The color additives D&C Red No. 6 (R6, C.I. 15850), D&C Red No. 7 (R7, C.I. 15850:1), and D&C Red No. 34 (R34, C.I. 15880:1), commonly known as Pigment Red 57, Pigment Red 57:1, and Pigment Red 63:1, respectively, are permitted for coloring drugs and cosmetics following batch certification by the U.S. Food and Drug Administration (FDA). The certification process ensures that impurities listed in the Code of Federal Regulations (CFR) are not above their specified limits. Lakes of these pigments are also U.S.-certifiable color additives (R6L, R7L, and R34L, respectively) and are produced by precipitating the pigment on an inert substratum such as alumina, $BaSO_4$, $CaCO_3$, rosin (colophony), or any combination of these. The above-mentioned color additives have not been approved by the FDA for injection into the skin.

During analysis of batches of R6L, R7L, and R34L submitted for certification, the ultra-high-performance liquid chromatograms invariably showed a peak of a hydrophobic compound that represented a non-CFR-specified impurity. Using spectral measurements and comparing them with those of a reference material, the impurity was identified as abietic acid, a major component of rosin which is a well-documented contact allergen. Rosin is used to alter the shade and solubility of the color additives. A preliminary survey of batches of R6L, R7L, and R34L showed that they contained up to 3.42%, 8.62%, and 5.66% abietic acid, respectively. The current work provides details on the determination of the extent and level of abietic acid in certified lake samples and in non-certifiable tattoo inks.

O57. SEQUELS OF VARIOUS TATTOO REMOVAL PRACTICES: LASERS, LACTIC ACID, EXCISION, WATER TATTOOING, AND SELF-TREATMENT

Mitra Sepehri[1], Katrina Hutton Carlsen[2] and Jørgen Serup[2]

[1]Department of Plastic Surgery, Herlev University Hospital, Denmark
[2]Department of Dermatology and the Wound Healing Centre, Bispebjerg University Hospital, Copenhagen, Denmark

Background: It is well known that tattoo inks are embedded deeply in the dermis, and therefore, difficult to remove without damaging normal skin structures. Worldwide, the tattoo removal industry is non-transparent and non-regulated. The Q-switched YAG lasers are gold standard in tattoo removal, but low priced lasers and amateur methods are also used.

Aim: To study tattoo complications after removal procedures in a hospital material of patients, which were referred due to a need for medical treatment.

Methods: Data was collected in the "Tattoo Clinic" at the Department of Dermatology, Bispebjerg University Hospital from 2008-2015. The subgroup of complications from applied procedures of removal is described.-The methods of removal applied were lasers, lactic acid, surgical excision, water tattooing, and various self-treatments.

Results: We identified following types of removal hazards in a total material of 493 tattoo complications:

Lasers: 18 cases (delayed healing, followed by hypertrophic scar, keloid, chronic inflammation or photosensitivity).

Lactic acid: 2 cases (severe scar formation).

Surgical excision: 1 case (disfiguring scarring).

Water tattooing: 9 cases (tattooist attempted to inject water in the tattooed area to remove tattoo pigment. Mild scarring was seen).

Self-treatment: 4 cases (patients attempted to remove the tattoos with sandpaper, excision or punctures with needles).

Conclusions: Tattoo complications due to tattoo removal for reasons of regret are dominated by scarring, which are often disfiguring, particularly due to off the record lasers and caustic removal by acid. Worldwide, the present situation with no regulation on removal techniques and the level of amateurism is unacceptable.

O58. TREATMENT OF PERIORBITAL HYPERPIGMENTATON WITH ERBIUM:YAG LASER

Natasa Teovska Mitrevska[1]

[1]*ReMedika hospital dermatology department, Skopje , Macedonia*

Dark circles under the eyes are a very common and refractory aesthetic problem.

Periorbital hyperpigmentation is caused by various exogenous and endogenous factors. The causative factors include genetic or heredity, excessive pigmentation, postinflammatory hyperpigmentation secondary to atopic and allergic contact dermatitis, periorbital edema, excessive vascularity, shadowing due to skin laxity and tear trough associated with aging. It can be a part of Jellinek sign in patients with hyperthyroidisam.

It present with brown to blackish – brown diffuse hyperpigmenation in the periocular region.

Pigment deposition, shadowing due to laxity, superficial location of vasculature and prominent nasojugal groove are recognized causative factors. For every etiology different treatment are available.

We present cases with periocular hyperpigmentation and treatment with Erbium Yag laser SP Dynamis (Fotona, Slovenia).
Erbium:YAG laser have the high affinity for water absorption that indirectly reduce melanin deposits from both the epidermis and dermis by vaporization of melanocytes, inducement of melanophage disruption as well as improved cellular turnover.

In our cases Erbium Yag laser is safety and effective in treating periorbital hyperpigmentation using smooth mood SP Dynamics (Fotona, Slovenia)

Keywords: Erbium Yag laser, Periorbital hyperpigmentation, periorbital edema

O59. PICO-SECOND LASER REMOVAL OF TATTOOS IN TATTOO REGRET, PRACTICAL EXPERIENCE AND CLINICAL STUDIES REFERENCED TO Q-SWITCHED (NANOSECOND) LASERS, THE PROS AND CONS OF THE TWO METHODS

Maurice A. Adatto[1]

[1]*Skinpulse Dermatology, Laser & Beauty Centres, Geneva, Switzerland*
Laser Consultant& Lecturer, Dermatology Department, Bern University Hospital, Bern, Switzerland

Background & Objectives: Tattoos have played an important role in human culture for thousands of years, and they remain popular today. The development of quality-switched (QS) lasers in the nanosecond (10^{-9}) domain has revolutionized the removal of unwanted tattoos for over 20 years. However, restrictions known with this nanosecond technology, such as resistant colours (blue, green yellow) and multiple sessions (sometimes up to 25) is over. Since 2012 we have a new generation of lasers called picosecond, as their pulse duration ranges between 350 and 500 picosecond (10^{-12}). This new generation of lasers offers the possibility to treat various skin conditions such as tattoos but also endogenous pigmented lesions.

Study Design / Material & Methods: To update the audience with the 5-year personal experience we have in various indications with the 3 main available wavelengths (532, 785 & 1064nm). This ultra-short pulse duration breaks the tattoo pigment in much smaller particles, thus eliminating it more easily and quickly. Regarding pigmented lesions the mechanism is similar and the shortened pulse duration creates less crusting and swelling afterwards.

Results: The use of picosecond laser in tattoo removal results in a) less sessions needed, so less time required to clear tattoos [(1)]. b) better clearance of residual pigment [(2)] c) possibility of removing previous resistant colours [(3)], as well as paradoxical darkening [(4)].

Conclusion: With this new picosecond technology, a new era is opened not only in the field of laser tattoo removal, allowing better and faster pigment removal, but also in the management of benign pigmented lesions.

Literature:

1. Adatto MA & al. New and Advanced Picosecond Lasers for Tattoo Removal. Curr Probl Dermatol. 2017;52:113-123.
2. Lorgeou A & al. Comparison of two picosecond lasers to a nanosecond laser for treating tattoos: a prospective randomized study on 49 patients. J Eur Acad Dermatol Venereol. 2018 Feb;32(2):265-270.
3. Alabdulrazzaq H, Brauer JA, Bae YS, Geronemus RG. Clearance of yellow tattoo ink with a novel 532-nm picosecond laser. Lasers Surg Med. 2015 Apr;47(4):285-8.
4. Bae YS, Alabdulrazzaq H, Brauer J, Geronemus R. Successful treatment of paradoxical darkening. Lasers Surg Med. 2016 Jul;48(5):471-3.

O60. "IRON" TATTOO REMOVAL WITH Q-SWITCHED LASERS

Kristine Heidemeyer[1]

[1]*Dermatology department, University Hospital Bern, Switzerland*

Background: Parenteral iron replacement for treatment of iron deficiency in diseases as anemia, hair loss, fatigue etc. became more popular in the last decades. In Switzerland, the amount of iron injections increased about 70% since 2010. A rare side effect (about 2.2% of treatments) is a greyish-brownish hyperpigmentation at the injection area due to iron extravasation, when the injection is paravenous.

Q-Switched (QS) lasers, pulse duration, in the range of nanosecond 10^{-9} second, are efficient in the removal of exogenous and endogenous pigments for over 20 years. They can also be used for the removal of cutaneous siderosis (iron deposits) after sclerotherapy or stasis dermatitis.

Nowadays, picosecond lasers are the gold standard for the removal of tattoos and seem to be more efficient than QS lasers to remove exogenous pigments.

Methods: We collected the cases of circumscriptive siderosis after paravenous iron injection treated with QS Nd: YAG 1064nm laser in the Dermatology Department of the University Hospital of Bern and in a private practice in Geneva since 2012.

In one patient we split the lesion in two parts and compared the efficiency of QS Nd: YAG 1064nm laser and QS Nd: YAG 532nm laser during the first session. In another patient, we compared the clearance of pigmentation with QS Nd: YAG 1064nm and picosecond laser, pulse duration in the range of 10^{-12} second. In all cases QS Nd: YAG 1064nm laser seemed to be more efficient. The treatments have been continued with the most efficient method (QS Nd: YAG 1064nm).

Results: In all cases iron tattoo was completely or almost completely removed with QS 1064nm laser within 2 to 10 sessions. Picosecond lasers seem to be less efficient than QS lasers in the removal of iron pigments. Furthermore, iron tattoos respond better to the wavelength of 1064 nm than 532 nm.

Conclusions: As intravenous replacement of iron is becoming more and more popular, side effects of paravenous iron injections presenting as local hyperpigmentation is becoming more frequent. This siderosis can be removed with QS lasers. Although iron has an absorbance peak at 410-415nm, laser treatments with a wavelength of 1064nm seems to be superior. This might be because of the deeper penetration depth of longer wavelength. Surprisingly, QS laser are superior to picosecond lasers in the treatment of siderosis. This is also because of the longer pulse duration, as paravenous iron deposits are composed of large molecules. But this has still to be proven.

Literature

Circumscripted pigmentations after iron injections-treatment with Q-switched laser systems.
Raulin C et al. Lasers Surg Med. 2001;28(5):456-60.
Successful treatment with 532-nm Q-switched Nd:YAG laser of cutaneous siderosis following intravenous iron extravasation.
Hammami Ghorbel H et al. J Eur Acad Dermatol Venereol. 2015 Apr;29(4):818-9.

O61. ABLATIVE LASER SURGERY FOR ALLERGIC TATTOO REACTIONS

Sebastiaan van der Bent[1], S. Huisman[1], T. Rustemeyer[1], A. Wolkerstorfer[2]

[1] Academic Tattoo Clinic Amsterdam, Department of dermatology, VU University Medical Center, Amsterdam, The Netherlands.
[2] Department of dermatology, Academic Medical Center, Amsterdam, The Netherlands.

Aim: To address the effectiveness and safety of ablative laser therapy including measurement of patient's satisfaction, in patients with allergic reactions to tattoos.

Methods: A retrospective cohort study was conducted including patients with allergic tattoo reactions who were treated with a 10600 nm ablative CO2 laser, either by full surface ablation or fractional ablation. Clinical information originated from medical files and a 25-item questionnaire.

Results: Sixteen patients were treated between September 2008 and January 2018. The median follow-up was 14 months. Of these, 15 patients (94%) achieved improvement of their symptoms. Fourteen patients completed the questionnaire. Ten patients reported to be satisfied with laser treatment. On a visual analogue scale (VAS, 0-10), pruritus and burning improved with a median of 5 and 4 points in the full surface ablation group and 3 points on both parameters in the fractional ablation group. Burden of treatment and adverse events were rated low. Treatment would be recommended to others by 87.5% (full surface ablation) and 50% (fractional ablation) of patients.

Conclusion: We conclude that CO2 laser ablation improves itching, burning and impact on daily life in tattoo allergy. Patients seem to prefer the full surface ablation above fractional ablation which may result from higher effectiveness and less treatment sessions. More evidence is needed before final recommendations can be given.

O62. SELECTION OF CANDIDATES FOR LASER TATTOO REMOVAL

Christa de Cuyper[1]

[1]*Dermatology Department of Ghent University, Belgium*

Although Q-Switched lasers are the treatment of choice for tattoo removal not all tattoos will disappear completely. It is very important to establish *realistic expectations* for every patient before starting the treatment. Correct *information* about the *limitations* of the procedure is crucial for better acceptance of sub-optimal outcomes. Even after numerous treatments some tattoo pigment may still remain. This will depend on the type of tattoo and the pigments which have been used, but also on the type of laser and laser linked parameters. The correct choice of an appropriate wavelength and laser fluence requires experience. Combination of different devices can be considered to improve the result. Pigment density and location play a role; some colors are more resistant. Moreover there is no guarantee that any treatment will restore the skin to its original condition.

Information about the *risk factors and complications* should be provided. Hypo- and hyperpigmentation is often transient but can persist.

Surinfection and textural changes should be avoided. Paradoxical darkening can occur especially in cosmetic tattoos containing iron pigments and titaniumdioxide. Gunpowder and firework tattoos risk the development of pox-like scars after Q-switched laser therapy. In tattoos with preexisting scarring, foreign body granuloma and allergic granulomatous reactions also a poor esthetic result can be expected. Alternative options can be considered (e.g. surgical excision, shaving, ablative methods).

Conclusion: Although Q-switched laser treatment is accepted as the best option for tattoo removal some patients have a higher risk of bad outcome. Patient selection and knowledge of the limitations of the devices is important to avoid dissatisfaction.

O63. HOW TO IMPROVE RESULTS OF LASER REMOVAL OF TATTOOS, NEED FOR TECHNICAL INNOVATION OR NEED FOR BETTER PRACTICE

Wolfgang Bäumler[1]

[1]*Department of Dermatology, University of Regensburg, Germany*

Decorative tattoos including permanent make-up are very popular world-wide. However, some people regret tattooing and seek for tattoo removal. Tattooed skin contains numerous solid particles of tattoo pigments. A major mechanism of tattoo removal is laser assisted fragmentation of these particles, which are then transported away from skin. For many years, Q-switched lasers with nanosecond pulse durations at high light intensities have been applied to cause such fragmentation via rapid heating up while sparing the adjacent tissue. Despite the long-lasting use of such laser treatment, the exact mechanisms of laser assisted fragmentation are hardly investigated. Due to short and intense laser pulses applied, non-linear effects of light (e.g. photoacoustic, optical breakdown) and nonlinear thermal properties in tattoo particles may play a crucial role. In the past years, lasers with even shorter pulse duration in the sub-nanosecond range were launched for tattoo removal. Theoretical considerations assumed that pulse durations shorter than nanoseconds allow even more effective fragmentation of tattoo particles. A couple of initial studies affirm the effectiveness of picosecond pulses in tattoo treatment, especially in clearing black tattoos. Furthermore, treatment with picosecond lasers seems to be less painful. Consequently, picosecond technology may be a new strategy for more effective removal of tattoo pigments at a lower rate of side effects. But there is an urgent need for more well-designed and randomized controlled trials to compare this treatment modality to the traditional nanosecond technology regarding efficacy and adverse reactions.

Poster abstracts

P1. ACCEPTABILITY, TOLERABILITY AND PERFORMANCE OF A DEXPANTHENOL WATER-IN-OIL FORMULATION IN TATTOO AFTERCARE

Sonja Trapp[1], Anna Macura-Biegun[1], Peter Kurka[1], Elena Alina Nanu[2], Rozalia Olsavszky[2]

[1]Bayer Consumer Care AG, Medical Strategy, Basel, Switzerland
[2]Eurofins Evic Product Testing Romania SRI, Bucharest, Romania

Permanent tattooing is common in Western countries with a prevalence of tattooed people ranging currently from 10% to 30%, and continuing to rise. Despite this increasingly popular trend, no official guidelines exist for tattoo aftercare instructions. Topical dexpanthenol has been used in the aftercare of new tattoos for years based on individual experience and its frequent use in dermatology and skin care. Various studies confirmed dexpanthenol's moisturizing and skin barrier enhancing potential. This investigator-blinded, prospective cosmetic study has been conducted in 54 newly tattooed adult subjects to assess the acceptability, tolerability and efficacy of a dexpanthenol-containing water-in-oil formulation after application on the tattooed skin 4-8 times daily for 14 days. The assessment of skin barrier restoration and clinical parameters was supplemented by a subject questionnaire to investigate the subjective perception, acceptance and benefits of the product application during the study period. The product performance was highly appreciated by the majority of the subjects throughout and at the end of the study with 95-98% of the participants strongly agreeing or agreeing that the applied product is suitable for the daily aftercare of tattooed skin. In addition, the acceptability of the water-in-oil formulation was very high with 93%, 98% and 96% of subjects who liked the product very much or liked it somewhat on study days 2, 7, and 14, respectively.

P2. OVERVIEW OF TATTOO COMPLICATIONS

Mitra Sepeheri[1]

[1]Department of Plastic Surgery, Herlev University Hospital, Denmark[1], Department of Dermatology and the Wound Healing Centre

Background: Numerous complications in tattoo reactions have been reported during the years, yet specific diagnostic definitions are still vague and based on histopathology that is indistinctive regarding the pathology of these reactions. Tattoo complications may be allergic, infectious, urticarial, foreign body induced etc. The pathomechanism behind determines the choice of treatment.

Aim: To introduce an overview of the broad spectrum of tattoo complications. The overview serves as a tool and a guide to treatment.

Methods: Data was collected in the "Tattoo Clinic" at the Department of Dermatology, Bispebjerg University Hospital from 2008-2015. The overview is based on extensive clinical experience and on clinical information originating from systematic patient records, including histopathology and microbiology, whenever indicated.

Results: 405 patients with 493 tattoo complications were included, supported by patient´s record, biopsy and microbiology. Clinical photos were taken to illustrate typical tattoo complications. The overview presented on the poster is illustrated with clinical photos of typical cases. The poster includes a treatment algorithm for each of the tattoo complications. The "treatment modalities" illustrates rational therapy such as surgery (especially dermatome shaving), laser treatment and medical approaches.

Conclusions: The overview of tattoo complications is based on a large patient material and covers a broad spectrum of different tattoo reactions. The classification system has been proposed to the World Health Organisation (WHO). The overview offers a treatment algorithm for evaluation and decision-making concerning tattoo complication.

Note: Two subgroups: technical and treatment hazards will be explained in detail in oral presentations; see congress programme.

P3. CAUSTIC PRODUCTS FOR TATTOO REMOVAL CAUSE SERIOUS COMPLICATIONS

Katrina Hutton Carlsen[1], Jørgen Serup[1]

[1]The "Tattoo Clinic", Dermatology Department, Bispebjerg University Hospital, Denmark

Background: The request for tattoo removal has increased parallel to the popularity of tattoos. Caustic chemical products to remove tattoos are affordable alternatives to laser treatment.

Aim: The aim was to construe patients' sequels to caustic tattoo removal products.

Methods: Patients referred to the "Tattoo Clinic" from 2013-2017 with complications after caustic tattoo removal products were included in the study, totalling 11 patients. Objective findings, burden of sequels, corrective treatments, cost of treatments and psychological aspects were studied.

Patients' assessments prior and subsequently to treatment on a Numeric Rating Scale (NRS score 1-10, 10=extremely dissatisfied) was obtained.

Results: All patients had scarring and residual tattoo pigments at the location of tattoo. Chronic itching (73%), redness (73%) and swelling (64%) were primarily reported. Patients were less satisfied with their tattoos after attempts of removal; Average NRS prior to removal was 7.5 and afterwards 8.9. Removal attempts had been performed by medical professionals (82%) and by cosmetologists (18%) using the marketed USA brands Tatt2Away and Rejuvi, installed with tattoo needles. All patients had corrective treatments (plastic surgery, laser removal, cover-up tattoos), totalling a mean amount of 1.953 EUR, not including consultations provided by the Hospital.

Conclusion: Caustic products intended for tattoo removal can cause chronic skin damage with the need for corrective interventions. The utilisation of caustic products for tattoo removal is freely allowed and hazardous therefore, restriction is necessary.

P4. COLOR REGISTRATION - NUISANCE OR BENEFIT?

Esben Hammershoy[1], Bjørn Severin[1]

[1]InkBase, Skanderborg, Denmark

Is legislation, making color registration compulsory, a good or a bad idea?

Is it possible to register colors, used on a client, in merely seconds and not minutes?

Can this exercise be turned into something useful for all involved the industry of Tattooing?

What is achievable, with data collected within the last twelve months?

P5. A RARE CASE OF B-CELL FOLLICULAR LYMPHOMA IN A SKIN TATTOO

Tammaro A[1],Luzi F[1],Iacovino C[1], Magri F[1], Chello C[1],De Marco G[1]

[1]Dermatology Department, Sapienza University, Rome, Italy

Tattoing is a widespread practice, which can be associated with several complications, including allergic reactions, lichenoid lesions, granulomatous reactions, vasculitis, pseudolymphoma and pseudo-epitheliomatous hyperplasia. Infrequently, neoplasms occurs on tattoos, such as epithelial tumors and lymphomas, which are rarely reported in the literature.

Here, we report an uncommon case of B-cell lymphoma occurring on a skin tattoo.

A 42-year old male patient was admitted in our hospital for the presence of a unique cutaneous lesion located at his trunk, specifically on his tattoo. The skin lesion appeared approximately four months before, while the tattoo was present since four years. At the physical investigation, a solitary erythematous nodular lesion was present on the tattoo. We performed an excisional biopsy with histologic evaluation of the lesion, which revealed the presence of a large B-cell follicular lymphoma (CD20+, CD79a+, Bcl6+, CD10-). The patient has undergone three cycles of CHOP chemotherapy and local radiotherapy, with complete response.

In conclusion, we presented this clinical case because of the rarity of this condition. In fact, lymphomas occurring on tattoos are extremely uncommon and rarely reported in the Literature, on the contrary to pseudo-lymphoma, which is a more frequent side effect of tattoos.

P6. INTRODUCING TATS - A NOVEL IN VITRO MODEL FOR TATTOO RESEARCH

Henrik Hering[1], Christian Zoschke[2], Markus Kühn[1], Guenther Weindl[2], Andreas Luch[1], Ines Schreiver[1]

[1]German Federal Institute for Risk Assessment, Department of Chemical and Product Safety, Berlin, Germany
[2]Free University of Berlin, Institute of Pharmacy, Berlin, Germany

During tattooing, ink is being injected into the skin, bypassing the epidermal barrier. The color giving pigments stay in the lower part of the skin, the dermis. To investigate interactions of tattoo pigments, human skin cells and possible environmental factors it is indispensable to account for the spatial arrangement of tattooed human skin. Following Russel and Burch's 3R-principle of replacement, reduction and refinement of animals used in research, we established an *in vitro* three dimensional human 'tattooed' skin model – 'TatS'.

TatS were comprised of pigments used in tattoo inks, primary human fibroblasts and keratinocytes in a bovine collagen G scaffold. After 3weeks of culture, TatS were frozen and cryosectioned. Tissue architecture was evaluated by haematoxylin and eosin staining. Immunofluorescence staining was carried out for detection of cytokeratin 10, E-cadherin, vimentin and collagen IV. Laser scanning confocal microscopy was used to ensure the absence of tattoo pigments in the epidermis. Non-pigmented skin models were used as control.

We were able to create TatS containing titanium dioxide in its anatase and rutile crystal conformation, carbon black and pigment orange 13. Tissue architecture was similar between all TatS and control. Immunofluorescence revealed similar expression of epidermal cytokeratin 10 and E-cadherin. Collagen IV as marker of the basal lamina was visible in all TatS. Pigments were not detectable in the epidermis.

In conclusion, TatS are able to reflect important parameters of tattooed human skin *in vitro* and offer the possibility to investigate tattoo related research in accordance with the 3R-principle.

P7. FINDING THE CAUSE OF TATTOO ALLERGIES - AN INTERDISCIPLINARY BRAINTEASER

Mana Kaveh[1], Lisa-Marie Eschner[1], Andreas Luch[1], Ines Schreiver[1]

[1]Bundesinstitut für Risikobewertung, Berlin, Germany

Allergic tattoo reactions are mostly associated with red tattoos and shades of red. The red colorant in the tattoo ink is composed of pigments which are practically insoluble and permanently installed in the dermis. In contrast, soluble ingredients like solvents have a different exposure scenario with fast elimination from the body. The allergic onset observed in red tattoos typically appears after months or years and therefore, is supposed to be caused by insoluble tattoo pigments which undergo metabolic-, laser- or sun-triggered breakdown, contributing as hapten formed in the dermis. Negative outcomes of patch tests in patients with culprit ink also indicate that the hapten is not directly present in the ink bottle, but formed from insoluble tattoo pigments over time. However, no tattoo-derived degradation product causing allergic reactions has been found yet. We aim to identify red tattoo pigment-derived sensitizing degradation products by using a liquid chromatography-quadrupole-time-of-flight tandem mass spectrometry (LC-qTOF-MS/MS)-based direct peptide reactivity assay (DPRA). In order to generate degradation products, the most frequently used red tattoo pigments identified in red tattoo allergy biopsies from previous investigations are metabolically processed or subjected to photochemical breakdown through UVA- and UVB-irradiation.

Author Index

Author index

Bold = Presenting author

Author index

Bold = Presenting author

Surname	First name	Abstract no.
Hammershoy	Esben	P4
Hauri	Urs	**O27**, O32
Heidemeyer	Kristine	**O60**
Hering	Henrik	**O51**, **P6**
Hesse	Bernhard	O50
Hildebrandt	Cornelia	**O25**
Hinojosa	Christopher	O34
Hofman	Mark	O45
Scherer Hofmeier	Kathrin	O32
Hohl	Christopher	**O28**
Huisman	S.	O61
Hvas	Diana	**O23**
J. Bircher	Andreas	**O32**
Jöud	Anna	O7
Kaveh	Mana	**P7**
Kierstein	Liz	**O40**
Wedel Kristensen	Mark	**O47**
Kurka	Peter	P1
Kühn	Markus	O51
La Riccia	Luana	O55
Lagrange	Adrien	O50
Lariccia	Luana	O11, O54
Larsen	Georg	**O29**, **O30**
Laumann	Anne	O39
Lavalle	Roberta	O10, O12
Lavarà	Giuseppina	**O8**
Leger	Marie	O39, **O44**
Leng	Lian	O34
Leoni	Claudia	O10, O12
Levner	Daniel	**O34**
Liberton	Niels	O45
Liszewski	Walter	**O17**, **O39**
Luch	Andreas	O50, O51
Macura-Biegun	Anna	P1
Michel	Ralph	**O13**
Teovska Mitrevska	Natasa	**O58**
Molinaro	Rita	**O19**
Murina	Andrea	O17
Mähnert	Erich	**O37**
Nielsen	Christel	**O7**
Nozdrina	Olga	O53
Oleshko	Vladimir	O53

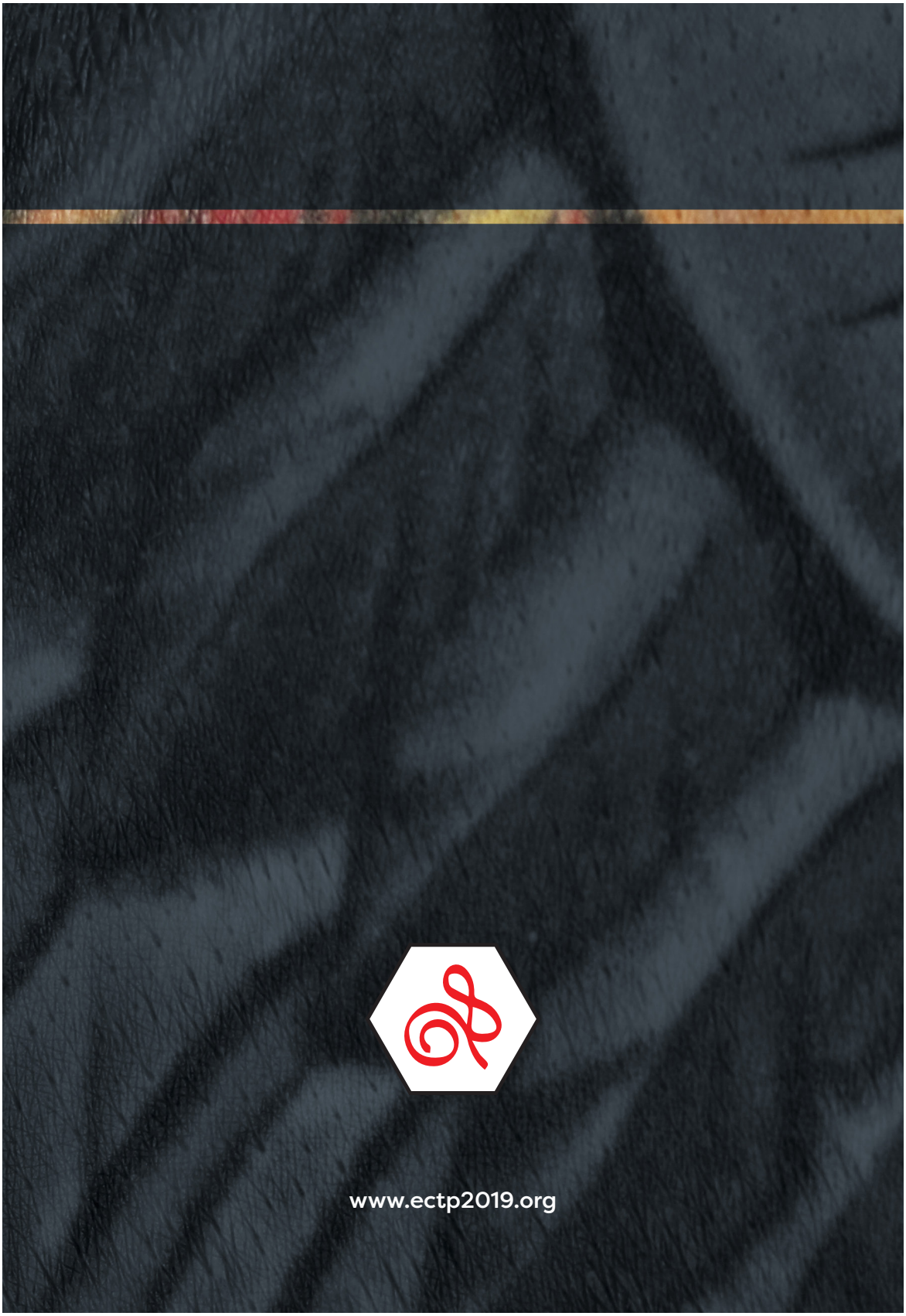
Author index

Bold = Presenting author

Notes

Notes

Find more information about ESTP on
www.estpresearch.org



www.ectp2019.org