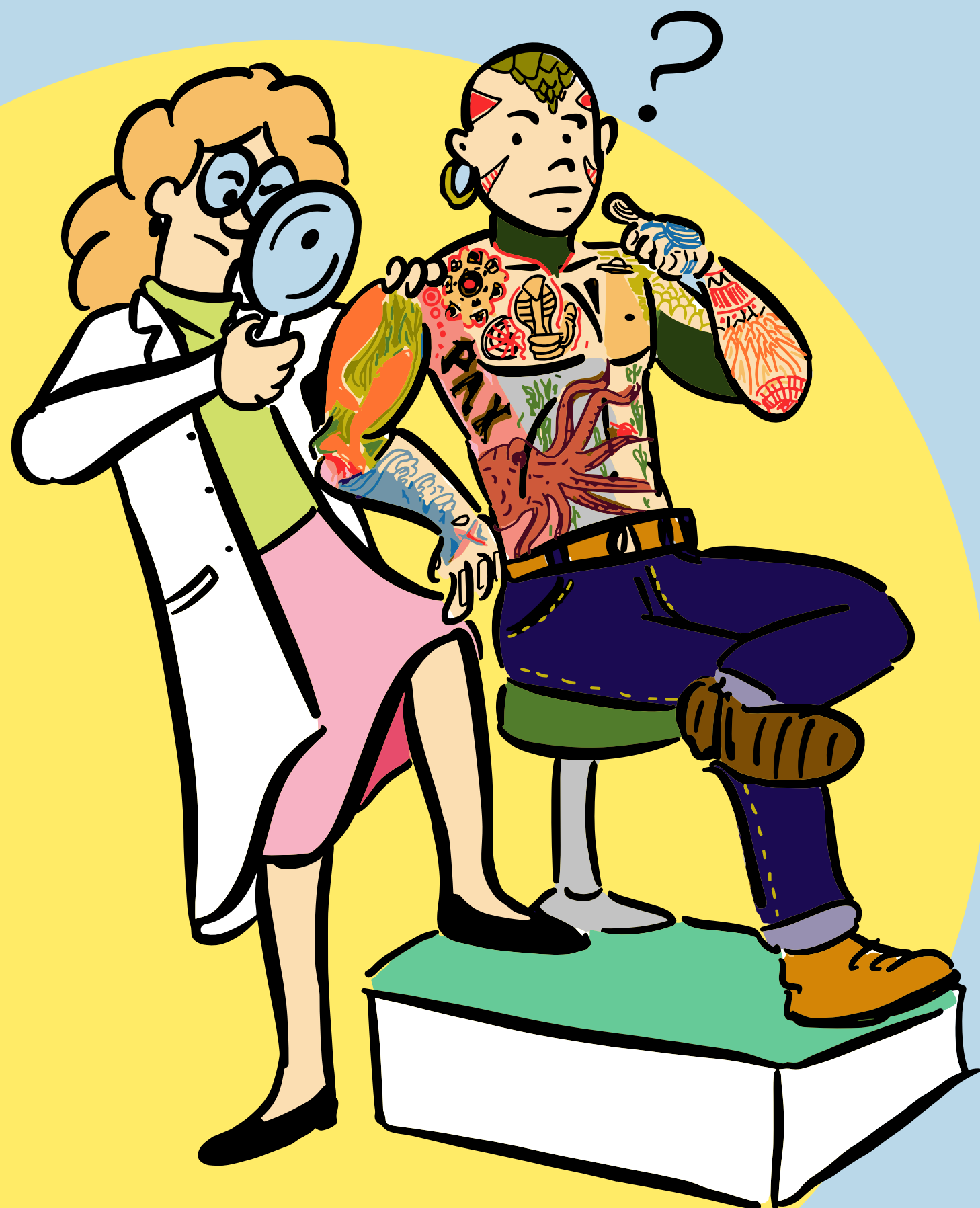


# TATTOO INKS



WHAT DOES  
SCIENCE SAY?

THE BFR SCIENCE COMIC

MANHATTAN IN THE 19TH CENTURY



ONE OF THE FIRST TATTOO STUDIOS IN THE USA BELONGED TO A GERMAN!

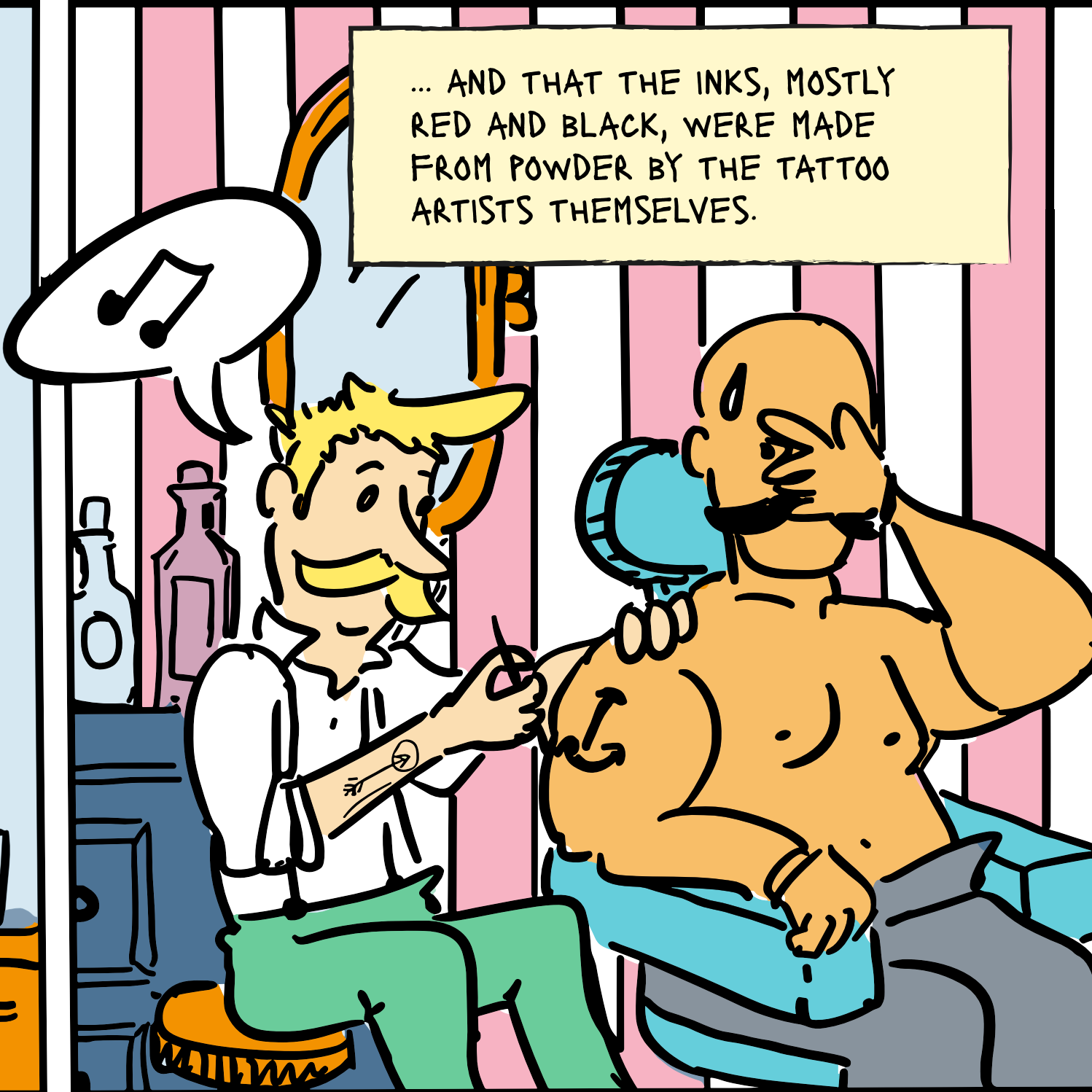
MARTIN HILDEBRANDT, NICKNAMED „OLD MARTIN“, SAILED AT SEA FOR MANY YEARS BEFORE SETTLING IN NEW YORK AROUND 1860 AND BECOMING A LEGEND AS A TATTOO ARTIST.



IT IS EVEN RUMOURED THAT BACK THEN, DURING THE TATTOOING PROCESS, ANY EXCESS BLOOD AND INK WAS WASHED OFF WITH WATER, URINE (!) OR ALCOHOL ...

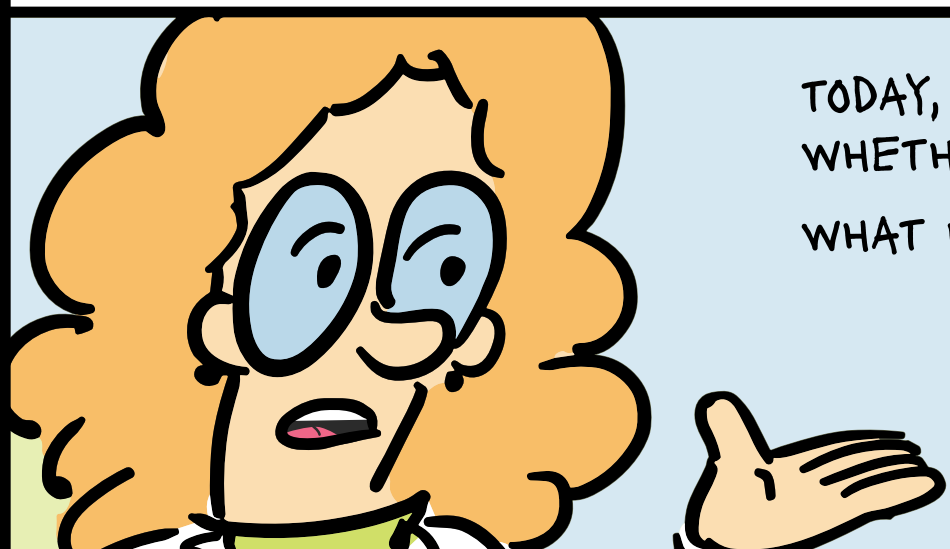


... AND THAT THE INKS, MOSTLY RED AND BLACK, WERE MADE FROM POWDER BY THE TATTOO ARTISTS THEMSELVES.



TODAY, OF COURSE, PEOPLE ARE MUCH MORE CONCERNED WITH THE QUESTION OF WHETHER TATTOO INKS CONTAIN TOXIC SUBSTANCES AND IF THEY POSE A HEALTH RISK. WHAT HAPPENS TO THE INK ONCE IT'S IN THE BODY - ARE TATTOOS HARMFUL?

WHAT DOES SCIENCE SAY?





## CLEANLINESS + HYGIENE



FIRST OF ALL, YOU SHOULD ALWAYS MAKE SURE THAT THE STUDIO IS CLEAN AND GOOD HYGIENE PRACTICES ARE USED.

JUST LIKE OTHER OPEN WOUNDS, FRESHLY TATTOOED SKIN CAN OCCASIONALLY BECOME INFECTED DUE TO POOR HYGIENE OR INKS CONTAMINATED WITH BACTERIA, VIRUSES OR FUNGI.



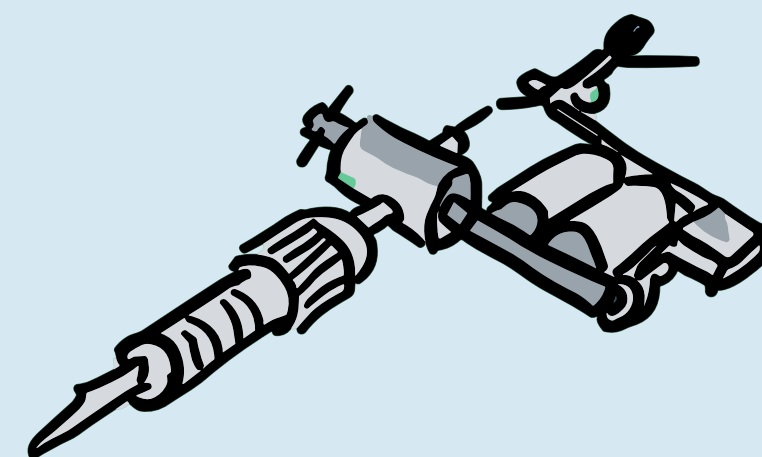
THE GREATEST UNCERTAINTY CONCERNS THE TATTOO INK ITSELF AND THE LARGE NUMBER OF SUBSTANCES USED ...

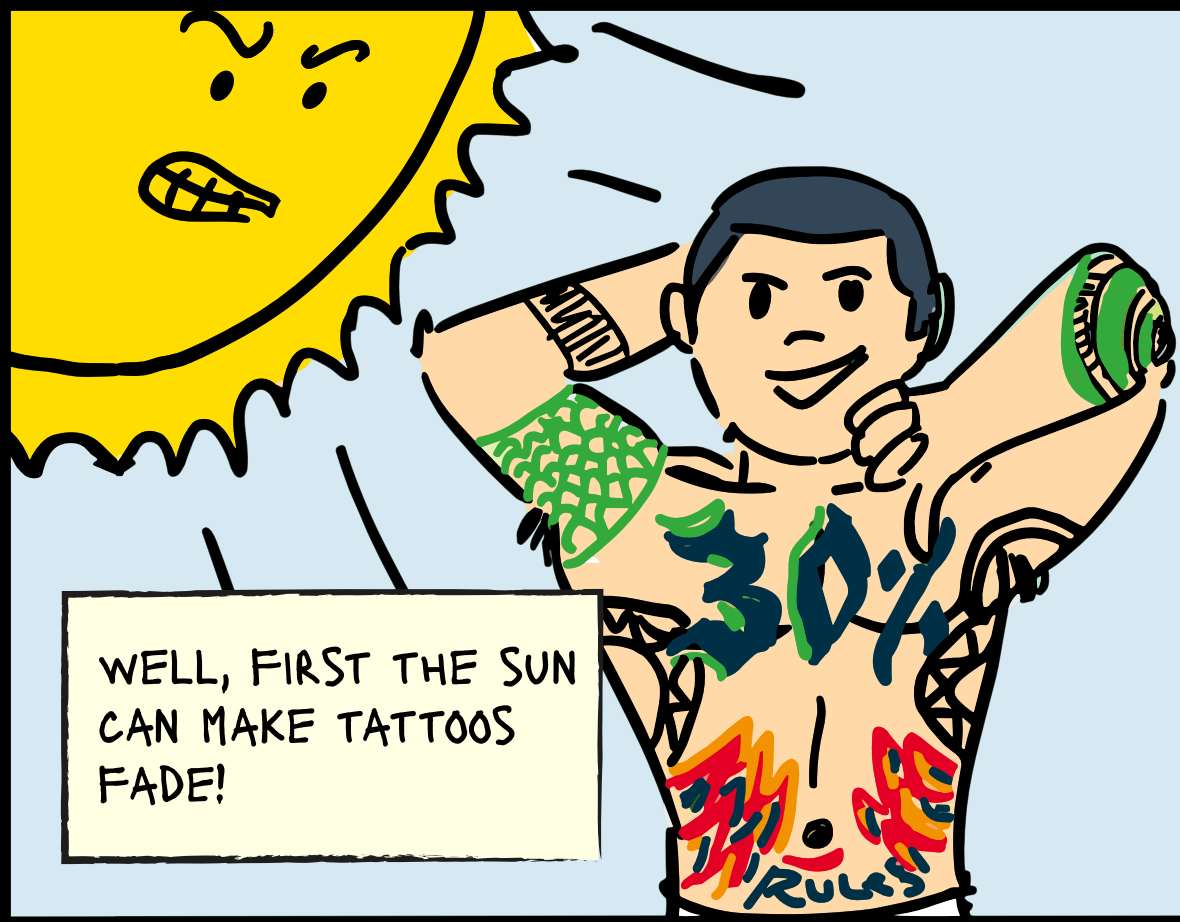


... WITH EACH ADDITIONALLY USED SUBSTANCE, IT BECOMES MORE DIFFICULT FROM A SCIENTIFIC POINT OF VIEW TO ASSESS THE HEALTH EFFECTS THAT THE AGENTS CAN CAUSE.

THEN THERE IS THE NEXT IMPORTANT QUESTION THAT RESEARCHERS ARE EXAMINING;

WHERE DO THE INK PIGMENTS MIGRATE TO IN THE BODY?





WELL, FIRST THE SUN CAN MAKE TATTOOS FADE!

... IT'S KNOWN THAT UP TO 30% OF THE PIGMENTS CAN DISAPPEAR FROM THE SKIN ...

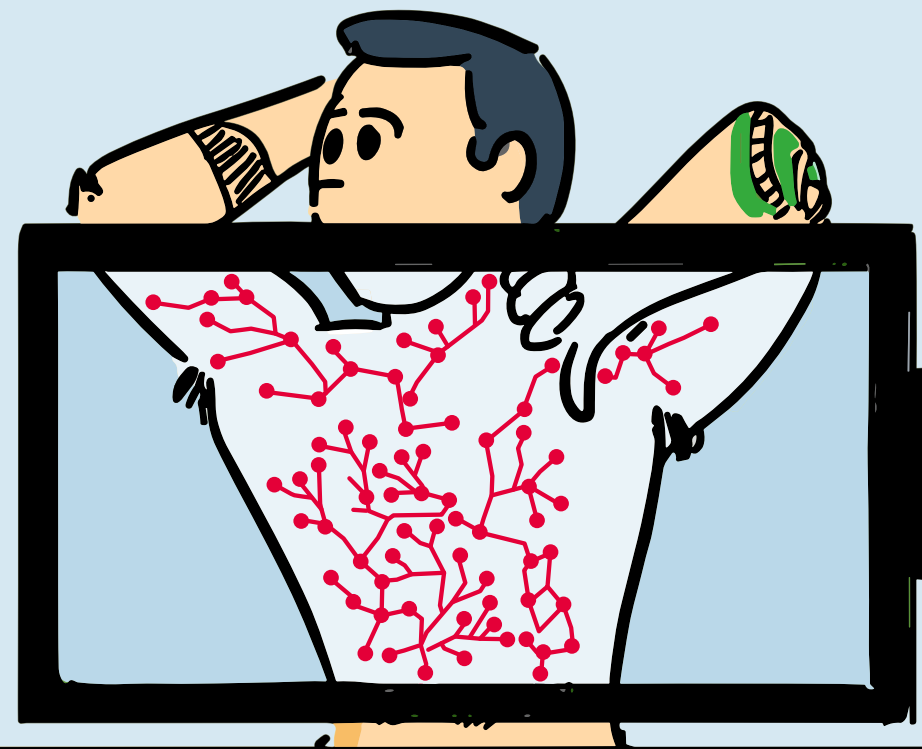
# BUT WHERE DO THEY GO?

WHAT HAPPENS TO THE PIGMENTS UNDER THE SKIN?



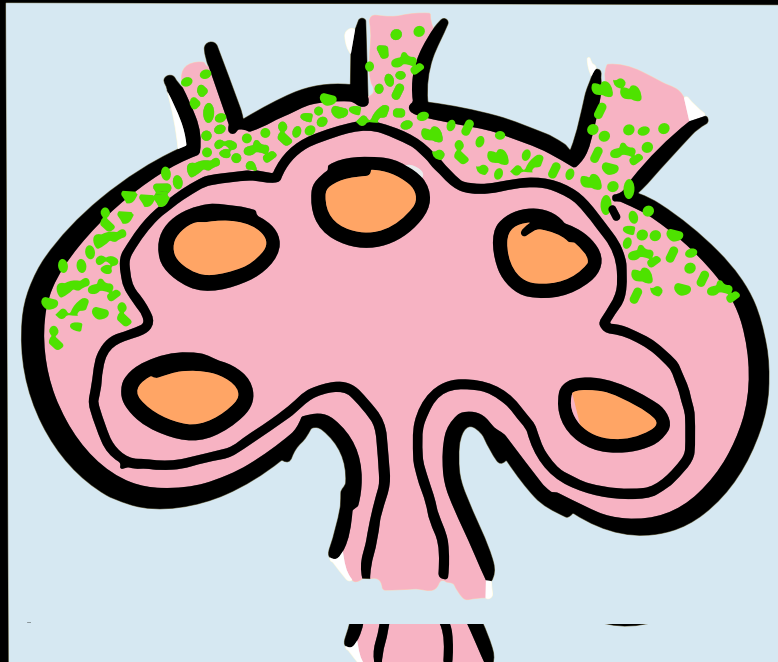
TO STUDY THIS, THE BFR RECEIVED SKIN AND TISSUE SAMPLES FROM DECEASED PERSONS WITH TATTOOS FROM ITS FORENSIC MEDICINE PARTNERS IN MUNICH FOR RESEARCH PURPOSES.

AND THE RESEARCHERS DETERMINED THAT A MAJORITY OF THE PIGMENTS ACCUMULATE IN THE LYMPH NODES.

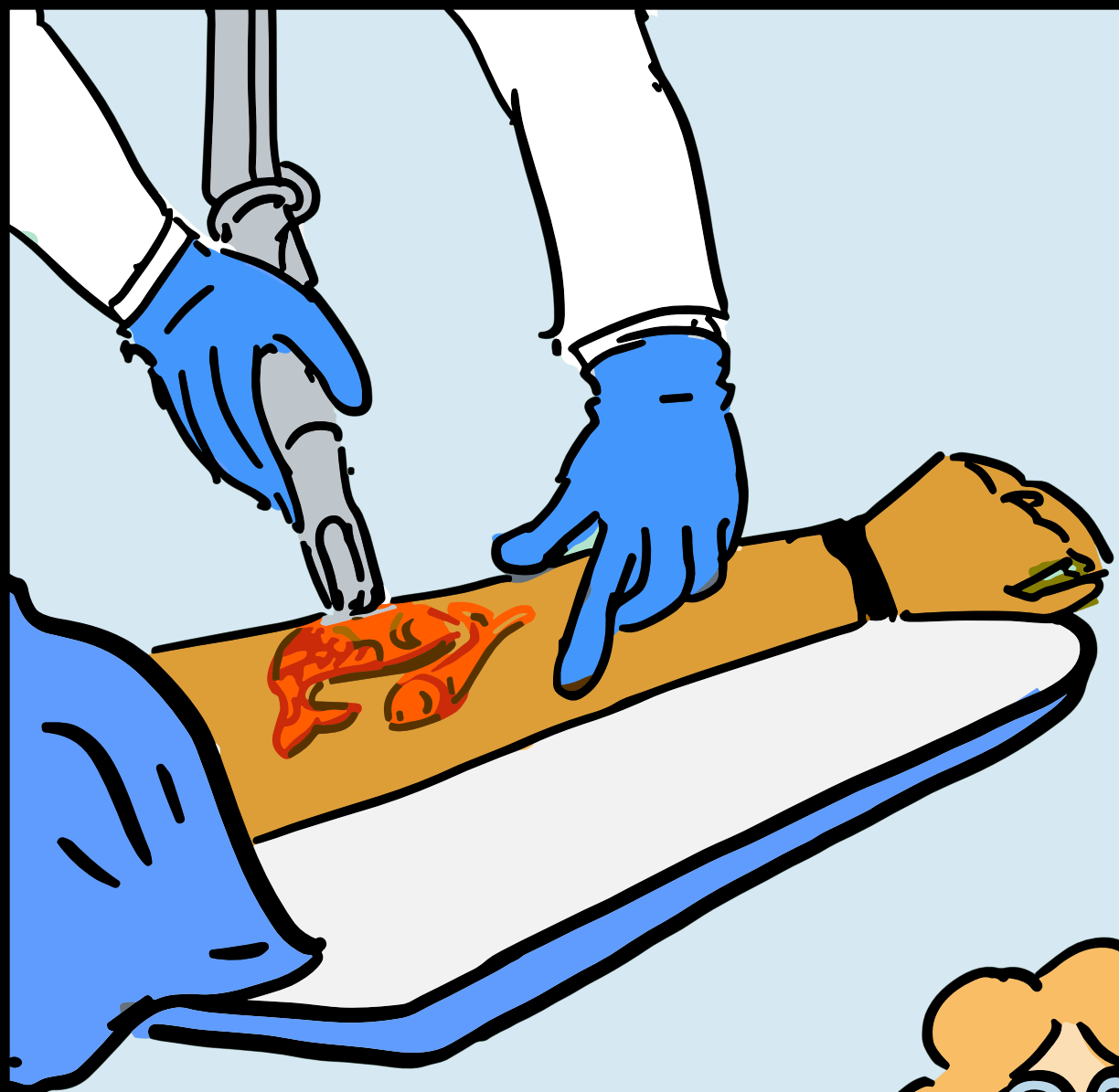


LYMPH NODES ARE ORGANS OF THE IMMUNE SYSTEM THAT HELP FIGHT AGAINST INFECTIONS AND DISEASES.

DURING WOUND-HEALING PROCESSES, COLOUR PIGMENTS ARE TRANSPORTED FROM THE SKIN TO THE LYMPHATIC FLUID - ENDING UP IN THE LYMPH NODES.

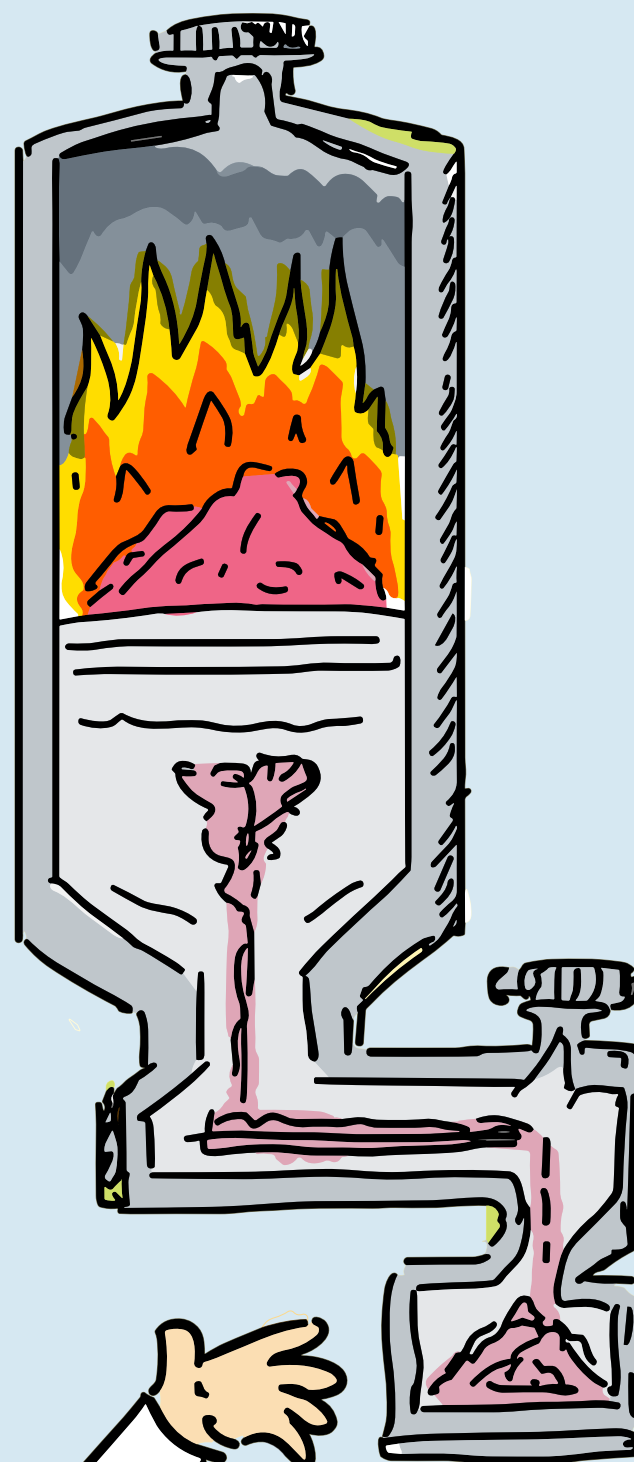


COLOUR PIGMENTS MIGRATE IN THE BODY - NANOPARTICLES IN PARTICULAR ARE VERY MOBILE



DURING THE LASERING, INTENSE HEAT BUILDS THAT LEADS TO DECOMPOSITION OF THE PIGMENTS.

PYR O L Y S I S



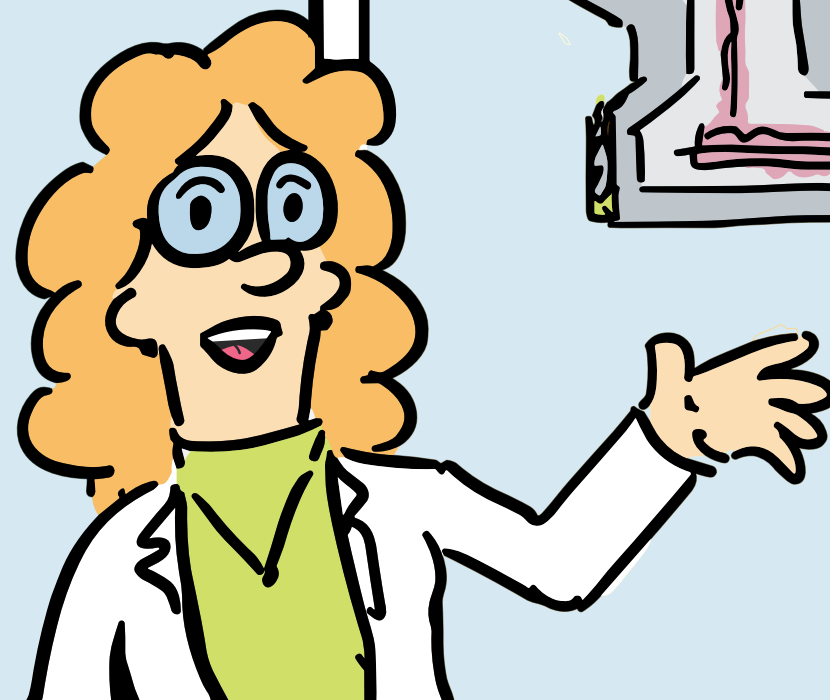
## ANOTHER HEALTH RISK; TATTOO REMOVAL BY LASER

THE BFR DEVELOPED A METHOD TO SIMULATE THIS PROCESS.

THE PIGMENT POWDER IS HEATED THROUGH PYROLYSIS TO 800 DEGREES CELSIUS.

THE RESULTING SUBSTANCES CAN THEN BE IDENTIFIED AND CLASSIFIED TOXICOLOGICALLY.

HYDROGEN CYANIDE, BENZENE AND OTHER SUBSTANCES ARE PRODUCED;  
- SUBSTANCES WITH A HIGH TOXIC POTENTIAL.

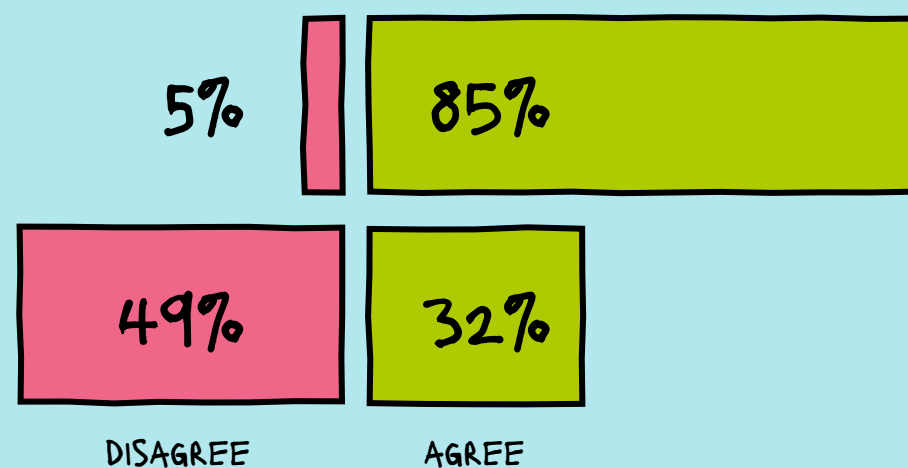


## RISK PERCEPTION

DUE TO THE EXTENSIVE INFORMATION KNOWN ABOUT TATTOOS NOWADAYS, RISK PERCEPTION IS AN INTERESTING BFR TOPIC;

TATTOO INKS CAN TRIGGER ALLERGIES.

THE COMPONENTS OF TATTOO INKS REMAIN COMPLETELY IN THE TATTOOED PART OF THE SKIN.\*

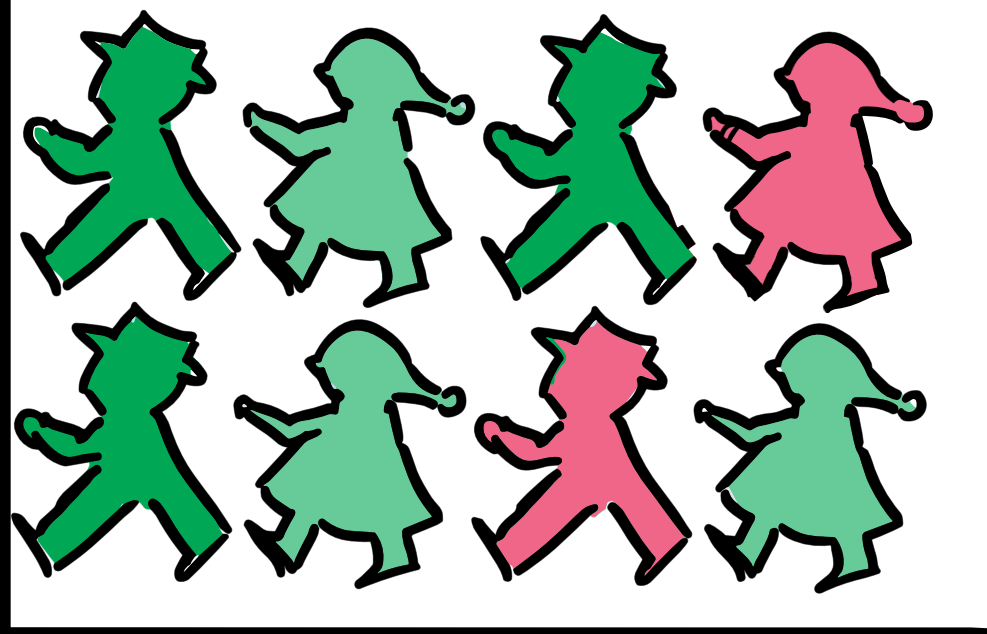


SOURCE:  
1,009 RESPONDENTS  
BFR CONSUMER MONITOR 2018, SPECIAL TATTOOS  
TOTAL LESS THAN 100% DUE TO: "DON'T KNOW" RESPONSES OR NO ANSWER  
\*STATEMENT THAT IS SCIENTIFICALLY INCORRECT

+++ +++ +++

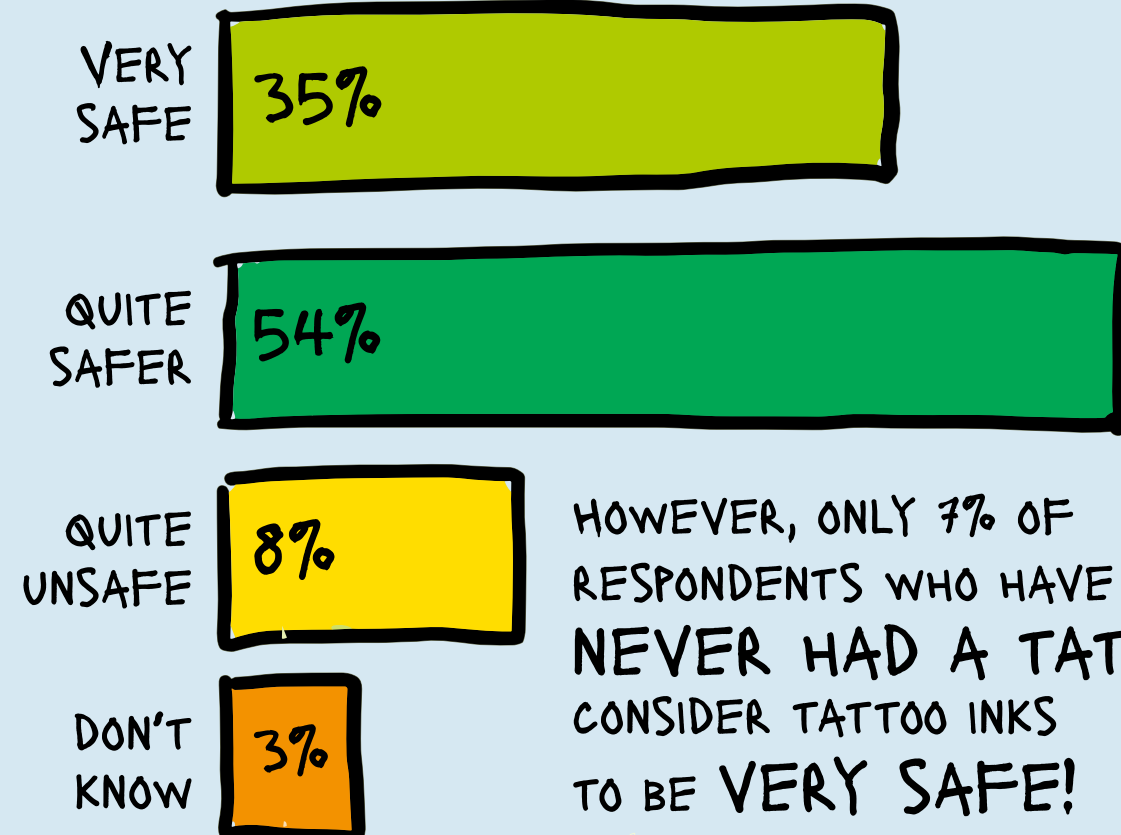
# BFR SURVEY

NUMBER OF TATTOOED PEOPLE AGED 25 TO 34;



ONE IN SIX GERMANS HAS A TATTOO – IN THE 25-34 AGE GROUP, THIS FIGURE RISES TO ONE IN FOUR.

HOW SAFE OR UNSAFE ARE THE INKS USED FOR TATTOOING IN GERMANY IN THE OPINION OF RESPONDENTS WHO CURRENTLY HAVE OR USED TO HAVE A TATTOO?



HOWEVER, ONLY 7% OF RESPONDENTS WHO HAVE NEVER HAD A TATTOO CONSIDER TATTOO INKS TO BE VERY SAFE!

SOURCE: 1,001 RESPONDENTS BFR CONSUMER MONITOR 2018, SPECIAL TATTOOS

AS OF JANUARY 2022, THE USE OF CERTAIN SUBSTANCES USED IN TATTOO INKS AND PERMANENT MAKEUP HAS BEEN RESTRICTED IN THE EUROPEAN UNION.

FOR EXAMPLE, PIGMENT MIXTURES MUST INCLUDE INFORMATION SUCH AS A REFERENCE NUMBER TO CLEARLY IDENTIFY THE BATCH THEY BELONG TO AS WELL AS A LIST OF INGREDIENTS.

CARCINOGENIC SUBSTANCES, ALLERGIES, INFECTIONS – A WIDE RANGE OF HEALTH RISKS ARE BEING DISCUSSED IN CONNECTION WITH TATTOO INKS.

EVERY CONSUMER SHOULD BE AWARE THAT GETTING A TATTOO IS ASSOCIATED WITH A HEALTH RISK.

MORE INFORMATION;  
[WWW.BFR.BUND.DE/EN](http://WWW.BFR.BUND.DE/EN)

This text version is a translation of the original German text which is the only legally binding version.



## Legal notice

Publisher:  
**German Federal Institute for  
Risk Assessment**

Max-Dohrn-Straße 8-10  
10589 Berlin, Germany  
T +49 30 18412-0  
F +49 30 18412-99099  
bfr@bfr.bund.de  
bfr.bund.de/en

Institution under public law  
Represented by the president Professor Dr Dr Dr h.c. Andreas Hensel  
Supervisory Authority: Federal Ministry of Food and Agriculture  
VAT ID No. DE 165 893 448  
Responsible according to the German Press Law: Dr Suzan Fiack



**BfR** | Identifying Risks –  
Protecting Health