

Network

Led by Maastricht University, CapCell brings together **13 partners from 8 European countries**, including universities, forensic institutes, companies, and police forces, to jointly develop, validate, and implement the proposed innovations in real forensic environments.

Maastricht University

KU LEUVEN

INSTITUTO DE INVESTIGAÇÃO E INOVAÇÃO EM SAÚDE UNIVERSIDADE DO PORTO

MEDIZINISCHE UNIVERSITÄT INNSBRUCK

Netherlands Forensic Institute Ministry of Justice and Security

SEBTI KOMTUEKSPERTISI INSTITUT

Politsei- ja Piirivalveamet

Bundesministerium Inneres

Copan innovating together

NimaGen.

voxdale

accelopment

EDNAP

 
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CapCell



Innovative forensic trace investigation

via microfluidics and single-cell genomics

 **Funded by the European Union**

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Challenge

CapCell addresses one of the greatest challenges in forensic science: the interpretation of mixed DNA evidence. Sexual violence is widespread in Europe and disproportionately affects women and girls. In many sexual assault cases, traces contain biological material from both victim and perpetrator(s), making it difficult to extract a single, usable DNA profile from the perpetrator(s).



women in the EU have experienced physical or sexual violence

Project facts



4 years



€4.5 million budget



13 partners



Coordinator: Maastricht University

Objectives

Through innovative microfluidic devices and single-cell sequencing technologies, CapCell will make it possible to **capture, isolate and analyse individual cells** from these complex mixtures, ensuring more accurate and legally sound evidence. CapCell's objective is to revolutionise forensic DNA analysis to deliver more justice for victims of sexual violence and assault.



Revolutionised Forensic DNA Profiling

New approaches for investigating complex mixed biological traces from sexual violence cases



Innovative Modular Prototype Toolkit

10 validated and implemented tools based on microfluidics and single-cell genomics



One male cell, one DNA profile

Automated, AI-based and more precise human identification across Europe

Innovations



Novel collection devices and protocols for postcoital swabs and trace evidence to maximise intact cell recovery and transfer



Microfluidics systems (MicroLyseFX and MicroSortFX) for the selection and isolation of sperm and male nucleated cells



New single-cell DNA sequencing tools using capillary electrophoresis, massively parallel sequencing, and long-read sequencing



Integrated analysis and interpretation tools including machine-learning-based automation for forensic data processing



A validated modular CapCell toolkit implemented and demonstrated in operational forensic environments