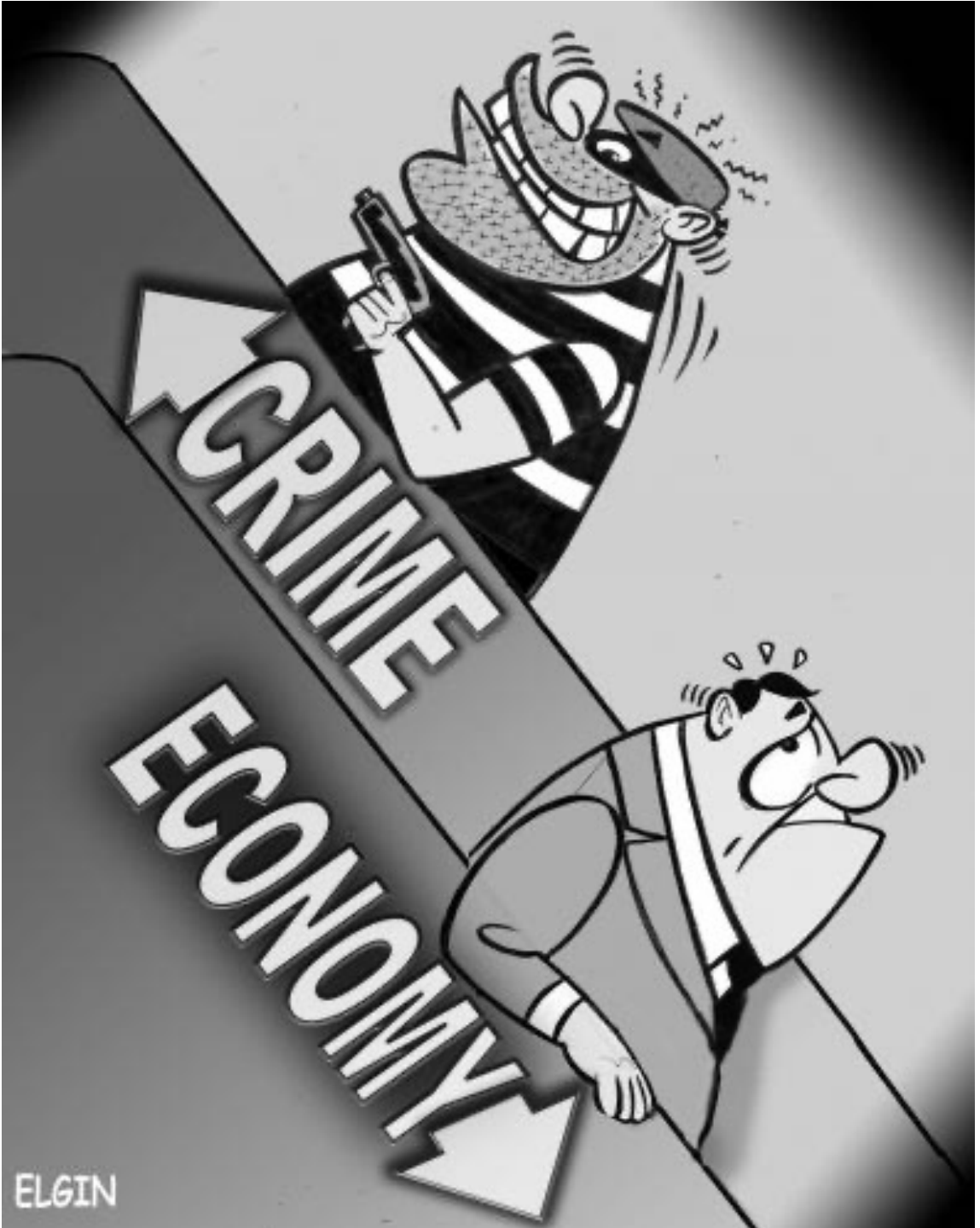
Prof.dr.sc Dragan Primorac

STRATEGIJA RAZVOJA PRIMJENJENE GENOMIKE U HRVATSKOJ

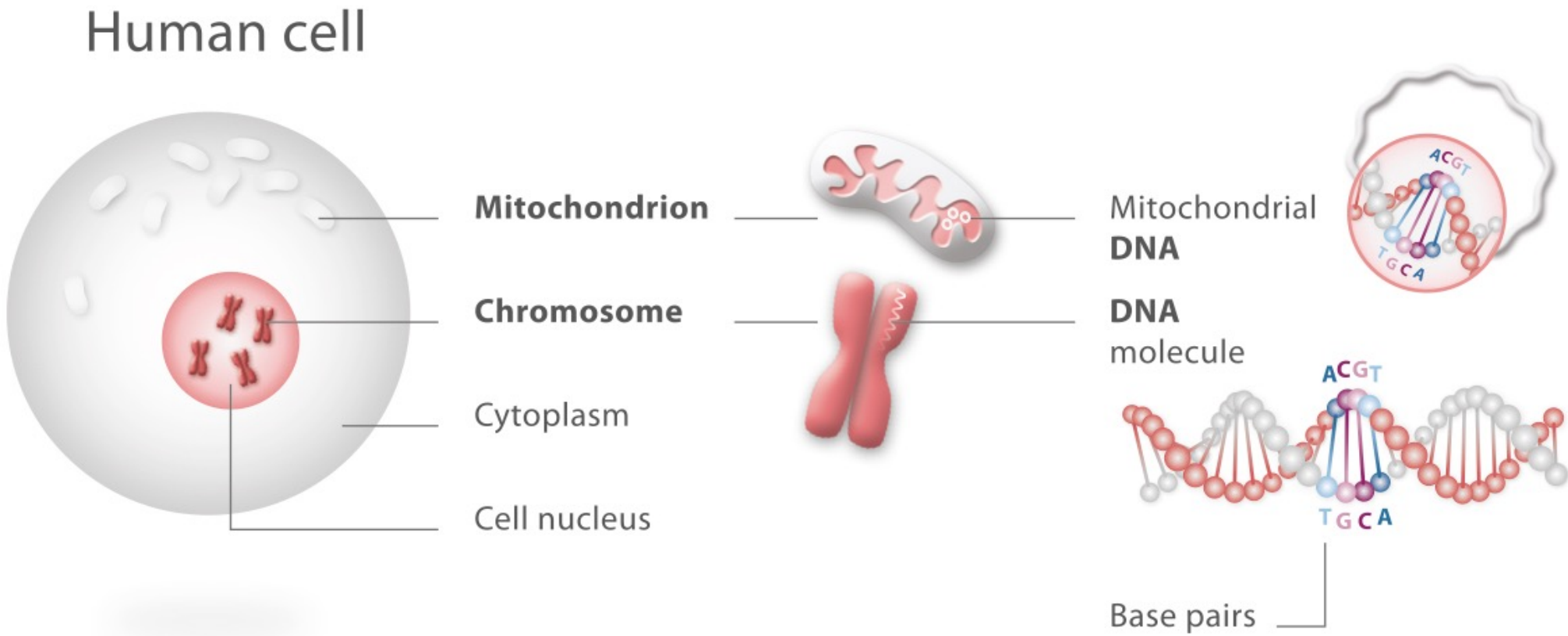
FORENZIČKA GENOMIKA



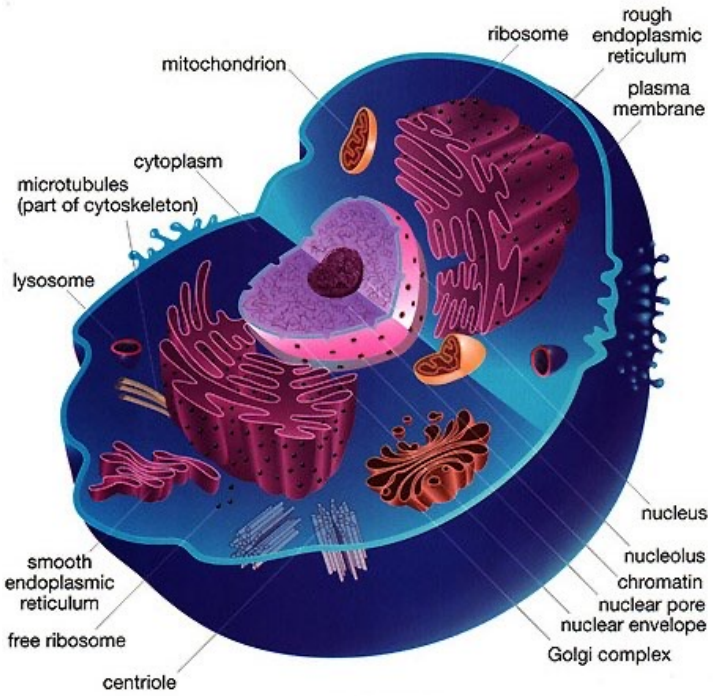
"EVIDENCE-BASED SCIENCE (FORENSICS)"

ABSENCE OF EVIDENCE IS NOT EVIDENCE OF ABSENCE

ANALIZA HUMANE DNA



Primorac and Schanfield. Forensic DNA Application: An Interdisciplinary perspective. CRC Press, 2014.

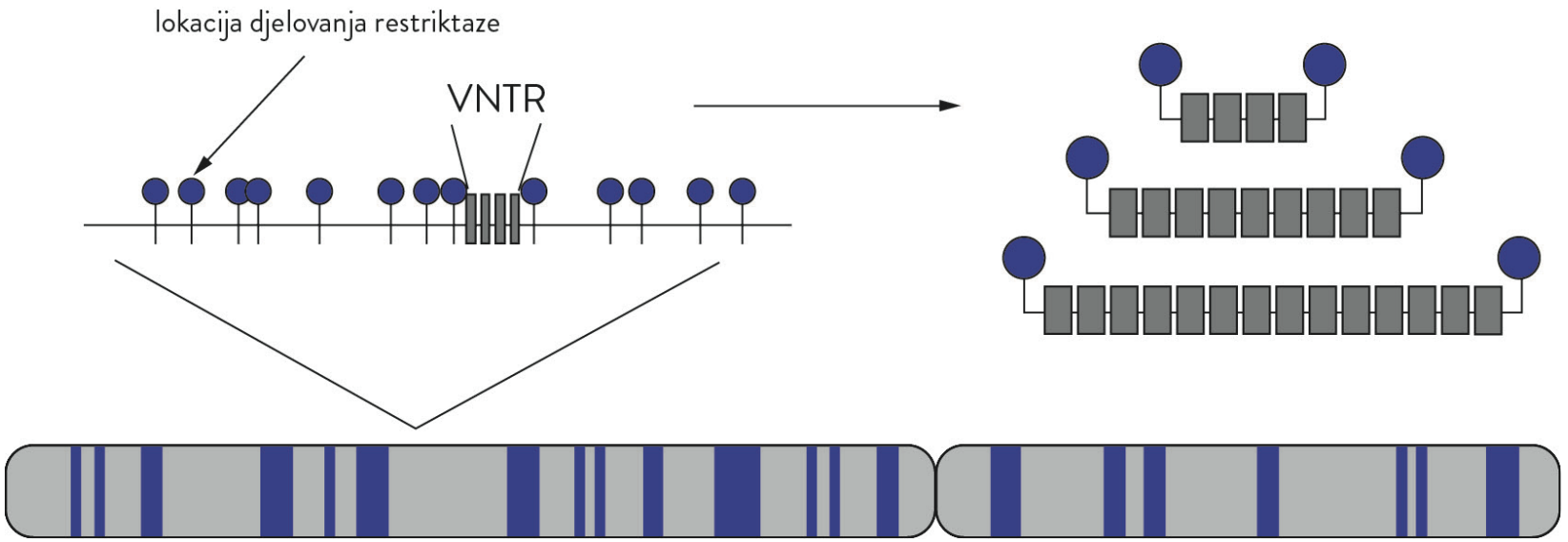


For a human diploid cell, the amount of DNA per cell is 6 pg

1 pg = 978 Mb*

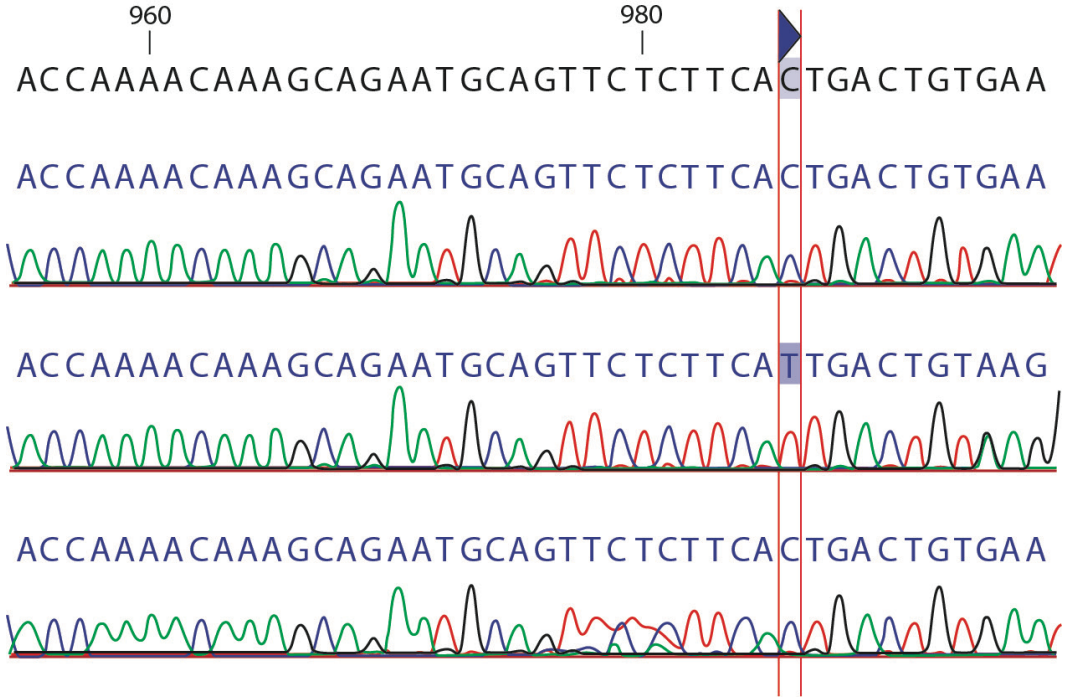
Since the entire human genome (haploid) is 3 000 Mb, all together in one human diploide cell there is 3 pg of DNA per haploid genome or 6 pg per the entire genom (diploid).

*Dolezel J, Bartoš J, Voglmayr H, Greilhuber J (2003). "Nuclear DNA content and genome size of trout and human". *Cytometry A* **51** (2): 127–128.



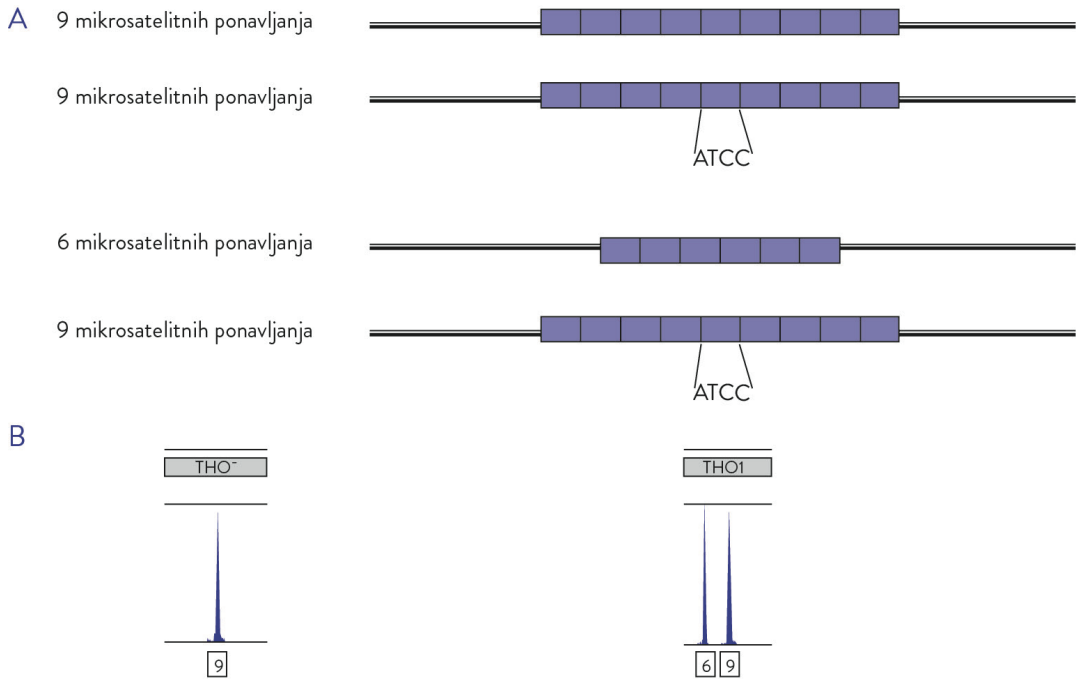
Shematski prikaz VNTR biljega

Primorac D, Marjanović D, Škaro V, Projić P, Džijan S. Topić E, Primorac D, Janković S, Štefanović M, Forenizička analiza DNA.
(Ur: Topić E, Primorac D, Janković S, Štefanović M. 3., dopunjeno izdanje. Zagreb: Medicinska naklada; 2024.

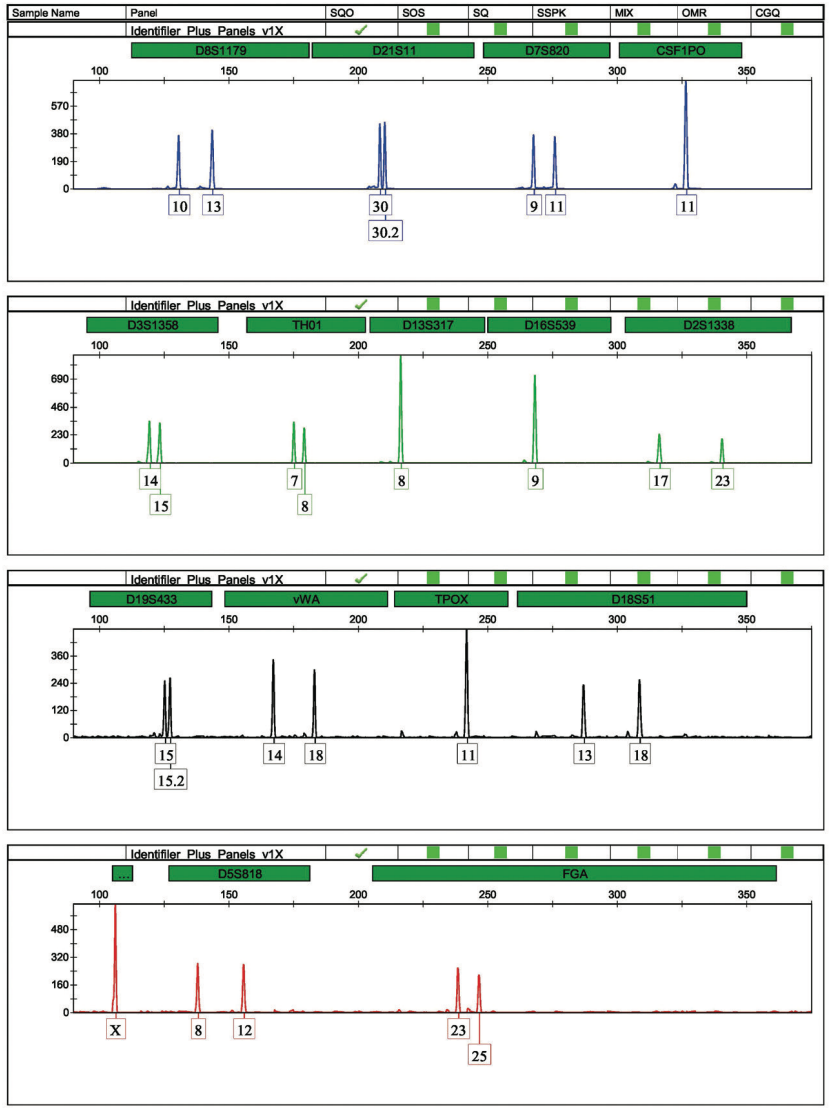


Shematski prikaz SNP biljega

Primorac D, Marjanović D, Škaro V, Projić P, Džijan S. Topić E, Primorac D, Janković S, Štefanović M, Forenizička analiza DNA. (Ur: Topić E, Primorac D, Janković S, Štefanović M. 2., dopunjeno izdanje. Zagreb: Medicinska naklada; 2018.



Shematski prikaz STR biljega



Prikaz rezultata AmpFLSTR® Identifiler® Plus PCR Amplification sustava.

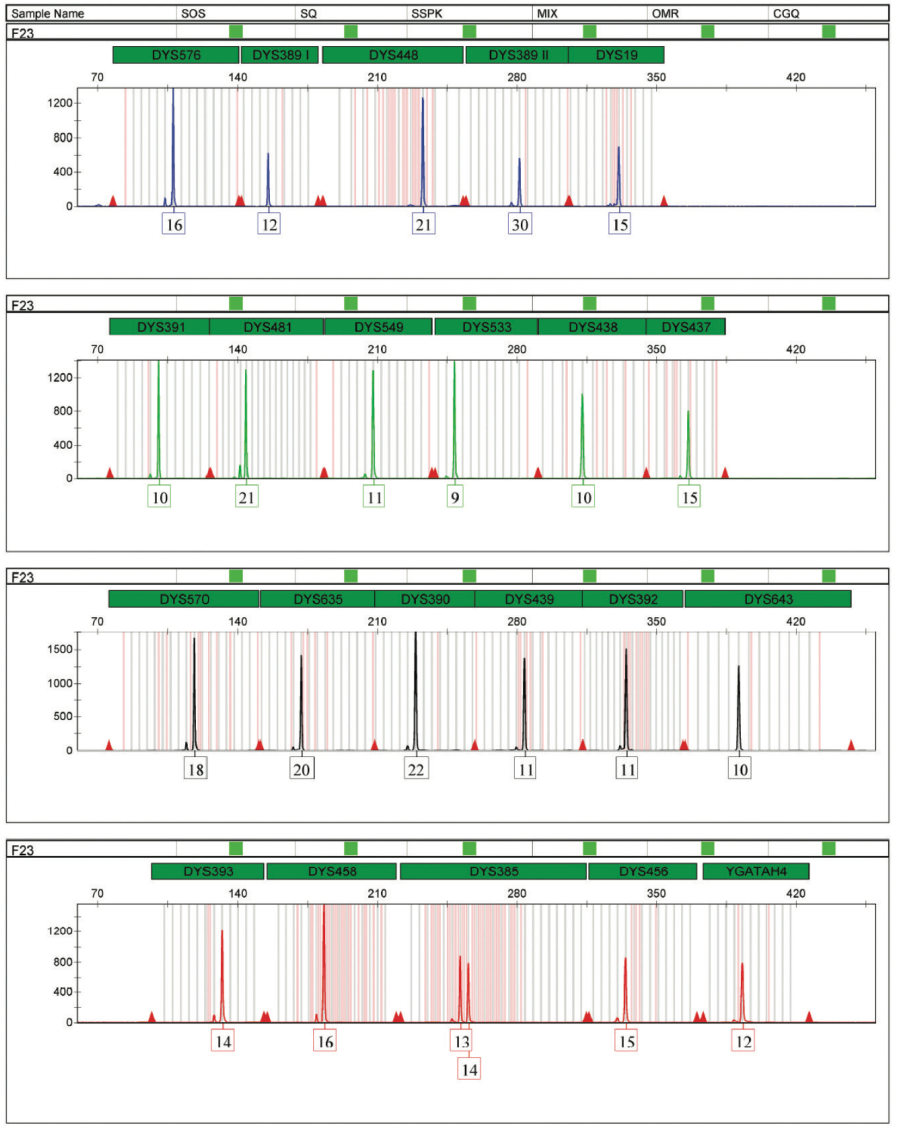
Primorac D, Marjanović D, Škaro V, Projić P, Džijan S. Topić E, Primorac D, Janković S, Štefanović M, Forenizička analiza DNA. (Ur: Topić E, Primorac D, Janković S, Štefanović M. 2., dopunjeno izdanje. Zagreb: Medicinska naklada; 2018.

Analiza genskih biljega na Y kromosomu

Njegov veći dio (oko 95 %) ne podliježe homolognoj rekombinaciji tijekom mejoze - nerekombinirajući dio Y-kromosoma (engl. *non-recombining region of the Y chromosome*, NRY).

Samo se 5 % Y-kromosoma potencijalno može rekombinirati s X-kromosomom i ta regija se naziva pseudoautosomnom regijom X i Y-kromosoma.

Primjena Y-kromosoma u forenzičkoj znanosti može značajno pomoći u rješavanju slučajeva kao što su prenatalno testiranja očinstva (ukoliko potencijalni očevi nisu u srodstvu putem muške linije), postupak identifikacije i testiranje srodstva po muškoj liniji u slučajevima kad drugačiji tip analize nije moguć, silovanje (posebice kada je uključeno više muškaraca), studije migracija stanovništva i evolucijske studije.



Y-STR profil generiran primjenom seta reagencija PowerPlex Y23 (Promega).

Primorac D, Marjanović D, Škaro V, Projić P, Džijan S. Topić E, Primorac D, Janković S, Štefanović M, Forenizička analiza DNA.
(Ur: Topić E, Primorac D, Janković S, Štefanović M. 3., dopunjeno izdanje. Zagreb: Medicinska naklada; 2024.

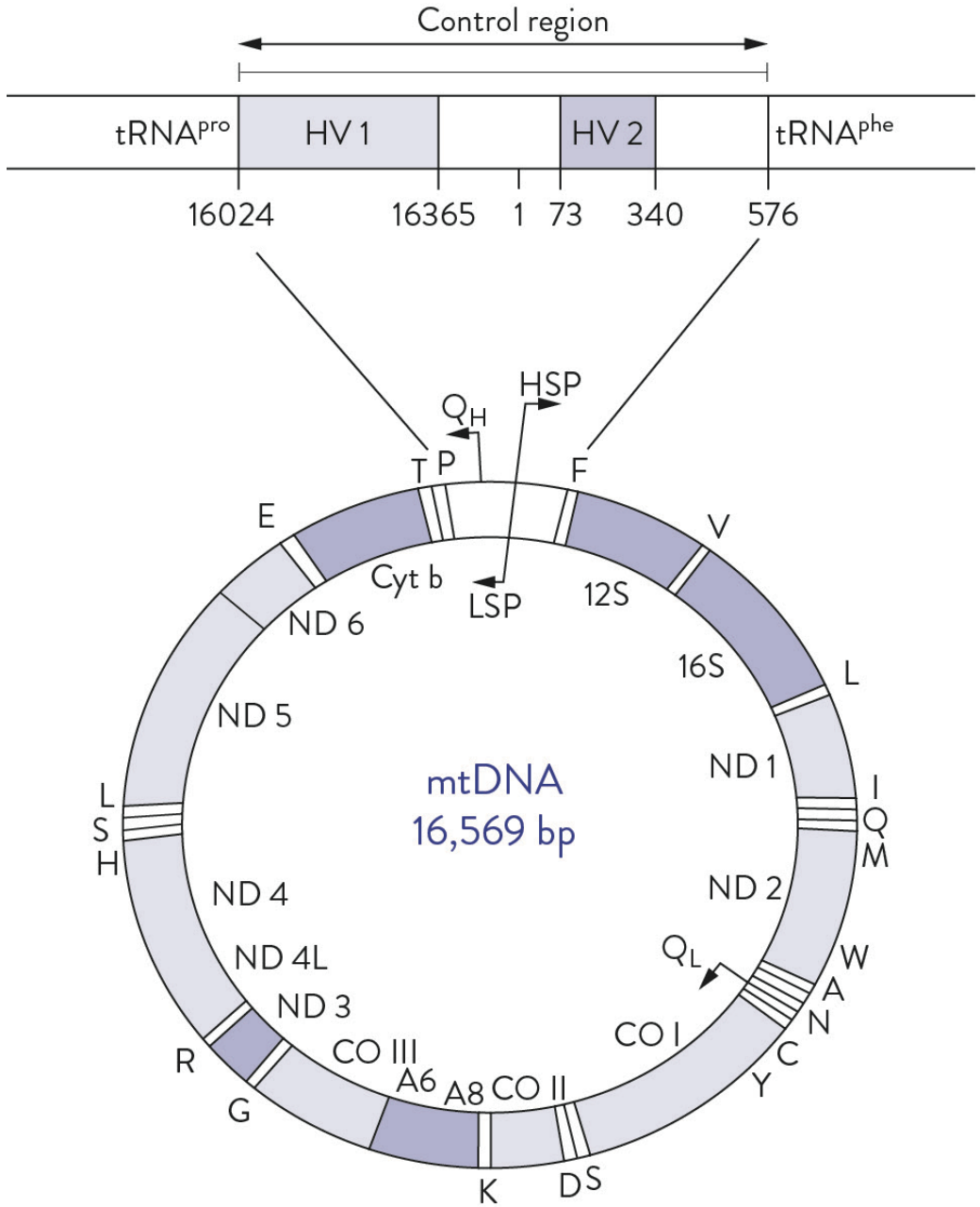
Analiza genskih biljega na X kromosomu

Za X-STR biljege najznačajniji multipleksni sustav koji se primjenjuje je Investigator® Argus X-12 (Qiagen), koji uključuje 12 X-STR biljega (DXS8378, DS10135, DXS10148, DXS7132, DXS10074, DXS10079, HPRTB, DXS10101, DXS10103, DXS7423, DXS10134, DXS10146).

Primorac D, Marjanović D, Škaro V, Projić P, Džijan S. Topić E, Primorac D, Janković S, Štefanović M, Forenizička analiza DNA. (Ur: Topić E, Primorac D, Janković S, Štefanović M. 3., dopunjeno izdanje. Zagreb: Medicinska naklada; 2024.

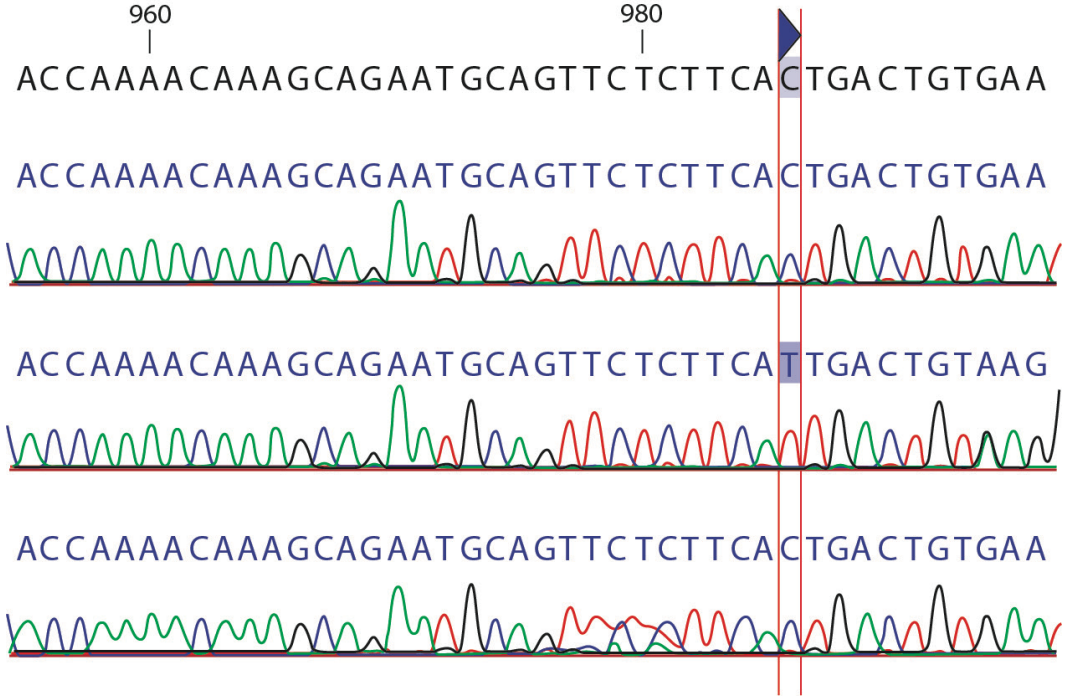
ANALIZA mt DNA

Mt DNA



- Nasljeđivanje putem majčine linije
- Slabija snaga diskriminacije
- Heteroplazmija

Primarno područje mtDNA, od interesa za forenzičku analizu, jest kontrolna regija koja nema kodirajuću funkciju. Unutar te regije su hipervarijabilna regija I (HVI) i hipervarijabilna regija II (HVII) koje su bogate polimorfizmima



Primorac D, Marjanović D, Škaro V, Projić P, Džijan S. Topić E, Primorac D, Janković S, Štefanović M, Forenizička analiza DNA.
(Ur: Topić E, Primorac D, Janković S, Štefanović M. 3., dopunjeno izdanje. Zagreb: Medicinska naklada; 2024.

METODOLOGIJE KOJE TREBA SUSTAVNO INTEGRIRATI U FORENZIČKOJ GENETICI

- Sekvenciranja nove generacije (engl. Next-generation sequencing) s naglaskom na cijelogenomsku analizu,
- Brze (rapidne) DNA tehnologije,
- mtDNA tehnika linearnih tračica sa svrhom brze analize informativnih polimorfizama u cjelokupnom mitohondrijskom genomu u svrhu forenzičkih vještačenja.

POSTUPCI KOJE TREBA SUSTAVNO INTEGRIRATI U FORENZIČKU GENETIKU

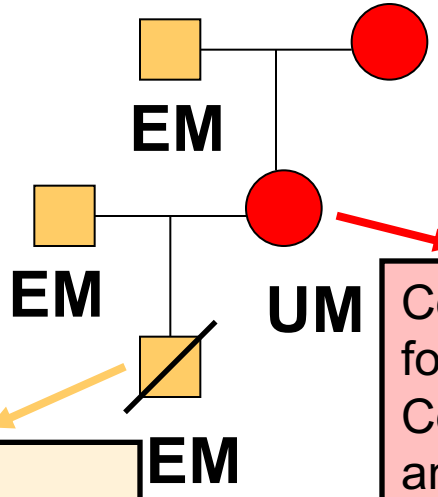
1.Forenzička identifikacija tkiva analizom nukleinskih kiselina,
2.DNA fenotipizacija,
3.Molekularna obdukcija,
4.Utvrđivanje starosti biološkog traga,
5.Forenzičke analiza RNA,
6.Forenzičke analiza biljne DNA,
7.Forenzičke analiza životinjske DNA,
8.Forenzička analiza DNA kukaca,
9.Farmakogenomika,
10.Brze rapidne detekcije mikroorganizama

NEKOLIKO PRIMJERA

FARMAKOGENOMSKA ANALIZA U FORENZICI

MORPHINE POISONING IN A BREASFED NEONATE

- Genetics for cytochrome P450 2D6 (CYP2D6), the enzyme catalysing the O-demethylation of codeine to morphine.
- Mother: was heterozygous for a CYP2D6*2A allele with CP2D6*2x2 gene duplication, classified as an **ultra-rapid metabolizer (UM)**
- Grandfather, husband, son: CYP2D6*1/*2 (EM)



Consistent with increased formation of morphine from Codeine and with somnolence and constipation

Clinical picture and laboratory test are consistant with death due to morphine intoxication

Koren G, et al. The Lancet. 2006;368:704-704

Personalized medicine is an important topic in today's health care. Adjusting the dose of frequently prescribes medicines to the genetic profile of patients is a tool which is nowadays available: pharmacogenetics. Yet, it is not always clear how this genetic information can be used in health care settings. Or for which drugs this information can be helpful. The current book "Pharmacogenetics in Clinical Practice" by Dragan Primorac and Wolfgang Höppner excellently provides this information in a clear and accessible manner. In 210 pages, an overview of 55 drugs, their important gene-drug interactions are presented, including background, genes involved, test descriptions, indications for using pharmacogenetic testing, and the consequences of test results. It is especially the included tables with specific dose recommendations based on genotype that make this book an essential tool for every health care practisioner who want to achieve optimal and safe drug treatment of their patients. Highly recommended.

Professor Ron van Schaik, Ph.D.
Erasmus University Medical Center, The Netherlands

Modern medicine is unthinkable without modern drugs. Pharmacogenetics is lifting their clinical use to new levels of efficacy and safety. This book delivers the basis of personalized medicine for them – it has been of great significance for me personally. Clinical medicine of the future will strongly depend on knowledgable physicians capable of applying pharmacogenetics to the benefit of their patients. This book serves as an outstanding tool to, provide the essentials of pharmacogenomics for all clinicians.

Prof. Johannes Brachmann, M.D., Ph.D.,
Medical School REGIOMED, Coburg, Germany

For those keen on bringing pharmacogenomics into their daily clinical practice, this book is sure to serve as a reliable and informative resource. I highly recommend this publication to physicians, pharmacists, nurses, and other healthcare providers who are committed to bringing personalized medicine to their patients' bedside. It quickly became one of the most frequent resources to consult in my pharmacogenomics practice because it is easy to use, quick to reference, and relevant to practice.

Dr. Adrijana Kekić, Pharm. D.,
Mayo Clinic, Phoenix, Arizona, United States

This compendium on "Pharmacogenetics in clinical practice" by Primorac and Höppner has compiled clinically highly relevant contemporary information on the pharmacogenetics of 55 often prescribed drugs for physicians and other health care professionals. The great value of this work lies in the efficient communication of the essential information on how the specific genetic makeup determines drug actions and adverse reactions. Physicians and health care professionals can immediately come up with sound decisions on the use of these drugs. Primorac and Höppner give the state of the art knowledge and advice that enables personalized medicine to harvest the latest progress in the fields of molecular biology and genetics for the practice of drug treatment.

Prof. Burkhard Poeggeler, Ph.D.,
Georg-August-University of Göttingen, Gütersloh, Germany

The book "Pharmacogenetics in Clinical Practice" by Dragan Primorac and Wolfgang Höppner, which is available in 3 languages, deals with the pharmacokinetics of 55 frequently used drugs against the background of pharmacogenetics. It takes up in a clear form the difficulties that the practicing physician experiences in his everyday life when he repeatedly finds that the same drug in apparently identical patients (age, size, gender) has a completely different effect and thus potentially one has an adverse effect. The work shows that the way to personalized medicine, as we would like it to be in the future, is through understanding pharmacogenetics.

Dr. Jan Oliver Schönfeldt, M.D.,
Institut für Kinderneurologie, Hamburg, Germany

The second edition of this book, written in English, German and Croatian, presents a systematic approach to patient pharmacogenetics. The recommendations are based on the CPIC ones and have the highest clinical level of evidence. This book certainly represents a contribution to safer treatment with minimal or no side effects, along with its role in the current and future efforts to develop fully personalized medicine.

Prof. Elizabeta Topić, Ph.D.,
Croatian Society of Medical Biochemists, Zagreb, Croatia

This text is excerpted from original summary statements by reviewers.

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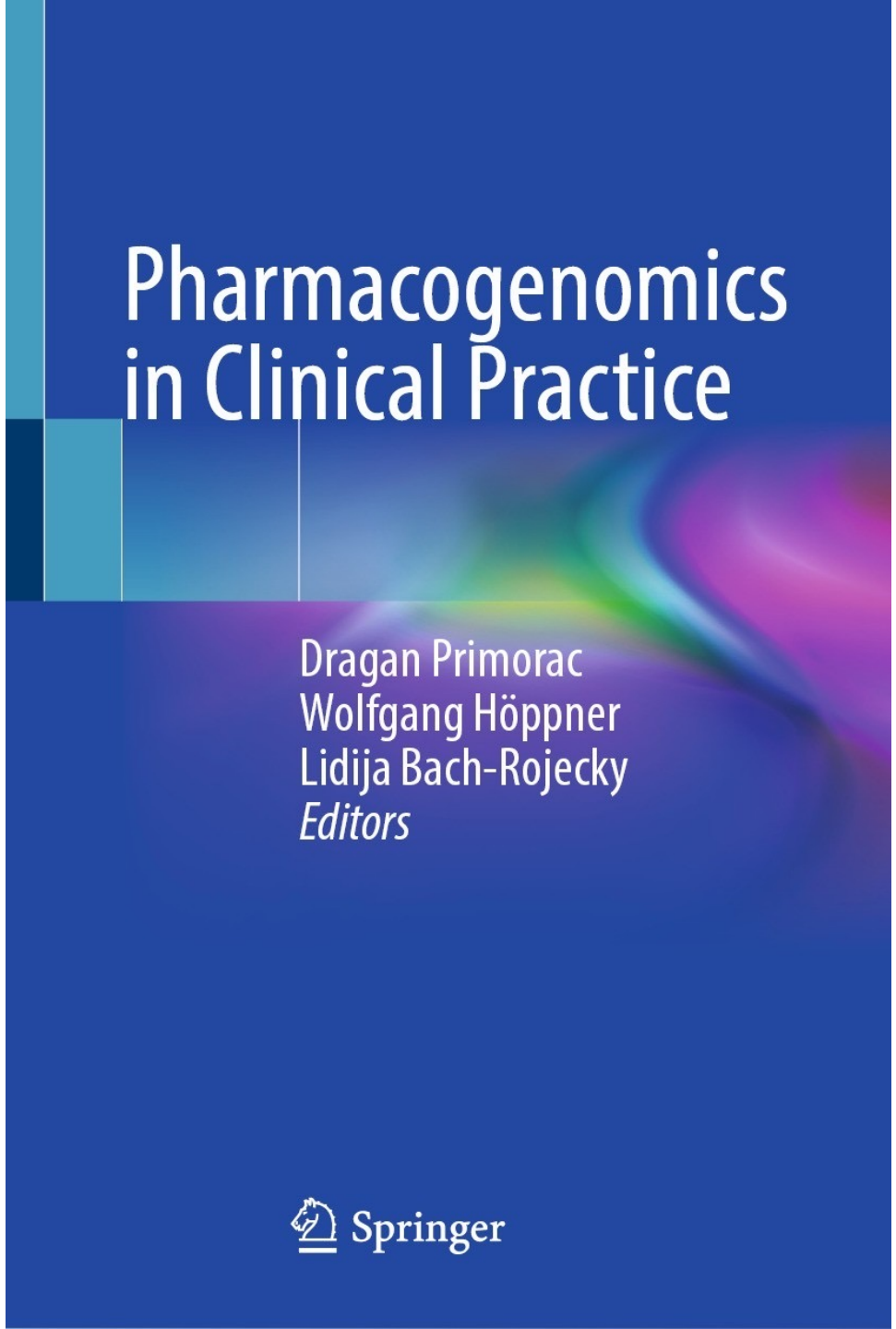
Pharmacogenetics in clinical practice / **Pharmakogenetik** in der klinischen Praxis / **Farmakogenetika** u kliničkoj praksi

Pharmacogenetics
in clinical practice
Experience with 55 commonly used drugs

Pharmakogenetik
in der klinischen Praxis
Die Erfahrungen mit 55 häufig verwendeten Medikamenten

Farmakogenetika
u kliničkoj praksi
Iskustvo s 55 lijekova korištenih u kliničkoj praksi

Dragan Primorac and Wolfgang Höppner


Pharmacogenomics
in Clinical Practice
Dragan Primorac
Wolfgang Höppner
Lidija Bach-Rojecky
Editors
Springer

MOLEKULARNA OBDUKCIJA

FORENSIC DNA APPLICATIONS

An Interdisciplinary Perspective

Forensic DNA Applications: An Interdisciplinary Perspective, Second Edition is fully updated to outline the latest advances in forensic DNA testing techniques and applications. It continues to fill the need for a reference book for people working in the field of forensic molecular biology testing and research as well as individuals investigating and adjudicating cases involving DNA evidence, whether they be civil or criminal cases.

DNA techniques have greatly impacted obvious traditional forensic areas, but such advances have also positively affected myriad new areas of research and inquiry. It is possible today to think about solving forensic problems that were simply unheard of even a few years ago. As such, the book pulls all relevant research and applied science together into a detailed and comprehensive collection.

Part I begins with the history and development of DNA typing and profiling for criminal and civil purposes. It discusses the statistical interpretation of results with case examples, mitochondrial DNA testing, Y single nucleotide polymorphisms (SNPs) and short tandem repeats (STRs), and X SNP and STR testing. It also explores low copy number DNA typing, mixtures, and quality assurance and control. Part II moves on to cover the various uses and applications of analyzing collected physical evidence, victim identification in mass disasters, analyzing animal DNA, forensic botany, and other unique applications. Part III is dedicated to the latest advances and developments in human molecular biology and Part IV looks at policies and laws and ethics governing DNA evidence, and its utilization in various cases and the courts.

Forensic DNA Applications, Second Edition covers cutting-edge research and advancements in the field and is the most up-to-date reference available. Edited and contributed to by the world's foremost leaders in the field, it is a must-have reference for established professionals, and an essential resource to legal professionals—lawyers and judges dealing with civil and criminal cases involving DNA technology—as well as students entering the fields of genetics and forensic DNA analysis.

FORENSIC SCIENCE/GENETICS

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FORENSIC DNA APPLICATIONS
SECOND EDITION

Edited by Dragan Primorac and Moses S. Schanfield

FORENSIC DNA APPLICATIONS
An Interdisciplinary Perspective
SECOND EDITION

Edited by
Dragan Primorac
Moses S. Schanfield

CRC Press
Taylor & Francis Group

IZNENADNA SRČANA SMRT

These athletes, in alphabetical order, experienced sudden cardiac death by age 40

Mohamed Abdelwahab, 22 (2006), soccer
Gaines Adams, 26 (2010), Amer. football
Jaouad Akaddar, 28 (2012), soccer
Davide Astori, 31 (2018), soccer
Víctor Hugo Ávalos, 37 (2009), soccer
Heath Benedict, 24 (2008), Amer. football
Hédi Berkhissa, 24 (1997), soccer
Viktor Blinov, 22 (1968), ice hockey
Gilbert Bulawan, 29 (2016), basketball
J. V. Cain, 28 (1979), Amer. football
Sékou Camara, 27 (2013), soccer
Alexei Cherepanov, 19 (2008), ice hockey
Mitchell Cole, 27 (2012), soccer
Jason Collier, 28 (2005), basketball
Hugo Cunha, 28 (2005), soccer
Renato Curi, 24 (1977), soccer
Alexander Dale Oen, 26 (2012), swimming
Shane del Rosario, 30 (2013), MMA
Ben Idrissa Dermé, 34 (2016), soccer
Lyle Downs, 24 (1921), Austral. football
Patrick Ekeng, 26 (2016), soccer
Bobsam Elejiko, 30 (2011), soccer
Derrick Faison, 36 (2004), Amer. football
Sebastian Faisst, 20 (2009), handball
Miklós Fehér, 24 (2004), soccer
Neil Fingleton, 36 (2017), basketball
Marc-Vivien Foé, 28 (2003), soccer
Matt Gadsby, 27 (2006), soccer
Hank Gathers, 23 (1990), basketball
Cristian Gómez, 27 (2015), soccer
Michael Goolaerts, 23 (2018), cycling
Larry Gordon, 28 (1983), Amer. football
Herb Gorman, 28 (1953), baseball
Rasmus Green, 26 (2006), soccer
Sergei Grinkov, 28 (1995), figure skating
Eddie Guerrero, 38 (2005), wrestling
Frank Hayes, 35 (1923), horse racing
Thomas Herrion, 23 (2005), Amer. football
Cătălin Hîldan, 24 (2000), soccer
Dixie Howell, 40 (1960), baseball
Chuck Hughes, 28 (1971), Amer. football
Flo Hyman, 31 (1986), volleyball
Endurance Idahor, 25 (2010), soccer
Robbie James, 40 (1998), soccer
Daniel Jarque, 26 (2009), soccer
Cristiano Júnior, 25 (2004), soccer
Joe Kennedy, 28 (2007), baseball
Darryl Kile, 33 (2002), baseball
John Kirkby, 23 (1953), soccer
Michael Klein, 33 (1993), soccer
György Kolonics, 36 (2008), canoeing
Wayne Larkin, 29 (1968), ice hockey
Rauli Levonen, 28 (1981), ice hockey
Reggie Lewis, 27 (1993), basketball
José Lima, 37 (2010), baseball
David Longhurst, 25 (1990), soccer
Nikola Mantov, 23 (1973), soccer
Pete Maravich, 40 (1988), basketball
Alex Marques, 20 (2013), soccer
Jesse Marunde, 27 (2007), weightlifting
Scott Mason, 28 (2005), cricket
Stan Mauldin, 27 (1948), Amer. football
Cormac McAnallen, 24 (2004), Gaelic football
Conrad McRae, 29 (2000), basketball
Fab Melo, 26 (2017), basketball
Nilton Pereira Mendes, 30 (2006), soccer
Igor Misko, 23 (2010), ice hockey
Stéphane Morin, 29 (1998), ice hockey
Piermario Morosini, 25 (2012), soccer
Carl Morton, 39 (1983), baseball
Damien Nash, 24 (2007), Amer. football
Frederiek Nolf, 21 (2009), cycling
Chaswe Nsofwa, 28 (2007), soccer
Gábor Ocskay, 33 (2009), ice hockey
Phil O'Donnell, 35 (2007), soccer
Samuel Okwaraji, 25 (1989), soccer
David Oniya, 30 (2015), soccer
Alen Pamić, 23 (2013), soccer
Pavão, 26 (1973), soccer
Bruno Pezzey, 39 (1994), soccer
Pheidippides, c. 40 (490 BC), marathon
Petar Radaković, 29 (1966), soccer
Mickey Renaud, 19 (2008), ice hockey
Bernardo Ribeiro, 26 (2016), soccer
Darcy Robinson, 26 (2007), ice hockey
Brad Rone, 34 (2003), boxing
Omar Sahnoun, 24 (1980), soccer
Serginho, 30 (2004), soccer
Ryan Shay, 28 (2007), marathon
Dave Sparks, 26 (1954), Amer. football
Cheick Tioté, 30 (2017), soccer
Robert Traylor, 34 (2011), basketball
Zeke Upshaw, 26 (2018), basketball
Luciano Vendemini, 24 (1977), basketball
Ginty Vrede, 22 (2008), kickboxing
Frank Warfield, 35 (1932), baseball
Chandler Williams, 27 (2013), Amer. football
David "Soldier" Wilson, 23 (1906), soccer
Sergejs Žoltoks, 31 (2004), ice hockey

frontiers in Medicine

IF 4.52

HYPOTHESIS AND THEORY
published: 22 March 2021
doi: 10.3389/fmed.2021.647412

Sudden Cardiac Death—A New Insight Into Potentially Fatal Genetic Markers

Dragan Primorac[1,2,3,4,5,6,7,8,9], Ljubica Odak[1,10], Vitorio Perić[1], Jasmina Ćatić[1,11], Jozica Šikić[12], Vjekoslav Radeljić[13], Šime Manola[13], Robert Nussbaum[14], Matteo Vatta[14], Swaroop Aradhya[14], Tanja Sofrenović[14], Vid Matišić[1], Vilim Molnar[1], Andrea Skelin[1], Jure Mirat[6] and Johannes Brachmann[4,8]*

[1] St. Catherine Specialty Hospital, Zagreb, Croatia, [2] Eberly College of Science, The Pennsylvania State University, University Park, State College, Philadelphia, PA, United States, [3] The Henry C. Lee College of Criminal Justice and Forensic Sciences, University of New Haven, West Haven, CT, United States, [4] Medical School, University of Split, Split, Croatia, [5] Faculty of Dental Medicine and Health, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia, [6] Faculty of Medicine, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia, [7] Medical School, University of Rijeka, Rijeka, Croatia, [8] Medical School REGIOMED, Coburg, Germany, [9] Medical School, University of Mostar, Mostar, Bosnia and Herzegovina, [10] Children's Hospital Zagreb, Zagreb, Croatia, [11] Department of Cardiology, Clinical Hospital Dubrava, Zagreb, Croatia, [12] Department of Cardiology, Clinical Hospital Sveti Duh, Zagreb, Croatia, [13] Department of Cardiology, Clinical Hospital Center Sestre Milosrdnice, Zagreb, Croatia, [14] Invitae, San Francisco, CA, United States

IDENTIFIKACIJE ŽRTAVA DOMOVINSKOG RATA

Prema stanju evidencija na dan 28. siječnja 2024. godine (podatci dostupni putem https://branitelji.gov.hr/o-ministarstvu/djelokrug/mjere/nestale-osobe/nestale-osobe-u-domovinskom-ratu-834/834) još je uvijek nepoznata sudbina **1.409 osoba** te mjesto ukopa posmrtnih ostataka **394 smrtno stradale osobe**, što **ukupno čini 1.803 neriješenih slučajeva iz Domovinskog rata**.

Uprava za zatočene i nestale pri Ministarstvu hrvatskih branitelja organizira, koordinira i i sudjeluje u terenskim izvidima, istraživanjima i ekshumacijama posmrtnih ostataka iz pojedinačnih, masovnih i asanacijskih grobnica osoba nestalih u Domovinskom ratu i posmrtnih ostataka smrtno stradalih osoba u Domovinskom ratu za koje nije poznato mjesto ukopa; organizira i koordinira obradu posmrtnih ostataka osoba nestalih u Domovinskom ratu i posmrtnih ostataka smrtno stradalih osoba u Domovinskom ratu za koje nije poznato mjesto ukopa ekshumiranih na području Republike Hrvatske te posmrtnih ostataka preuzetih s područja drugih država i njihovu identifikaciju.

Republika Hrvatska mora iskazati bezuvjetnu predanost i posvećenost rješavanju pitanja nestalih i smrtno stradalih osoba u Domovinskom ratu za koje nije poznato mjesto ukopa.


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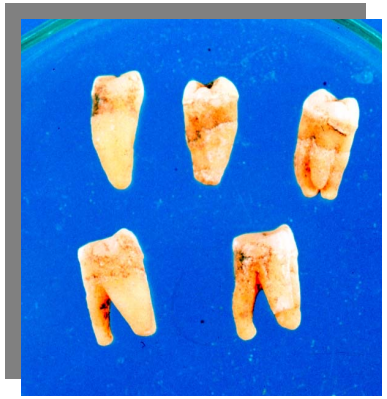
Sample Selection Preferences

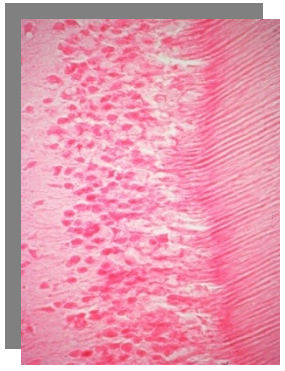
Teeth

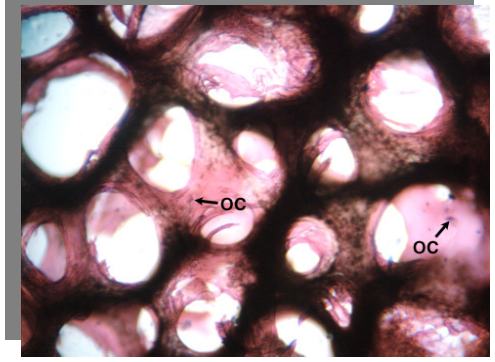


Long Bones

Flat Bones

DNA Is Better Preserved In A High Density Matrix Like Dentine & Compact Bone than in Spongy Bone



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Primorac D., Andelinovic S., Definis-Gojanovic M., Drmic I., Rezic B., Baden MM., Kennedy MA., Schanfield MS., Skakel SB., Lee CH. Identification of war victims from mass graves in Croatia, Bosnia and Herzegovina by use of standard forensic methds and DNA typing. *J Forensic Sci* 1996;41:891-894.

ORGANIZACIJA FORENZIČKE GENETIKE U REPUBLICI HRVATSKOJ

Uspješna primjena forenzičke genomike zahtjeva interakciju između znanstveno-nastavnih institucija (Sveučilišni Odjel za forenzične znanosti, Sveučilišta u Splitu, Stručni studij – Kriminalistika pri Policijskoj akademiji, pravni fakulteti hrvatskih sveučilišta, Zavod za sudsku medicinu i kriminalistiku Medicinskog fakulteta Sveučilišta u Zagrebu, Klinički zavod za patologiju, sudsku medicinu i citologiju KBC Split, Zavod za sudsku medicinu i kriminalistiku Medicinskog fakulteta Sveučilišta u Rijeci, Klinički zavod za patološku anatomiju i sudsku medicinu KBC Osijek, i druge srodne institucije, Centra za forenzička vještačenja i ispitivanja "Ivan Vučetić" pri MUP-u, MORH-a, sigurnosno-obavještajnih agencija (SOA, VSOA), Ureda Vijeća za nacionalnu sigurnost, Institut za antropologiju, Genos d.o.o. itd.

Suradnja s znanstvenim organizacijama poput Hrvatskog društva za humanu genetiku te institucijama iz inozemstva (Američka Akademija za forenzičke znanosti (AAFS), Međunarodno društvo primijenjenih bioloških znanosti (ISABS)), Međunarodno društvo za forenzičku genetiku (ISFG), itd., nužna je kako bi se hrvatski forenzičari upoznali s najnovijim dostignućima iz područja forenzičke genetike, ali prezentirali i rezultate vlastitog rada i istraživanja.

NEKA OD ETIČKIH PITANJA U FORENZIČKOJ GENETICI

•Koja kaznena djela trebaju aktivirati pretraživanje DNA baza podataka?
•U kojem trenutku bi se uzorci trebali prikupljati (nakon podizanju optužnice ili nakon pritvora ili pak po rođenju za osnivanje široke (preventivne) populacijske baze podataka)?
•Koje lokuse u genomu treba analizirati da bi se generirali genetski profili nužni za forenzičku obradu?
•Tko bi trebao imati pristup uzorcima i DNA profilima i u koje svrhe?
•Koliko dugo DNA profile i uzorke treba zadržati u DNA bazi podataka

DNA BAZE PODATAKA U RH

- Evidencija DNA osumnjičenih i osuđenih osoba, Centar za forenzična ispitivanja, istraživanja i vještačenja „Ivan Vučetić"
- DNA baza podataka pri Zavodu za sudsku medicinu i kriminalistiku Medicinskog fakulteta Sveučilišta u Zagrebu koja sadrži DNA profile srodnika nestalih osoba i DNA profile ekshumiranih posmrtnih ostataka

Molekularno-genetska analiza u kaznenom postupku Republike Hrvatske uređena je:

- Zakonom o kaznenom postupku,
- Pravilnikom o načinu uzimanja uzoraka biološkog materijala i provođenja molekularno-genetske analize,
- Pravilnikom o ustrojstvu i načinu vođenja zbirki s automatskom obradom podataka o utvrđivanju istovjetnosti osumnjičenika,
- Zakonom o pojednostavljenju razmjene podataka između tijela država članica Europske unije nadležnih za provedbu zakona,
- Zakonom o zaštiti fizičkih osoba u vezi s obradom i razmjenom osobnih podataka u svrhe sprječavanja, istraživanja, otkrivanja ili progona kaznenih djela ili izvršavanja kaznenih sankcija,
- Zakonom o izvršavanju kazne zatvora.

EDUKACIJA


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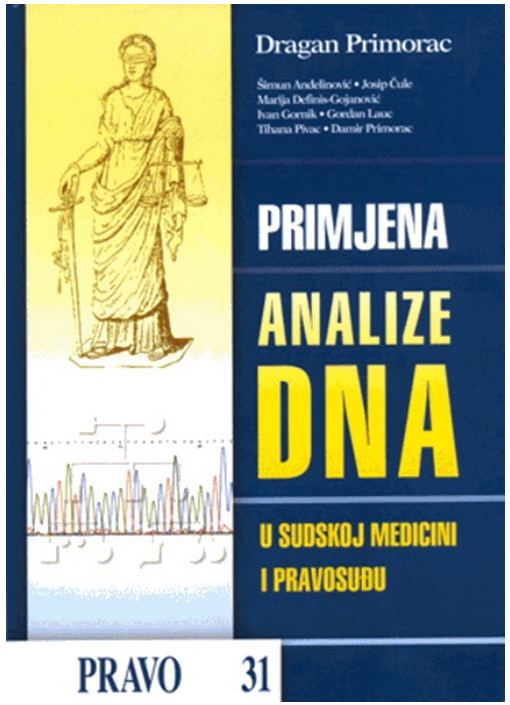

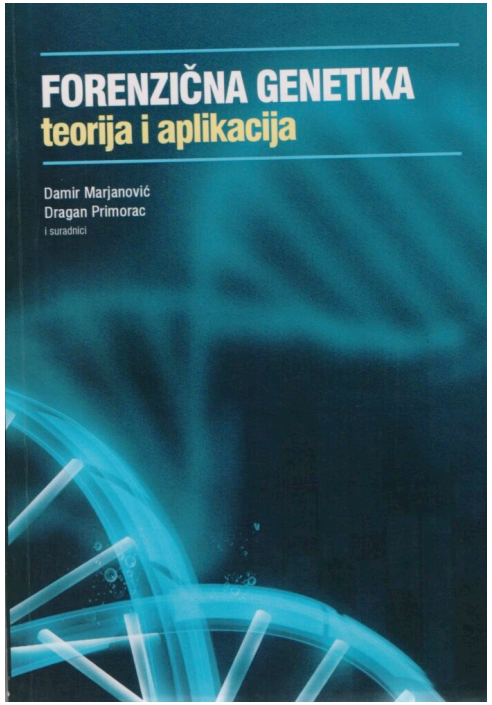

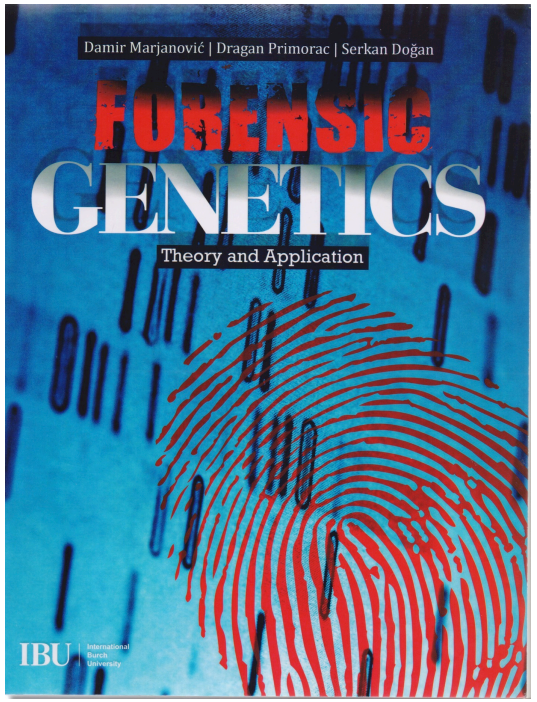

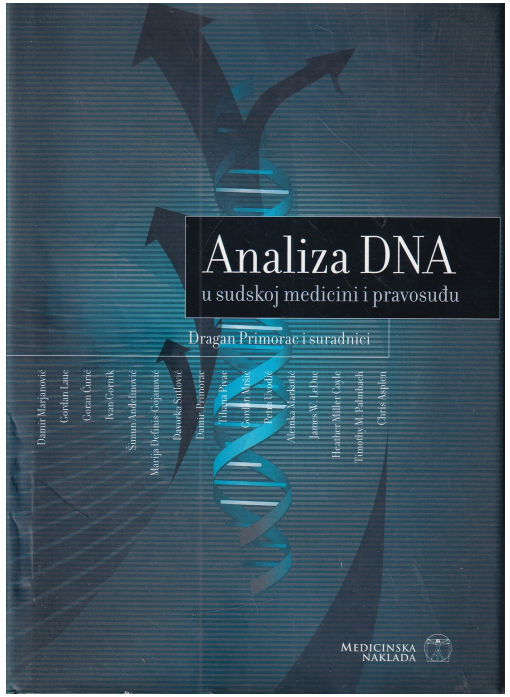

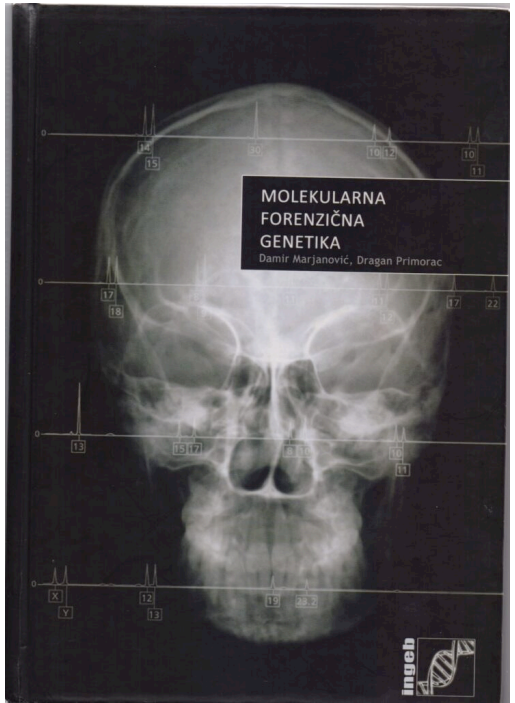

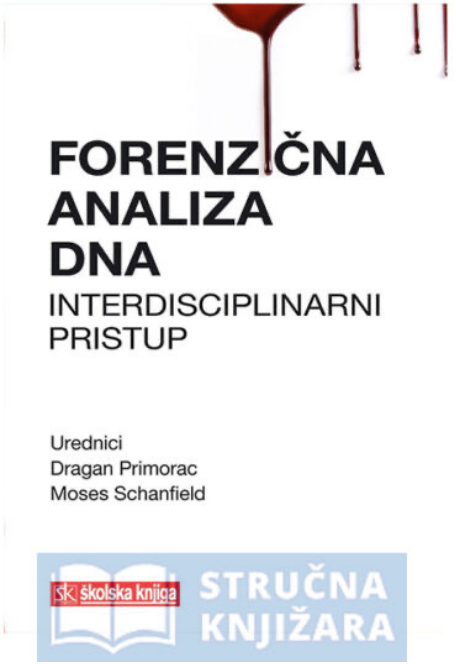

FORENSIC DNA APPLICATIONS
AN INTERDISCIPLINARY PERSPECTIVE

FORENSIC DNA APPLICATIONS

Primorac | Schanfield

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Edited by
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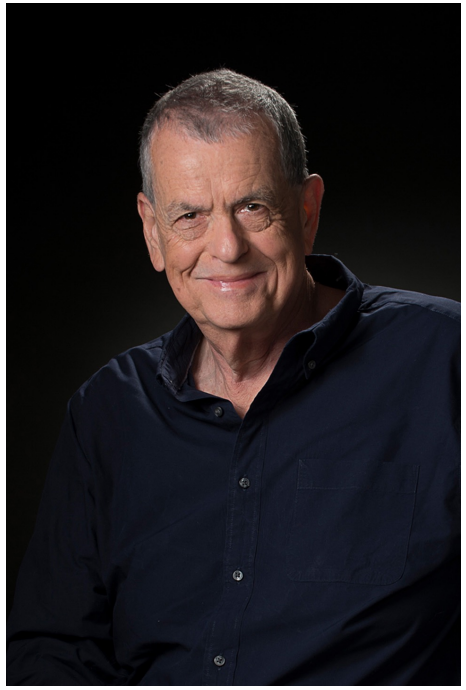

Prof. Aaron Ciechanover, Ph.D.
Nobel Prize in Chemistry
2004

Prof. Richard Roberts, Ph.D.
Nobel Prize in Physiology or Medicine
1993

Prof. Gregg Semenza, Ph.D.
Nobel Prize in Physiology or Medicine
2019

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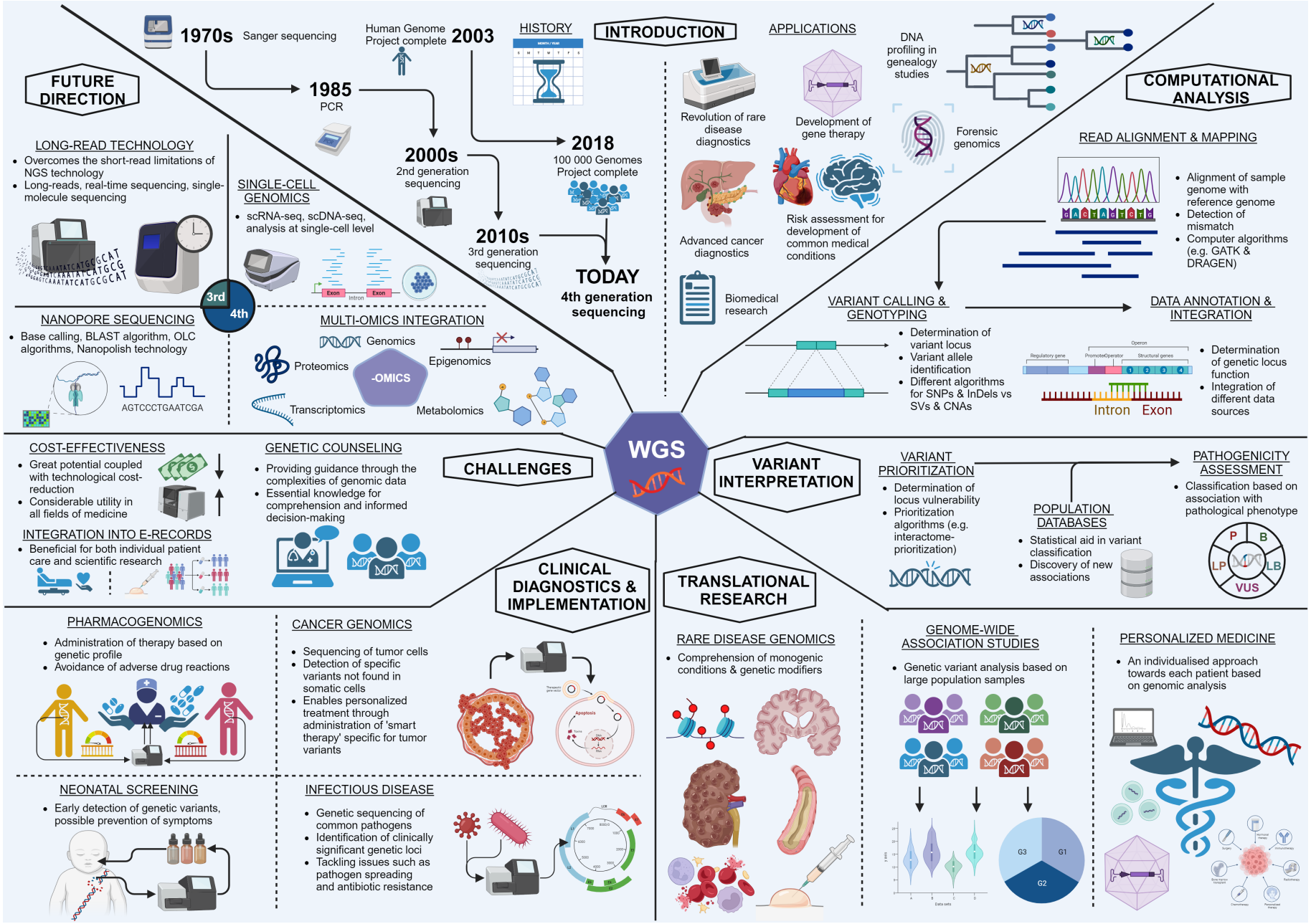

Petar Brlek, Luka Bulić, Matea Bračić, Petar Projić, Vedrana Škaro, Dragan Primorac. Implementing Whole Genome Sequencing (WGS) in Clinical Practice: Challenges and Future Perspectives (in press)