

ABSTRACTS INTERNATIONAL SCIENTIFIC DAY ON OXIDATIVE STRESS, AGING, AND AGE-RELATED DISEASES 16 JANUARY 2026

Epidemiological Features of Tracheostomy in Elderly Patients

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Introduction: Tracheostomy is a common ICU procedure. It remains a topic of ongoing debate, especially about its indications, timing, and technique in elderly patients.

Objective: To describe the epidemiological and prognostic characteristics of elderly patients who underwent tracheostomy in a surgical ICU.

Methods: We conducted a descriptive observational study in an anesthesia and intensive care department. All ICU patients between January 2024 and March 2025 who underwent tracheostomy were included. We collected data retrospectively using a standardized form. The form had three sections: sociodemographic and epidemiological data, tracheostomy characteristics, and complications and outcomes.

Results: A total of 52 patients were included in the study. The population was predominantly male (78.8%), with a mean age of 70 years. ICU admission diagnoses were neurological conditions (48.38%), particularly hemorrhagic stroke (14.51%), polytrauma (25.8%), respiratory disease (15.4%), septic shock (7.7%), and severe pancreatitis (1.1%). All tracheostomies were performed using a surgical technique. Failed weaning from mechanical ventilation was the most frequent indication (85.48%). The mean time to tracheostomy was 11 days. Outcomes were favorable in 12 patients, with decannulation achieved in 13.5% and discharge home with a tracheostomy in 9.6% of cases. The overall mortality rate was 76.9%. Mortality was significantly associated with neurological disease and polytrauma ($p < 0.001$).

Conclusion: This study showed a high mortality rate among tracheostomized patients, which appears to be related primarily to the underlying critical illness rather than to tracheostomy itself.

RDW versus EuroSCORE II to predict the outcome of elderly patients undergoing cardiac surgery

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Introduction: Coronary artery bypass grafting (CABG)

remains the gold standard strategy for revascularization in patients with complex coronary artery disease, particularly in those who are older. Accurate risk stratification is crucial for optimizing perioperative management. Some tools are already validated, such as the Euroscore II; others need further investigations, such as the red cell width distribution (RDW).

Methods: We conducted a retrospective, observational, analytical study in the Department of Cardiothoracic Surgery at Sahloul University Hospital. We included patients aged >60 years who underwent on-pump CABG over 25 months. Variables collected included sociodemographic characteristics, perioperative data, EuroSCORE II, and serial management of RDW (Day one, three, and five).

Results: The mean age was 67.79 years ± 6.24 with a male predominance (SR=4.92). The ASA score was $\geq$ III in 84.41% of cases. The EuroSCORE II was $\geq 4\%$ in 80.62% of cases. The mean left ventricular ejection fraction was 53%. The median ICU stay was 103.19 hours ± 68.34 . The mean of extra-corporeal circulation was 88.96 min ± 26.34 , and in-hospital mortality was 11.7%. The best predictive performance for mortality was observed for RDW on day 5 (AUC-ROC = 0.857), followed by RDW on day 3 (AUC-ROC= 0.808), then by RDW on day 1 (AUC-ROC= 0.793). The AUC-ROC of Euroscore II was 0.792

Conclusion: RDW appears to be a more effective predictor of mortality than EuroSCORE II in elderly patients undergoing coronary artery bypass grafting. However, larger, prospective studies are warranted to confirm these findings and establish RDW's clinical utility in this population.

Impact of anesthetic technique on the outcome of elderly patients undergoing transvesical prostatic adenomectomy

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Introduction: Benign prostatic hyperplasia is a common condition in older men, affecting nearly 50% at the age of 60 and almost all men over 80. Transvesical prostatic adenomectomy remains the reference procedure for large prostates. In this context, we assessed the impact of anesthetic technique on postoperative outcomes after transvesical simple prostatectomy.

Methods: We conducted a retrospective, observational, analytical study in the Urology Department of Sahloul

University Hospital. Patients were divided into two groups according to anesthetic technique (SA group vs GA group). Outcomes of interest included intraoperative bleeding, length of hospital stay, and postoperative mortality.

Results: Thirty patients were included, with a mean age of 68 years. Eighteen patients received spinal anesthesia, and twelve received general anesthesia. Operative and anesthetic times were longer in the GA group (66.3 and 76.3 min) than in the SA group (47.8 and 56.1 min, $p = 0.008$). Changes in hemoglobin and hematocrit suggested greater blood loss in the GA group, with a significant postoperative decrease in hematocrit (34.3% vs 37.4%, $p = 0.002$). Postoperative blood loss was also slightly higher under GA (67.5 vs 58.9 mL). Transfusion and vasopressor requirements were more frequent in the GA group. Length of hospital stay was longer in the GA group (9.1 vs 8.1 days), without a significant difference ($p = 0.22$).

Conclusion: In our study, general anesthesia was associated with greater bleeding and a slightly longer hospital stay, with no observed mortality. Larger prospective studies are needed to confirm these findings.

Performance of existing prognostic models in predicting mortality of severe elderly trauma patients

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Introduction: Trauma is known to be more common among young people. Recently, it has been increasingly affecting elderly patients due to the aging of the population. Existing prognostic models are essentially validated in young patients, suggesting the need for their assessment in the elderly. This study aimed to assess the prediction performance of the Injury Severity Scale (ISS), the Acute Physiology and Chronic Health Evaluation (APACHE II), Vittel criteria, and the Simplified Acute Physiology Scale II (SAPS II) in elderly trauma patients.

Methods: A retrospective analytical study was carried out in the intensive care unit of Sahloul Teaching Hospital, including severe trauma patients aged 60 years and above. Data were collected via a pre-established form covering sociodemographic parameters, trauma mechanisms, severity assessment, management, and patient outcomes. The primary endpoint was in-hospital mortality.

Results: This study enrolled 78 polytrauma patients. The mean age was 71.04 years, with a male predominance (sex ratio of 3.4). Road traffic accidents were the most frequent mechanism (78.9%). Thoracic (88.4%) and cranial injuries (54.7%) were the most common. The mortality rate was 24.2%. The best predictive capacities were found for SAPS II (AUC = 0.771) and APACHE II (AUC = 0.765). ISS showed acceptable performance (AUC = 0.703), while the Vittel criteria showed the most impaired performance (AUC = 0.547).

Conclusion: Physiologic scores, mainly SAPS II and APACHE II, showed better performance in predicting mortality. Systemic repercussions of aging and comorbidities may

explain the limitations of anatomical scores.

Perfusion Index versus Shock Index in Predicting Hemorrhagic Risk during Lumbotomy Procedures in elderly patients

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Introduction: Perioperative hemorrhage remains a major complication of lumbotomy procedures. Conventional hemodynamic parameters may fail to detect early tissue hypoperfusion. The perfusion index (PI) and shock index (SI) are non-invasive markers that may improve early prediction of hemorrhagic risk.

Objective: To compare the predictive performance of the perfusion index and shock index for hemorrhagic risk, assessed by blood transfusion requirement during lumbotomy surgery.

Methods: A prospective analytical study was conducted, including elderly patients undergoing elective lumbotomy at Sahloul University Hospital between February and November 2025. Perfusion index and shock index were recorded at different intraoperative times. The primary outcome was blood transfusion requirement, considered important when it exceeds one Packed Red Blood Cells. Predictive performance was assessed using receiver operating characteristic (ROC) curves.

Results: Finally, 37 patients were included. The mean age was 68.54 years $\pm$ 8.26. The sex ratio was 1.17. High blood transfusion requirements were observed in 21.6% of cases. In the group of high blood requirement, PI was significantly lower at 30 min ($p=0.08$) and at 45 min ($p=0.05$); however, SI was significantly higher at 45 min ($p=0.006$) and at 60 min ($p=0.034$). Considering the ROC curves, the higher performances were observed with SI at 45 min (AUC-ROC=0.841) and at 60 min (AUC-ROC=0.0784). The PI showed insufficient performance (AUC-ROC<0.7)

Conclusion: The shock index is a sensitive and reliable early predictor of perioperative hemorrhagic risk during lumbotomy, outperforming the perfusion index. Its routine perioperative use may enhance Patient Blood Management strategies and improve hemodynamic optimization.

Prognostic value of hemogram-derived indices in elderly patients undergoing major urological cancer surgeries

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Introduction: Urological oncologic conditions are a major cause of morbidity and mortality, particularly in older and comorbid patients. Conventional prognostic scores, such as the American Society of Anesthesiologists (ASA) classification, lack specificity. Low-cost hematological

biomarkers, such as the neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), and red cell distribution width (RDW), may provide useful prognostic information.

Methods: We performed a retrospective, analytical study in the Urology Department of Sahloul University Hospital, including all patients who underwent major urological surgery between May 2022 and May 2024. Sociodemographic data, hematological indices, intraoperative variables, and postoperative outcomes were collected. Prognostic models were assessed for their ability to predict a composite endpoint including transfusion, ICU admission, and readmission.

Results: Thirty patients were included (mean age 62.6 ± 15.6 years; 70% male). Most patients were classified as ASA II (50%). Procedures performed were predominantly extended nephrectomy (50%) and total cystoprostatectomy (33%). Intraoperative complications occurred in 23.3% of patients, mainly hemorrhagic, with transfusion required in 30%. No deaths and no major infectious or thromboembolic complications were observed. ICU admission was required for 60% of patients, and 56.7% required postoperative monitoring or readmission. Among hematological indices, NLR was significantly higher in patients who met the composite endpoint (5.26 vs 3.11 ; $p = 0.04$) and showed the best prognostic performance ($AUC = 0.87$), whereas PLR and RDW were not predictive.

Conclusion: Complete blood count–derived indices, particularly NLR, appear to be simple, accessible, and effective prognostic markers for predicting postoperative outcomes in major urological oncologic surgery.

The characterization and quantification of the polyphenols in the infusion prepared from *Rosmarinus officinalis* L collected from Mount Zaghouan (Hamem Zeriba)

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Introduction: Rosemary (*Rosmarinus officinalis* L.) is a widely used aromatic plant in Tunisia, traditionally consumed as an herbal tea for the treatment of various ailments. Although numerous studies have focused on

aqueous rosemary extracts, the chemical composition of infusions prepared according to traditional practices remains insufficiently documented.

Objective: The aim of this study was to characterise the phenolic compounds present in rosemary tea prepared from plants collected on Mount Zaghouan, Tunisia, and to evaluate whether the traditional infusion method is an effective and reliable approach for extracting bioactive compounds.

Methods: Rosemary infusion was prepared by steeping a tea bag containing 2 g of powdered rosemary leaves in 100 ml of hot water for 15 minutes. Qualitative and quantitative analyses were performed using a validated ultra high performance liquid chromatography method coupled with diode array detection (UHPLC-DAD, Shimadzu 8045). Identification of compounds was achieved by comparison with authenticated reference standards and previously established data from our laboratory.

Results: Eleven polyphenolic compounds were identified in the rosemary infusion, including chlorogenic acid, caffeic acid, p-coumaric acid, ferulic acid, sinapic acid, rosmarinic acid, luteolin, and several luteolin and feruloylnepitrin derivatives. Among these compounds, rosmarinic acid was found to be the most abundant.

Conclusion: The traditional infusion method proved effective for extracting phenolic compounds from rosemary. Consequently, it can be considered a suitable reference procedure for the extraction of bioactive compounds. Moreover, the phenolic content of Tunisian rosemary tea supports its traditional consumption and highlights its potential nutritional and therapeutic value overall and importance.

Role of Oxidative Stress in Ovarian Aging and Embryo Quality in IVF

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Introduction: Ovarian aging is a complex process leading to decreased ovarian reserve and oocyte quality, which can negatively impact in vitro fertilization (IVF) outcomes. Oxidative stress (OS), defined as an imbalance between reactive oxygen species production and antioxidant defenses, plays a key role in oocyte senescence and mitochondrial DNA damage, thereby affecting embryonic development. This review aims to summarize recent evidence on the impact of OS on ovarian aging and embryo quality in IVF.

Methodology: A literature search was conducted using PubMed, Scopus, and Web of Science from inception to October 2025. MeSH terms and keywords included "oxidative stress," "ovarian aging," "oocyte quality," "embryo quality," "IVF," and "female infertility," combined with Boolean operators "AND"/"OR." Articles were selected based on reporting associations between OS, ovarian aging, and embryonic outcomes in IVF. Both

human and animal studies providing mechanistic insights were included, while reviews, case reports, and non-English publications were excluded.

Results and Discussion: The search identified 385 articles, of which 28 met inclusion criteria after full-text screening. Studies consistently showed that elevated OS in the ovarian microenvironment is associated with reduced ovarian reserve, mitochondrial DNA damage in oocytes, and decreased embryo quality. Negative effects were especially pronounced in women over 35 years old. Antioxidant interventions and optimized embryo culture strategies demonstrated potential benefits, although **Results** were heterogeneous. Limitations included small sample sizes, variability in OS assessment Methods, and lack of standardized protocols.

Conclusion: Oxidative stress significantly contributes to ovarian aging and reduced embryo quality in IVF. Assessment and modulation of OS may improve management of infertile patients, but prospective, standardized studies are needed to confirm these findings.

The Contribution of Artificial Intelligence to Personalized Preventive Medicine in Aging

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Introduction: Aging varies significantly among individuals, rendering standardized approaches insufficient for predicting or preventing age-related decline. P4 medicine (Predictive, Preventive, Personalized, Participatory) shifts clinical care from reactive treatment toward anticipatory strategies targeting early biological changes. Artificial intelligence (AI) is transforming preventive medicine by enabling continuous monitoring, early detection of healthy aging deviations, and individualized interventions before disease onset.

Objective: To examine how AI revolutionizes personalized preventive medicine in aging, from real-time biological monitoring to optimized tailored anti-aging interventions.

Methods: We reviewed AI-based biological clocks and next-generation wearable biosensors, analyzing their predictive accuracy, clinical validation, and integration capabilities. A rigorous validation framework assessed AI-generated recommendations across eight criteria: accuracy, clinical utility, completeness, explainability, causal evidence, interdisciplinary integration, longitudinal robustness, and alignment with aging mechanisms.

Results: AI-based biological clocks (MoveAge, PpgAge) predict biological age using accessible data streams. MoveAge achieves high accuracy with accelerometer-derived movement patterns ($r=0.93$; mean error 8.02 years), while PpgAge uses photoplethysmography signals from wearables. Both biomarkers strongly associate with all-cause mortality and incident chronic diseases, validated across hundreds of thousands of participants. Next-generation biosensors enable continuous multi-

biomarker monitoring: smart tattoos measuring lactate and cortisol, microneedle patches sampling interstitial fluid, contact lenses quantifying tear glucose, and breath analyzers detecting volatile compounds. AI integrates these data streams to detect early deviations from healthy aging trajectories with unprecedented sensitivity. **Conclusion:** AI democratizes personalized preventive anti-aging medicine through consumer devices, empowering individuals to actively monitor and influence their longevity trajectories.

The LORD Pathway and Cellular Anti-Aging Defense Programs

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Introduction: Why do we age? Recent discoveries (2024–2025) challenge the paradigm of inevitable aging by revealing sophisticated cellular defense systems whose gradual failure orchestrates age-related decline, offering unexpected molecular answers to this fundamental question.

Objective: To elucidate revolutionary mechanisms of the LORD pathway and explore how cellular anti-aging defense programs could be pharmacologically reactivated to slow cellular deterioration.

Methods: We analyzed recent molecular discoveries on cellular defense mechanisms, focusing on the LORD pathway, NRF2 regulation, and mitophagy dynamics during aging. We examined epigenetic regulatory switches, protective gene expression patterns, and their therapeutic potential for geroprotective interventions.

Results: A major breakthrough is the 2024 identification of the LORD (Lipid Oxygen Radical Defense) pathway, functioning as a molecular alarm detecting early lethal lipid damage. This epigenetic guardian regulates protective gene expression via a phosphorylation-dependent switch involving ZNF354A, KAP1, and SETDB1, coordinating a defensive cascade with glutathione, coenzyme Q10, and iron homeostasis to block ferroptosis. The NRF2 pathway, master regulator of antioxidant defenses, declines dramatically with age, weakening cellular resilience. Surprisingly, basal mitophagy maintains or increases in multiple tissues during aging; however, abrupt mitophagy failure during cellular senescence causes dysfunctional mitochondria accumulation, releasing cytosolic DNA that triggers chronic inflammation through the cGAS-STING pathway.

Conclusion: These findings reveal novel therapeutic opportunities: rather than merely counteracting aging symptoms, interventions could awaken dormant cellular defense programs, restoring intrinsic resilience and slowing age-associated decline. The LORD pathway and related mechanisms represent promising targets for next-generation geroprotective therapies.

Reversibility of Aging Processes

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Introduction: Aging has long been considered unidirectional and irreversible. This dogma is now challenged by groundbreaking studies in Nature, Cell, and Science, demonstrating that cellular and tissue rejuvenation is experimentally achievable and reproducible.

Objective: To synthesize revolutionary advances (2023–2025) demonstrating aging reversibility, analyzing underlying theories and experimental evidence from leading scientific journals.

Methods: We systematically reviewed breakthrough studies on aging reversal, including the Information Theory of Aging, partial reprogramming strategies, senolytic interventions, stem cell therapies, and gene therapies. Evidence was analyzed from high-impact publications documenting molecular mechanisms and physiological outcomes.

Results: The Information Theory of Aging (Sinclair, Cell 2023) proposes aging Results from recoverable epigenetic information loss. In 2025, senescence-resistant mesenchymal stem cells reversed aging in non-human primates after 44 weeks, improving cognition, bone density, and reproductive health without adverse effects (Cell). Partial reprogramming using Yamanaka factors (OSK) restored vision in aged mice (Nature 2020) and extended residual lifespan by 109% in mice equivalent to 77-year-old humans (2024). Young immune cells from human stem cells reversed cognitive decline and Alzheimer's pathology in mice (Advanced Science 2025). Senolytic clearance prolongs median lifespan (Mayo Clinic 2016). Lysosomal function restoration reverses hematopoietic stem cell aging (Cell Stem Cell 2025). Gene therapies using follistatin and klotho demonstrate epigenetic rejuvenation in humans (2024), with over 100 offshore-treated patients showing muscle and cognitive improvements without adverse events.

Conclusion: Convergent evidence establishes aging as reversible, providing robust foundations for human rejuvenation therapies and marking a paradigm shift in aging biology.

The Antioxidant Paradox: Can We Block Oxidative Stress to Preserve Youth?

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Introduction: The anti-aging industry massively promotes antioxidant supplementation to "block oxidative stress" and preserve youth. This intuitive approach assumes

eliminating free radicals prevents aging. However, decades of clinical trials reveal a paradoxical reality fundamentally challenging this strategy.

Objective: To critically analyze whether pharmacological oxidative stress blockade through exogenous antioxidants is physiological, feasible, and safe, evaluating potential dangers and mechanisms explaining supplement failure.

Methods: We reviewed clinical trial data, mitohormesis mechanisms, and redox signaling pathways. Analysis included randomized trials on 161,045 subjects, examining cancer prevention efficacy, mitochondrial targeting capabilities, and dose-dependent pro-oxidant effects.

Results: Mitohormesis revolutionizes understanding: low mitochondrial free radical levels trigger protective adaptive responses increasing stress resistance and longevity, explaining caloric restriction and exercise benefits. Paradoxically, antioxidant supplements abolish these beneficial signals. Randomized trials demonstrate complete absence of cancer-preventive effects, with significant bladder cancer risk increase. Beta-carotene increases lung cancer risk by 20% in smokers. Antioxidants fail reaching mitochondria—the critical pro-tumoral radical production site—accumulating at ineffective peripheral sites. Elevated antioxidant levels paradoxically protect cancer cell growth. Optimal balance requires physiological hydrogen peroxide levels below 100 nM for beneficial signaling, while supraphysiological concentrations cause irreversible damage. Excessive suppression disrupts essential kinases, transcription factors, and mitochondrial biogenesis. Endogenous enzymatic antioxidants prove infinitely more effective than exogenous supplements. Certain antioxidants become pro-oxidants at high doses via redox cycling.

Conclusion: Completely blocking oxidative stress is neither physiological, feasible, nor safe. Optimal approaches favor redox hormesis through exercise, caloric restriction, and endogenous antioxidant activation rather than potentially carcinogenic massive supplementation.

Oxidative Stress, Aging, and Psychiatric Disorders: A Pathophysiological Triad

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Introduction: Oxidative stress is a key mechanism in brain aging and psychiatric disorders. Excess reactive oxygen species relative to antioxidant defenses induce neuronal damage, mitochondrial dysfunction, and neuroinflammation, increasing vulnerability to depression, anxiety, and cognitive decline in older adults.

Methods: A narrative literature review was performed using PubMed, ScienceDirect, and Scopus (2000–2025). Keywords included oxidative stress, aging, psychiatric disorders, neuroinflammation, and antioxidant therapy. Studies addressing mechanistic and clinical associations between oxidative stress, aging, and psychiatric conditions were analyzed.

Results: Oxidative stress biomarkers—elevated lipid

peroxidation, reduced glutathione, and decreased superoxide dismutase and catalase activity—were consistently associated with cognitive and emotional impairments. In older adults, these alterations correlated with reduced synaptic plasticity and higher prevalence of depression, anxiety, and mild cognitive impairment. Antioxidant interventions such as N-acetylcysteine, polyphenols, and vitamin E demonstrated neuroprotective effects and improved responses to antidepressant therapy. Oxidative stress interacts with neuroinflammation, mitochondrial dysfunction, and hypothalamic–pituitary–adrenal axis dysregulation, forming a pathophysiological triad that underlies psychiatric vulnerability during aging.

Conclusion: Oxidative stress represents a central link between brain aging and psychiatric disorders. Integrative strategies combining lifestyle modifications and targeted antioxidant therapies may help delay neuropsychiatric decline and improve mental health outcomes in older adults. Further research is needed to validate oxidative biomarkers and optimize intervention strategies.

Impact of oxidative stress on sperm DNA fragmentation and IVF/ICSI outcomes

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Introduction: Oxidative stress (OS) Results from an imbalance between the production of reactive oxygen species and the antioxidant defense system, leading to sperm damage and increased sperm DNA fragmentation (SDF). SDF is a major limiting factor in male fertility and may negatively affect the outcomes of assisted reproductive technologies (ART), including in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI). This review aims to summarize recent evidence on the relationship between OS, SDF, and IVF/ICSI performance.

Methodology: A literature review was conducted using PubMed, Scopus, and Web of Science from inception to October 2025. A total of 412 articles were identified, and 23 studies met the inclusion criteria after full-text screening based on relevance and methodological quality.

Results and Discussion: Most included studies were retrospective observational in design. High OS levels were consistently associated with increased SDF, which correlated with reduced fertilization rates, poorer embryo quality, and lower clinical pregnancy rates in both IVF and ICSI cycles. The detrimental impact of SDF appeared more pronounced in conventional IVF, whereas ICSI partially mitigated these effects through sperm selection. Interventions targeting OS reduction, such as antioxidant supplementation and optimized sperm handling techniques, showed potential benefits; however, Results were heterogeneous due to variations in study design and assessment Methods.

Conclusion: Oxidative stress plays a significant role in sperm DNA fragmentation and may compromise IVF/

ICSI outcomes. Integrating OS and SDF assessment into the management of male infertility may improve ART success, although further standardized prospective studies are needed.

A SIRT1 variant is associated with type 2 Diabetes and complications in the Tunisian population

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Introduction: Type 2 diabetes (T2D) is a chronic metabolic disorder driven by key molecular mechanisms such as inflammation, mitochondrial dysfunction, and oxidative stress. SIRT1, a protein with epigenetic regulatory activity, plays a central role in counteracting oxidative stress by modulating antioxidant defenses and cellular protection pathways. In this context, single nucleotide polymorphisms (SNPs) in the SIRT1 gene, especially the rs7895833 variant, may alter protein expression or activity. The objective is to investigate the association between the SIRT1 rs7895833 polymorphism and T2D and its complications in the Tunisian population.

Methods: A case–control study was conducted including 203 patients with T2D diagnosed according to ADA criteria and 203 healthy controls. SNP genotyping was performed using the MS-PCR technique.

Results: Statistical analysis revealed a significantly higher frequency of the G allele of the SIRT1 rs7895833 polymorphism in diabetic patients compared with controls ($p = 0.003$; OR = 1.59 [1.17–2.18]). Furthermore, this polymorphism was associated with several clinical and biological parameters. The G allele was significantly associated with poor glycemic control ($p = 0.021$). A trend toward association was also observed with obesity ($p = 0.08$) and android fat accumulation ($p = 0.056$). Regarding macrovascular complications, a significant association was identified with their presence ($p = 0.042$), particularly with peripheral arterial disease ($p = 0.03$).

Conclusion: These findings support the involvement of the SIRT1 gene in T2DM and its progression, opening perspectives for more targeted management strategies. However, these associations remain essentially observational and must be corroborated by functional studies.

Respiratory diseases as predictors of disability and early retirement in Tunisia

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Background: It has been established that sickness absence is strongly associated with disability and early

retirement. Nevertheless, little is known about the risk of early retirement across diagnostic causes. The aim was to determine the contribution of respiratory diseases (RD) to early retirement and disability.

Methodology: We examined medical files of patients who have consulted for early retirement or disability in the department of Occupational Medicine and Environmental Pathology of Farhat Hached University Hospital of Sousse between 2012 and 2023. Sociodemographic, medical and professional data was collected based on a pre-established questionnaire.

Results: A total of 406 participants with early retirement or disability was identified during the period of the study, among them, 85 (20.9%) had RD. The mean age was 54.65 ± 4.72 years with a sex ratio of 1.5. The mean occupational seniority was 26.22 ± 8.47 years. The most represented work sectors were healthcare (16.5%), textile industry (15.3%), food industry (8.2%) and education (5.9%). Asthma (48.2%) and chronic obstructive pulmonary disease (20%) accounted for nearly two third of the conditions leading to permanent disability on the grounds of which early retirement was granted. Obstructive sleep apnea/hypopnea, overlap syndrome and lung cancer represented 8.2%, 2.4% and 1.2% of cases respectively.

Conclusion: It is important to identify RD leading to early retirement or disability in order to consider strategies to encourage and enable longer working lives.

Advanced Maternal Age in ART: Impact and Emerging Therapeutic Approaches

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Introduction: Advanced maternal age (AMA) is an increasingly prevalent matter in assisted reproductive technology (ART) due to delayed childbearing worldwide. While ovarian aging is a major determinant, multiple additional factors contribute to age-related ART failure. This review aims to summarize the impact of advanced maternal age on ART outcomes and discuss emerging therapeutic strategies.

Methods: A review of the literature was conducted using the key words "advanced maternal age", "ART", "IVF", "outcomes", "treatment". Priority was given to systematic reviews, meta-analyses, randomized controlled trials. Published articles between 2015 and 2025 were included.

Results and Discussion: Advanced maternal age effects include reduced oocyte yield, lower fertilization and blastocyst formation rates, decreased implantation and live birth rates, and an increased risk of miscarriage. Multiple interacting mechanisms are at the origin of these effects. Ovarian aging remains central, characterized by a decline in follicular and oocyte quality, mitochondrial dysfunction, epigenetic alterations. This increases embryonic aneuploidy. Clinically, advanced maternal age is associated with higher miscarriage rates,

and increased cycle cancellation. Other mechanisms affect the implantation and the pregnancy such as the age-related alterations in endometrial receptivity, uterine vascularization, and the changes in the systemic hormonal and metabolic environment. PGT-A may improve embryo selection efficiency in selected older patients, although evidence from randomized trials remains limited. Emerging therapeutic approaches targeting mitochondrial function, oxidative stress and ovarian rejuvenation show promising preclinical Results.

Conclusion: Advanced maternal age significantly compromises ART success through complex and multifactorial biological mechanisms extending beyond ovarian reserve. While strategies such as PGT-A and novel adjuvant therapies offer potential benefits, their clinical application should be individualized.

Association between morphological abnormalities and sperm DNA integrity in infertile men

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Introduction: Male infertility is a complex condition involving both conventional sperm parameter abnormalities and impaired sperm DNA integrity. Standard semen analysis, while essential, does not evaluate sperm DNA fragmentation (SDF), a critical factor in male infertility. This study aimed to assess the prevalence of elevated SDF in infertile men and its association with sperm morphological abnormalities.

Methods: A retrospective observational study was conducted on 75 semen samples from infertile patients. Semen analysis followed WHO 2021 guidelines. Severe teratozoospermia was defined as <4% normal sperm forms. Sperm DNA fragmentation was measured using the TUNEL assay, and the DNA Fragmentation Index (DFI) was classified as normal (<15%), intermediate (15–30%), or high (>30%).

Results: The mean patient age was 41 years. DFI was normal in 21%, intermediate in 67%, and high in 12% of cases. Severe teratozoospermia was observed in 91%. Head abnormalities were present in 89% of patients, and a high Multiple Anomalies Index (MAI) in 77%. DFI was positively correlated with elongated head forms ($p=0.007$) and MAI ($p=0.018$). No significant association was found between DFI and lifestyle factors.

Conclusion: Sperm DNA fragmentation testing complements conventional semen analysis and should be incorporated into the assessment and management of male infertility to better guide assisted reproductive strategies.

AMPK activation mediates the antioxidant and anti-inflammatory effects of oleuropein in renal ischemia-reperfusion injury

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Introduction: Oleuropein is a major olive-derived polyphenol with well-established antioxidant and anti-inflammatory properties.

Objective: In the present study, we investigated the protective effect of OLE in a renal ischemia/reperfusion (I/R) rat model. We assessed whether OLE action depends on the modulation of AMPK-mediated oxidative stress and inflammation pathways.

Methods: Rats were subjected to 60-min of renal ischemia followed by 120-min of reperfusion. OLE (50 mg/kg, per os) was administered for three consecutive days before I/R. Ara-A, an AMPK inhibitor, was infused at a rate of 100 µg/kg per min for 10 min before the onset of ischemia.

Results: Our Results showed that OLE treatment improved significantly renal function, cell integrity and antioxidant status. These effects were completely blunted after Ara-A administration. Rats' pretreatment with OLE reduced NF-κB pathway through the phosphorylation of AMPK and its downstream target molecule COX 2, an effect that was abolished following AMPK inhibition.

Conclusion: In Conclusion, this study reveals that OLE pretreatment attenuates kidney injury after I/R and this beneficial effect is related to the activation of AMPK pathway. These Results emphasize oleuropein therapeutic potential for limiting oxidative and inflammatory damages associated with renal I/R.

Nursing in Safeguarding the Well-being and Dignity of Elderly Patients in Hospital Settings

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Introduction: With increasing life expectancy, the elderly face numerous health challenges. Mistreatment in hospitals, whether physical or psychological, remains a serious concern. This study aims to explore the contribution of nursing care in enhancing the well-being and dignity of hospitalized elderly patients.

Methods: This is a descriptive cross-sectional study with a quantitative approach. The target population consists of nurses from various services in three University Hospital Centers. Data collection was carried out using a self-administered, anonymous questionnaire.

Results: A total of 100 nurses participated, with 86% being female. Most were aged between 30 and 40 years (47%) and had 11-15 years of occupational seniority (38%). Half held senior nurse positions. Sixty-two percent

described proper care as a mix of respect, quality care, and positive attitudes. More than half (58%) practiced it regularly, with family support (64%) and team stability (57%) as key facilitators. Obstacles included poor communication (60%) and lack of time and staff (51%). Eighty-two percent stressed the importance of quality meals, and 76% emphasized activities for elderly patients. Respecting schedules and encouraging outings were also highlighted (70%). Eighty-four percent viewed proper care as essential for care quality. Respect (71%) and communication (64%) were considered key principles. Over half (53%) saw ageism as a barrier to providing proper care. Seventy percent of nurses lacked specific training, but 71% believed it was necessary. Most (89%) agreed family collaboration was vital.

Conclusion: The care of elderly patients depends on respect, communication, and collaboration with families.

Impact of Extraction Processes on the Phytochemical Richness in Antioxidant Bioactive Compounds of *Nitraria retusa*

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Introduction: *Nitraria retusa*, a species widely distributed in the arid regions of Tunisia, is traditionally used for its antioxidant, anti-inflammatory, anti-obesity, hypolipidemic, and neuroprotective properties. The extraction of secondary metabolites represents a key step for their identification and scientific valorization. The objective of this study is to compare three conventional extraction Methods, namely maceration, infusion, and decoction, in order to evaluate their extraction yield, polyphenol and flavonoid contents, as well as their influence on antioxidant activity and the chromatographic profile of *Nitraria retusa*.

Methods: Extracts were prepared by maceration, infusion, and decoction following standardized protocols. Extraction yields, phenolic and flavonoid contents, and antioxidant activity were determined using standard biochemical Methods. High-performance liquid chromatography (HPLC) analysis was performed to identify and quantify the major bioactive metabolites.

Results: Extraction efficiency varied significantly depending on the method used. Maceration produced extracts with the highest concentrations of phenolic compounds, whereas infusion and decoction allowed faster extraction but with different quantitative profiles. HPLC chromatograms revealed notable variations in bioactive composition according to the extraction process.

Conclusion: Extraction Methods strongly influence the phytochemical profile and bioactive compound richness of *Nitraria retusa*. Optimizing the choice of extraction method is essential for improved scientific, therapeutic,

and industrial valorization of this species.

Effect of Age and BMI on Response to *Nitraria retusa* Infusion in Overweight/Obese Women

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Introduction: Obesity is a major risk factor for age-related diseases and is linked to oxidative stress and dyslipidemia. *Nitraria retusa* has shown antioxidant, anti-obesity, and hypolipidemic effects in both animal models and humans. This study investigated the influence of age and body mass index (BMI) on the response to *Nitraria retusa* infusion in overweight and obese adult women as part of a targeted prevention strategy.

Methods: Thirty overweight and obese women received an intervention based on *Nitraria retusa* infusion for three months. Parameters measured before and after the intervention included body weight, BMI, body composition, waist circumference, and lipid profile. Participants were stratified according to age (<40 years vs. >40 years) and BMI (>30 kg/m²). Comparisons were performed using paired t-tests.

Results: *Nitraria retusa* infusion led to significant reductions in body weight (-2.06 ± 0.44 kg), BMI (-0.74 ± 0.17 kg/m²), fat mass ($-0.92 \pm 0.24\%$), and waist circumference (-3.11 ± 0.75 cm), along with an increased muscle-to-fat ratio ($+0.02 \pm 0.006$; all $p \leq 0.006$). Women under 40 years showed the strongest response, with greater weight loss (-2.51 ± 0.71 kg) and increased HDL cholesterol ($p = 0.008$). The greatest improvements were observed in obese younger women (BMI >30 kg/m²), while effects were attenuated in older women.

Conclusion: *Nitraria retusa* infusion improves body composition, weight loss, and lipid profile, with stronger effects in younger obese women. Age and BMI influence the response, supporting its potential for targeted weight management and prevention of age-related diseases.

Evaluation of the antioxidant activity of different extracts of *Nitraria retusa*

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Introduction: *Nitraria retusa* (Nitrariaceae) is a halophytic plant characteristic of desert regions in North Africa and Asia. It is well known for its exceptional richness in secondary metabolites, which confer a strong antioxidant potential.

Objective: To determine the contents of total polyphenols, flavonoids and condensed tannins in *Nitraria retusa*

extracts, and to evaluate their in vitro antioxidant activity. **Methods:** Three extraction procedures were applied to the plant leaves: infusion, decoction, and hydroethanolic maceration. Total polyphenols, flavonoids and condensed tannins quantified using spectrophotometric **Methods.** Antioxidant activity was assessed using the FRAP and ABTS assays to evaluate reducing power and free radical scavenging capacity, respectively.

Results: *Nitraria retusa* exhibited a high total polyphenol content, reaching 52.31 mg GAE/g in the maceration extract. Flavonoids were present at high concentrations (19.52–24.83 mg

CE/g), whereas condensed tannins were detected at lower levels (1.19–1.65 mg CE/g). Antioxidant assays revealed a strong reducing capacity, with FRAP activity corresponding to 40–60% of Trolox activity. The ABTS assay confirmed this antioxidant potential, with a minimum IC₅₀ value of 6.08 mg/mL for the infusion extract.

Conclusion: *Nitraria retusa* is distinguished by a remarkable richness in phenolic compounds and a strong antioxidant potential, supported by the synergistic action of its secondary metabolites. These findings highlight the interest of this plant as a promising natural source of bioactive molecules with high antioxidant value.

Influence of geographical origin on the phenolic composition of *Rosmarinus officinalis*

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Introduction: *Rosmarinus officinalis* is a Mediterranean medicinal plant rich in phenolic compounds, known for its antioxidant, anti-inflammatory, and anti-aging properties, whose bioactive composition varies with geographical origin. This study evaluates the effect of the collection region on the phytochemical profile of aqueous extracts from three areas in Tunisia.

Methods: Rosemary leaves were collected in Aïn Draham, Djebel Oueslatia, and Djebel Zaghouan. After washing, drying, and grinding, extracts (1g/50 mL, infused for 15 minutes at 100°C) were prepared, centrifuged, filtered, and stored. The qualitative and quantitative analysis of phenolic compounds was carried out by high-performance liquid chromatography (HPLC), based on retention times and areas under chromatographic peaks.

Results: HPLC analysis revealed rosmarinic acid and quercetin as the dominant compounds, with a similar qualitative profile among extracts but significant quantitative differences depending on geographical origin. Extract B is rich in rosmarinic acid. Extract A has a high quercetin content. Extract C shows low phenolic levels.

Conclusion: HPLC analysis reveals marked quantitative variability in phenolic compounds, despite comparable

qualitative composition between samples. This variability suggests a significant influence of origin on phenolic content and could impact the biological activity and antioxidant potential of the studied plant.

Oxidative stress during Gamete and embryo cryopreservation: Challenges and mitigation strategies

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Introduction: Cryopreservation of gametes and embryos is a fundamental technique in assisted reproductive technologies (ART), enabling fertility preservation and improved clinical outcomes. However, freezing and thawing procedures expose cells to oxidative stress caused by excessive production of reactive oxygen species (ROS), which can negatively affect cellular structure and function.

Methodology: A literature review was conducted using PubMed, Web of Science, and Google Scholar. Studies published up to October 2025 were screened using keywords related to oxidative stress, cryopreservation, gametes, embryos, and antioxidants. Original articles, reviews, and meta-analyses focusing on ROS-induced damage and antioxidant strategies in human or animal models were included. Twelve relevant studies were selected after eligibility screening.

Results: The selected studies demonstrated that cryopreservation significantly increases ROS levels, leading to lipid peroxidation, mitochondrial dysfunction, and DNA fragmentation. Spermatozoa were the most vulnerable cells, while oocytes and embryos showed stage-dependent sensitivity. Antioxidant supplementation, vitrification techniques, and optimized laboratory conditions reduced oxidative damage and improved post-thaw viability and developmental competence.

Conclusion: Oxidative stress is a major factor compromising the quality of cryopreserved gametes and embryos. Combining antioxidant strategies with optimized cryopreservation protocols may enhance ART outcomes. Further research is required to standardize interventions and evaluate long-term reproductive and offspring health effects.

Physical and Mental Quality of Life among Healthcare Professionals: Impact of Aging and Age-Related Comorbidities

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Introduction: The quality of life of healthcare

professionals is influenced by biopsychosocial factors, with biological aging mediated by oxidative stress and chronic inflammation, impairing functional capacity and mental well-being. This study aims to identify the factors associated with Physical Component Summary (PCS) and Mental Component Summary (MCS) scores among healthcare workers.

Methods: A cross-sectional study was conducted among 130 healthcare professionals, grouped by age (<40 vs. ≥40 years). QoL was assessed using a standardized questionnaire SF12.

Results: Among 130 participants, the population was mostly female (80.8%), with a mean age of 39 years. At least one comorbidity was present in 56.2% of participants, mainly diabetes (15.4%) and hypertension (13.1%). The mean global QoL score was 68 ± 20.5 . A statistically significant decline in the mental health score (MCS) was detected among participants aged ≥40 compared to those <40 (58.4 ± 26.9 vs. 63.6 ± 23.8). After linear regression, the physical score (PCS) was significantly reduced by female sex and diabetes. The mental score (MCS) was negatively associated with female sex and age and positively associated with occupational seniority. The global score was reduced by female sex, age and working in medical department.

Conclusion: Aging is associated with deterioration in mental health among health care workers. The detrimental impact of diabetes and ageing on QoL scores suggests an increased vulnerability associated with aging-related biological processes. These Results emphasize the importance of preventive measures that target oxidative and metabolic stress in order to protect healthcare workers' health capital.

Integrative Management of Knee Osteoarthritis: Evidence for Acupuncture in Elderly and Frail Populations

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Background: Knee osteoarthritis (KOA) is a major cause of chronic pain, functional limitation, and disability in older adults. Beyond structural joint degeneration, KOA significantly impairs daily activities, autonomy, and quality of life, particularly in vulnerable elderly populations. Persistent pain, reduced mobility, and social withdrawal contribute not only to physical decline but also to a shortened disability-free life expectancy. Although conventional pharmacological treatments can relieve symptoms, their long-term use is often limited by adverse effects, underscoring the need for safe, patient-centered therapeutic alternatives.

Objective: To explore the role of acupuncture as a supportive and integrative intervention for improving pain, physical function, and quality of life in elderly patients with knee osteoarthritis.

Methods: Recent randomized controlled trials, systematic reviews, and meta-analyses evaluating

manual acupuncture and electroacupuncture in KOA were reviewed. Outcomes included pain intensity, physical function, mobility, and health-related quality of life, assessed using validated clinical scales.

Results: Across multiple studies, acupuncture was associated with clinically meaningful reductions in knee pain and improvements in physical function. Patients frequently reported better mobility, greater ease in daily activities, and enhanced overall well-being. Electroacupuncture demonstrated particularly promising and sustained effects with good tolerability. Emerging evidence suggests that acupuncture may act through combined peripheral and central mechanisms, including modulation of inflammation, neural pain pathways, and psychosocial factors involved in chronic pain.

Conclusion: Acupuncture appears to be a valuable adjunct in the management of knee osteoarthritis in elderly populations, supporting autonomy, improving quality of life, and potentially extending disability-free life expectancy.

Occupational Eye Injuries in Workers Over 50: Assessing Clinical Severity and Age-Related Sequelae

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Introduction: Occupational eye injuries are a major cause of visual morbidity. While epidemiological data are well-documented for the general population, the specificities of the senior workforce (over 50 years old) remain poorly detailed. This study aims to describe the epidemiological, professional, clinical, and medico-legal characteristics of occupational eye injuries in workers aged over 50.

Methods: A retrospective descriptive study was conducted on occupational eye injuries reported to the National Health Insurance Fund (CNAM) in the Central Region (Tunisia), over a period of 15 years.

Results: Among 60 reported occupational eye injuries, 15 cases involved workers aged over 50 years (25%), with a maximum age of 62 years. The population was predominantly male (87%). The most affected sectors were construction (26.7%) and metallurgy (20%). At the time of injury, 93.3% of workers were not using eye protection. Metallic foreign bodies were the leading cause of trauma (33.3%). Open-globe injuries accounted for 40% of cases, while closed-globe injuries represented 53.3%. A unilateral decrease in visual acuity was observed in 40% of patients. Permanent visual impairment occurred in 47% of cases, mainly due to corneal leukoma (20%), macular involvement (20%), and post-traumatic cataract (13%). The mean duration of work disability was 180 days (range: 60–300 days), and the mean Permanent Partial Disability rate was 24.9%.

Conclusion: Occupational eye injuries in workers over 50 years old are associated with severe visual outcomes, prolonged work disability, and high disability rates, suggesting reduced post-traumatic resilience of aging ocular structures and highlighting the need for targeted preventive measures.

Paternal age and sperm quality: focus on DNA fragmentation

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Introduction: Advanced paternal age is increasingly common and may impair sperm quality. Conventional semen analysis often fails to detect age-related changes, whereas sperm DNA fragmentation (SDF) is a sensitive marker of genetic integrity. This study aimed to assess the impact of advanced paternal age on sperm DNA fragmentation compared to conventional semen parameters in infertile men.

Methods: A retrospective cohort study included 75 infertile men evaluated in the reproductive biology department. Participants were stratified into two age groups: ≤45 years (n=45) and >45 years (n=30). Semen analysis followed WHO 2021 guidelines, and sperm DNA fragmentation was measured using the TUNEL assay.

Results: Men aged over 45 years showed significantly higher DNA fragmentation index (DFI) values compared with men under 45 years ($28.5\% \pm 4.2\%$ vs $18.3\% \pm 3.1\%$; $p < 0.001$). In contrast, no significant differences were observed in conventional semen parameters between groups, including sperm concentration (42.8 ± 11.6 vs 45.2 ± 12.3 million/mL; $p=0.34$), motility ($49.7\% \pm 7.9\%$ vs $52.3\% \pm 8.2\%$; $p=0.28$), or semen volume (3.1 ± 0.7 vs 3.2 ± 0.8 mL; $p=0.41$). Multivariate analysis confirmed age as an independent predictor of elevated DFI ($\beta=0.42$, $p<0.001$), while confounders showed no significant effect.

Conclusion: Advanced paternal age is independently associated with increased sperm DNA fragmentation, whereas conventional semen parameters remain unchanged. DFI may serve as a more sensitive marker of age-related spermatogenic decline, supporting its integration into the evaluation of older infertile men to guide assisted reproductive strategies.

Paternal Age and ICSI Outcomes: Biological Mechanisms and Clinical Implications

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Introduction: Delayed fatherhood has become increasingly common worldwide that increases concerns

about the impact of advanced paternal age on assisted reproductive technology (ART) outcomes. This review aims to evaluate the impact of paternal age on ICSI outcomes, explore the underlying biological mechanisms, and the clinical implications in ART.

Methods: This review of the literature was conducted using PubMed and major reproductive medicine journals. The search included the keywords "paternal age", "ICSI", "ART outcomes", "sperm DNA fragmentation", "epigenetics", and "offspring health". Priority was given to systematic reviews, meta-analyses, randomized controlled trials published 2015 and 2025.

Results and Discussion: Advanced paternal age was associated with progressive age-related alterations in sperm quality. While sperm concentration was variably affected, sperm motility and morphology tended to decline. More consistently, paternal aging was associated with increased sperm DNA fragmentation, elevated oxidative stress, and a higher prevalence of chromosomal abnormalities. Advancing paternal age was linked to the accumulation of de novo point mutations and epigenetic alterations including abnormal DNA methylation patterns. Clinically, fertilization rates following ICSI were generally preserved. However, several studies reported impaired embryo development, reduced blastocyst formation rates, altered cleavage and higher miscarriage rates and a trend toward reduced live birth rates. In addition to effects on ART outcomes, advanced paternal age was associated with increased risks of adverse offspring outcomes, including neurodevelopmental disorders. This impact is amplified by advanced maternal age. Emerging management strategies, including sperm DNA fragmentation testing, antioxidant therapy, testicular sperm retrieval, and advanced sperm selection techniques have potential benefits.

Conclusion: Advanced paternal age negatively influences ICSI outcomes through complex mechanisms. Although fertilization may be preserved, embryo competence, pregnancy maintenance, and offspring health may be compromised.

Physiological and Psychological Impact of Menopause on Women in the Kairouan Region

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Introduction: Menopause is a physiological transition associated with hormonal changes that may affect vasomotor, physical, psychological, and sexual health, with a negative impact on women's quality of life. In the Kairouan region, data describing these effects remain limited.

Methods: A descriptive and analytical cross-sectional study was conducted between July and December 2024 among 300 postmenopausal women in the Kairouan region. Data were collected through semi-structured interviews using the validated Menopause-Specific Quality of Life (MENQOL) questionnaire. Sociodemographic characteristics, medical history, and

menopausal variables were analyzed to identify factors associated with symptom severity.

Results: The mean age of participants was 58.8 ± 8.7 years. Most women were homemakers (62.2%), and 40% had no formal education. The age at menopause was slightly lower than international averages. Vasomotor, physical, and psychological symptoms were the most frequently reported and increased in severity during the postmenopausal period. Symptom severity was significantly associated with diabetes ($p = 0.05$), thyroid disorders ($p = 0.006$), age at menopause ($p = 0.02$), and a history of cancer ($p < 0.001$). Awareness and management of menopausal symptoms were generally insufficient, particularly for psychological complaints.

Conclusion: Menopause has a substantial multidimensional impact on the quality of life of women in the Kairouan region. These findings highlight the need for improved health education, early identification of high-risk women, psychological support, and better training of healthcare professionals adapted to local needs.

Sexuality in Menopausal Women: Impacts and Challenges

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Introduction: Sexual health is an essential component of women's overall well-being and is frequently affected during menopause due to hormonal, physical, and psychosocial changes. These alterations may significantly impair sexual function and quality of life, yet remain underexplored in the Tunisian context.

Methods: A descriptive and analytical cross-sectional study was conducted among 50 menopausal women attending the outpatient gynecology clinic at Ibn El Jazzer University Hospital in Kairouan. Data were collected using a structured self-administered questionnaire including the Female Sexual Function Index (FSFI), along with information on menopausal symptoms, medical history, and hormone replacement therapy use.

Results: Sexual dysfunction was highly prevalent, with 82% of participants scoring below the FSFI cutoff of 26.55. The mean overall FSFI score was 16.40 ± 10.34 . Menopausal symptoms were frequently reported, including hot flashes (88%), sleep disturbances (52%), vaginal dryness (48%), urinary incontinence (42%), and osteoporosis (34%). Hormone replacement therapy was used by 28% of participants. No statistically significant associations were identified between sexual dysfunction and the studied clinical or demographic factors.

Conclusion: Menopause plays a significant role in the alteration of sexual health during midlife. Addressing sexual dysfunction in menopausal women requires a multidisciplinary approach integrating clinical management, patient education, and psychosocial support. Enhancing awareness and encouraging open communication between women and healthcare providers are essential to improve sexual well-being and

quality of life.

Urtica dioica Poultrice in the Management of Knee Osteoarthritis: A Systematic Review

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Background: Knee osteoarthritis is a chronic and disabling condition that affects daily activities and quality of life for millions of patients worldwide. Alongside conventional treatments, many patients turn to traditional topical remedies such as *Urtica dioica* (stinging nettle) poultices in search of pain relief and improved joint function. Despite their long-standing use, the clinical value of these applications has not been clearly established.

Objective: This systematic review aimed to explore and synthesize the available clinical evidence on the effectiveness and safety of *Urtica dioica* poultice when used in the management of knee osteoarthritis.

Methods: Following PRISMA guidelines and a PICO-based approach, we conducted a structured search of the literature focusing on adults with knee osteoarthritis treated with topical *Urtica dioica* applications. Studies assessing pain, functional outcomes, and adverse effects were considered, including randomized controlled trials and pilot clinical studies.

Results: Only a small number of clinical studies were identified, most of which investigated nettle sting applications rather than standardized poultices. These studies reported modest short-term pain relief and generally good tolerability, but functional improvements were inconsistent and not statistically robust. Importantly, no high-quality randomized controlled trials specifically evaluating *Urtica dioica* poultices were found.

Conclusion: Although *Urtica dioica* poultices remain widely used in traditional practice and appear to be safe, current scientific evidence does not allow firm **Conclusions** regarding their effectiveness in knee osteoarthritis. Carefully designed clinical trials with standardized poultice preparations and validated outcome measures are needed to better define their place within integrative approaches to gonarthrosis management.

Inflammatory Cytokine Profiles in Frailty: A Cross-Sectional Study of Tunisian Older Adults

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Introduction: Frailty represents a multidimensional syndrome involving the complex interplay of psychological, physical, and biological factors. Given the established role of inflammation in aging and age-related conditions, understanding its contribution to frailty development remains crucial. Our aim is to evaluate serum levels of pro-inflammatory cytokines (TNF- α ,

IL-8, and IL-6) across different frailty stages in elderly and examine their relationships with biochemical and geriatric parameters.

Methods: A cross-sectional study was conducted among 141 Tunisian older adults (≥ 65 years) classified using the Short Emergency Geriatric Assessment (SEGA) into three groups: non-frail (SEGA ≤ 8 , n=50), frail ($8 < \text{SEGA} \leq 11$, n=40), and severely frail (SEGA > 11 , n=51). Serum pro-inflammatory cytokines were quantified using sandwich ELISA.

Results: Severely frail subjects were significantly older and exhibited lower BMI, higher depression risk, greater malnutrition risk, reduced independence, increased physical inactivity, and altered biochemical profiles compared to frail and non-frail groups. TNF- α levels were significantly elevated in severely frail subjects (28.71 pg/ml) compared to frail (25.54 pg/ml) and non-frail subjects (28.16 pg/ml, $p < 0.001$). Similarly, IL-8 levels were markedly higher among severely frail individuals (22.31 pg/ml) versus frail (9.69 pg/ml) and non-frail subjects (19.91 pg/ml, $p < 0.001$). No significant differences in IL-6 levels were observed. Negative correlations were identified between inflammatory markers (TNF- α , IL-8, IL-6, CRP) and albumin, HDL, activities of daily living (ADL), and malnutrition assessment (MNA) scores.

Conclusion: This study provides evidence supporting the role of pro-inflammatory cytokines, particularly TNF- α , CRP, and IL-8, in frailty pathogenesis among older adults, suggesting inflammation as a potential therapeutic target for frailty prevention and management.

Oxidative Stress Biomarkers in Tunisian Frail elderly

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Introduction: Frailty encompasses a complex syndrome arising from the interplay of physical and biological factors. Oxidative stress, recognized as a key contributor to aging and age-related pathologies, may induce deleterious effects on cellular membranes, potentially playing a pivotal role in frailty pathogenesis. Our aim is to investigate the relationship between frailty and oxidative stress by evaluating antioxidant enzyme activities and oxidative damage markers in red blood cells and plasma of elderly.

Methods: This study enrolled 70 participants aged ≥ 65 years, stratified using the Short Emergency Geriatric Assessment (SEGA) into frail patients (n=40) and non-frail controls (n=30). Spectrophotometric analyses were performed to quantify malondialdehyde (MDA), conjugated dienes (CD), and carbonylated proteins (CP) as oxidative damage markers, alongside superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx) activities as indicators of antioxidant defense capacity in plasma and/or erythrocytes.

Results: Frail patients demonstrated significantly elevated activities of all three antioxidant enzymes: catalase, glutathione peroxidase, and superoxide dismutase,

compared to non-frail controls ($p < 0.05$). Concomitantly, substantial accumulation of lipid and protein oxidation products (MDA, CD, and CP) was detected in the plasma and/or red blood cells of frail individuals. Positive correlations were established between catalase activity and conjugated dienes levels, as well as with frailty scores.

Conclusion: These findings provide compelling evidence for oxidative stress at the peripheral level in frail patients, characterized by both enhanced antioxidant enzyme compensatory responses and increased oxidative damage to lipids and proteins. The disruption of redox homeostasis in erythrocytes may represent a pathophysiological mechanism underlying frailty development and progression.

Stress, Musculoskeletal Disorders, and Work Capacity: Factors in Premature Aging Among Healthcare Workers.

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Introduction: Aging is a complex process strongly influenced by extrinsic factors, particularly the work environment. Healthcare workers (HCWs), who are continuously exposed to stressful situations, irregular working hours, and pathogenic agents, are especially vulnerable to premature and pathological aging.

Objective: To investigate factors associated with early physical aging among healthcare workers.

Methods: A cross-sectional study conducted among HCWs in the departments of Physical Medicine and Rehabilitation, Neurology, Maxillofacial Surgery, Pediatrics, Cardiology, and Orthopedics at Sahloul University Hospital in Sousse, Tunisia, during March and April 2024. The Nordic Musculoskeletal Questionnaire was used to screen for musculoskeletal disorders. The Karasek Job Content Questionnaire assessed psychosocial stress at work, and the Work Ability Index (WAI) evaluated perceived work capacity.

Results: Of 145 distributed questionnaires, 105 were completed (response rate: 72.4%). The mean age of participants was 48.4 ± 5.7 years, with a male-to-female ratio of 0.57. Nurses represented the largest group (61.9%). Mean job tenure at the hospital was 18.61 ± 7.2 years. Over the past 12 months, 87.6% of participants reported pain in the neck and/or back, elbows, hands/wrists, or legs. According to the Karasek model, 18.1% of respondents experienced "job strain." Based on the WAI scores, 37.1% rated their work capacity as poor, 26.7% as moderate, 21.9% as good, and 14.3% as very good.

Conclusion: These findings highlight the critical impact of working conditions in the healthcare sector on premature aging. Improving these conditions is essential to prevent early retirement, enhance work performance, and reduce absenteeism among healthcare professionals.

Quality of life in Tunisian infertile men

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Introduction: Infertility affects 10–15% of the Tunisian population and represents a significant psychosocial burden. This study aimed to assess the quality of life (QoL) of infertile Tunisian men and to identify associated sociodemographic and psychological factors.

Methods: A descriptive cross-sectional study was conducted among 50 infertile men attending the Reproductive Biology Department of Farhat Hached Hospital, Tunisia, between September and October 2025. Participants completed the Fertility Quality of Life (FertiQoL) questionnaire and the Hospital Anxiety and Depression Scale (HADS), both validated in Arabic. Clinical characteristics and semen parameters were also collected.

Results: The mean age was 39.5 years. Anxiety symptoms were observed in 44% of participants, while depressive symptoms were present in 16%, including 8% with clinically significant depression. Depressive symptoms were associated with increased sexual dysfunction, including reduced libido and erectile difficulties (AOR 3.8; 95% CI 1.9–7.1). Impaired QoL was found in 22% of men, with severe impairment in 6%. The most affected FertiQoL domains were Emotional and Mind–Body. Lower QoL was significantly associated with higher body mass index, rural residence, and non-ART treatment in partners. No significant association was found between semen parameters and either QoL or psychological distress scores. Psychological stress correlated positively with longer infertility duration.

Conclusion: Infertility negatively impacts the quality of life of Tunisian men, particularly in emotional and psychosomatic domains. Integrating psychological assessment and supportive interventions into infertility management may improve overall well-being and coping strategies.

Particularities of allergic contact dermatitis in the elderly

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Introduction: Allergic Contact Dermatitis (ACD) is a common delayed hypersensitivity reaction that becomes more complex in elderly individuals due to changes in skin and immune function.

Aims: To describe the clinical characteristics of ACD in elderly subjects and evaluate their allergic responses to

patch tests.

Methods: A retrospective descriptive study was conducted at the Occupational Medicine Department of Farhat Hached University Hospital in Sousse from 2010 to 2020 and included all patients aged 65 and older who underwent patch testing with the European Standard Battery containing 28 allergens for the diagnosis of ACD.

Results: The study included 50 patients with an average age of 72 years and a male predominance (sex ratio 1.17). The most represented age group was 70-75 years (42%). Four patients had a family history of atopy, 8% had personal history of skin allergies, 12% had fungal infections. Patch tests revealed sensitization primarily to chromium (22%), nickel (12%), cobalt (12%), and balsam of Peru (10%) with positive reactions at two cross levels in 26% of cases. In 12% of cases, the etiology of contact dermatitis remained undetermined. Analytical study showed statistically significant relationships between erythematous lesions and nickel sensitization ($p=0.019$), lichenoid appearance and allergic urticaria diagnosis ($p=0.017$), as well as irritative dermatitis origin and gardening activities ($p=0.009$).

Conclusion: Diagnosis of ACD in elderly individuals is complex due to age-related skin changes and extraproductive factors. Patch tests remain a crucial tool, though their interpretation can be challenging due to specific characteristics in this population.

Obesity-Related Oxidative Damage to Male Reproductive Function: A comprehensive Literature Review

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Introduction: According to WHO data, the prevalence of obesity, a chronic multifactorial condition caused by energy imbalance and excessive fat buildup, has tripled since 1975 affecting 13% of adults worldwide (11% of men and 15% of women). An increasing amount of evidence links obesity to male infertility, with oxidative stress (OS) being the main mechanism affecting sperm proteome, endocrine function, and semen quality. Obesity induces reproductive dysfunction through excessive ROS and stress pathways, impairing sperm quality, hormones, and fertility potential across clinical and animal studies. These findings point to weight management and antioxidants as important therapies.

Methods: In order to assess obesity-related OS mechanisms and mitigation strategies like weight management and antioxidant therapy, this literature review integrates a variety of evidence from human clinical studies, long-term animal models, short-

term high-fat diet interventions (mice 8 weeks), and comparative genetic/diet-induced obesity rat studies.

Results: According to human cohort studies, obese men show higher ROS, early apoptotic spermatozoa, DNA fragmentation, decreased testosterone, and increased cortisol in addition to considerably lower sperm motility, concentration, total count, normal morphology, and seminal TAC. SURRG long-term obese Wistar rats (54–60 weeks) exhibit altered sperm parameters, an imbalance in estradiol, and proteome alterations in the epididymis and sperm affecting inflammatory proteins, metabolism, and ROS generation. 8-week-old mice on a high-fat diet displayed reduced testicular weight, abnormal morphology, germ cell depletion, decreased sperm count, motility, viability, and testosterone, elevated caspase-3, decreased Bcl-2, and ER stress markers (Xbp1, Grp78, CHOP). Diet-induced vs. genetic obesity differentially alters hormone receptors, leptin signaling, cytokines, OS biomarkers, and cell cycle mediators through varying adipose tissue accumulation.

Conclusion: Through apoptosis, hormonal instability, OS-driven sperm destruction, and disruption of the blood-testis barrier, obesity impairs male fertility. Optimizing reproductive results in obese males requires multidisciplinary weight loss, antioxidant supplements, and lifestyle therapies that have been validated via long-term clinical trials.

Modulating sperm oxidative stress with platelet-rich plasma: Emerging evidence in male subfertility

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Platelet-rich plasma (PRP), an innovative therapy with established efficacy across multiple medical disciplines, shows considerable promise yet remains underexplored in its effects on human sperm quality. This study aims to investigate the effect of autologous PRP supplementation on oxidative stress levels in human sperm. From a methodological standpoint, PRP was freshly prepared from venous blood and added to each ejaculated semen sample at different concentrations of 2%, 5%, and 10%. Reactive oxygen species (ROS) in spermatozoa were measured after 24 hours of incubation at 37° (5% CO₂), using nitro-blue tetrazolium (NBT) test. A total of 180 semen samples were obtained from 15 patients. Findings indicate that the supplementation with PRP significantly reduced the reactive oxidative species levels in spermatozoa mainly after 24h of incubation with PRP at 2% ($p = 0.001$), 5% ($p = 0.001$) and 10% ($p = 0.001$) when compared to the control group. This study has shown that PRP supplementation could be a promising

tool to enhance sperm quality against oxidative stress and a starting point to investigate the usefulness of PRP in ART procedures.

Is seminal oxidative stress a mirror of psychological stress perceived by infertile men?

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Introduction: Psychological stress has been increasingly linked to oxidative stress in infertile men. Anxiety and depression may induce reactive oxygen species (ROS), disrupting the balance between oxidants and antioxidants and impairing semen quality. This study assessed the association between anxiety/depression scores and seminal oxidative stress in Tunisian infertile men.

Methods: A cross-sectional study was conducted at the Reproductive Biology Laboratory of Fattouma Bourguiba University Hospital (Monastir, Tunisia) from August 2020 to January 2023. Patients undergoing semen analysis were included, excluding those with diagnosed psychiatric disorders, severe symptoms, or recent major stressors. Anxiety and depression were assessed using the validated Arabic HADS scale. Semen analysis followed WHO 2021 guidelines. Seminal SOD (N=105) and catalase (N=51) were measured.

Results: A total of 282 patients were evaluated. Mean HAD-D and HAD-A scores were 6.56 ± 3.07 and 7.94 ± 3.73 , respectively. Mean SOD and catalase levels were 42.32 ± 24.08 U/mL and 19599.82 ± 12745.36 U/mL. Patients with higher HAD-D scores had significantly elevated catalase levels (29856.07 ± 15904.51 vs 17968.14 ± 11564.79 U/mL; $p=0.02$). No differences were observed for SOD, and no correlation was found between oxidative stress markers and HADS scores.

Discussion: Despite unchanged SOD levels, elevated catalase in depressed patients contrasts with literature suggesting antioxidant depletion under chronic oxidative stress. This may reflect an early compensatory response, possibly mediated by glucocorticoid-induced ROS. Limitations include cross-sectional design, lack of hormonal data, and small catalase sample. Future studies should include oxidative damage markers and stress-reduction strategies.

Conclusion: Elevated catalase levels were observed in infertile men with higher depression scores. While no correlation was found between antioxidant enzymes and psychological status, screening for depressive symptoms remains important in infertility management.

Assessment of Healthcare Providers' Knowledge and Attitudes Regarding the Specificities of Care in Older Adults

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Background: Population aging poses major challenges for healthcare systems. In Tunisia the leading aging nation in the Arab and African regions ensuring caregivers are equipped to meet older adults' complex needs is urgent. Geriatric care demands a holistic approach integrating medical, psychological, and social dimensions, yet knowledge and attitude gaps among providers may compromise care quality.

Aims: To assess healthcare professionals' knowledge and attitudes regarding geriatric care specifics in hospital settings.

Methods: A descriptive cross-sectional study was conducted in 2021 among 150 healthcare workers at Sahloul University Hospital (Sousse, Tunisia). A pre-validated French questionnaire evaluated sociodemographic/professional characteristics and knowledge/attitudes across 15 geriatric domains (e.g., skin changes, dementia, pain, medication, elder abuse, communication).

Results: Ninety-two responses were collected (60.9% response rate); mean age was 40.4 years, 51.1% female, 70.7% nurses. Most had >10 years' experience (76%). While 73.9% correctly identified age-related skin changes, misconceptions persisted: 67.4% considered pain a normal aging consequence and 46.7% assumed sleeping patients were pain-free. Alcohol (82.6%) and infections (69.6%) were recognized as dementia-exacerbating factors. Regarding elder abuse, 65.2% estimated family members as perpetrators in half of cases. Communication strategies for sensory-impaired patients were endorsed by 60.9%. Confidence varied widely: 81.5% felt capable of triage, but only 16.3% in pain assessment. Notably, 100% reported full confidence in nutritional assessment and end-of-life decisions.

Conclusion: Targeted educational interventions on pain management, atypical disease presentation, delirium recognition, and ethical issues are essential to enhance geriatric care quality.

Telomere biology between aging and cancer

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Understanding the intricate dynamics of telomere biology is essential to delineate the strong interface between aging and cancer. Telomeres, the protective terminal structures of chromosomes, occupy a pivotal position in

this interplay. Although progressive telomere shortening driven by limits to cellular replication can constrain tumor growth by activating DNA repair pathways, it can simultaneously foster oncogenic chromosome alterations that promote tumorigenesis. The enzyme telomerase, which sustains telomere length, stands out as a central factor in this context: its upregulation in cancerous cells preserves telomeres, thereby mitigating the growth-inhibitory impact of critically short telomeres on proliferation. Moreover, telomerase appears to influence cellular fate beyond telomere maintenance, contributing to cell growth via alternative signaling routes. This perspective aims to synthesize these observations and to examine the dual role of telomere loss in aging and cancer within the broader frameworks of developmental biology, tissue turnover, and evolution.

Life style and Oxidative Stress: Impact on sperm quality in Tunisian infertile men

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Introduction: Male infertility is implicated in nearly 50% of couple infertility cases and represents a growing public health challenge. Beyond genetic and medical causes, sperm quality is strongly influenced by lifestyle habits. These modifiable determinants primarily act through oxidative stress mechanisms, leading to impaired spermatogenesis and sperm DNA damage. This study aimed to assess the impact of lifestyle factors on sperm quality in infertile Tunisian men.

Methods: A cross-sectional study was conducted in October 2025 in the Reproductive Biology Department of Farhat Hached Hospital. Fifty infertile men underwent semen analysis according to WHO 2021 criteria and completed a structured questionnaire collecting demographic data, lifestyle habits, stress level, sleep quality assessed using the Pittsburgh Sleep Quality Index (PSQI), and diet evaluated by the Mediterranean Diet Adherence Screener (MEDAS). The DNA Fragmentation Index (DFI) was measured using the TUNEL assay in a subgroup of 10 patients.

Results: The mean age was 39.5 years and the mean BMI was 26.5 kg/m². Smoking was reported by 70% of participants and high psychological stress by 42%. Teratozoospermia was the most frequent semen abnormality (82%). Smoking was significantly associated with reduced sperm concentration ($p=0.001$) and progressive motility ($p=0.031$). Poor sleep quality was negatively correlated with progressive motility ($\rho = -0.39$; $p=0.0059$). Low adherence to the Mediterranean diet combined with obesity significantly increased morphological abnormalities ($p=0.027$). Higher DFI values were associated with the accumulation of multiple lifestyle risk factors ($p=0.016$).

Conclusion: Modifiable lifestyle factors exert a significant

and cumulative negative impact on sperm quality, supporting the integration of lifestyle counseling into male infertility care.

Phenotypic variability linked to novel MAPK8IP3 variants identified by whole-exome sequencing in corpus callosum malformations

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Introduction: The MAPK8IP3 gene is involved in MAPK signaling pathways that regulate neuronal differentiation, axonal guidance, and brain morphogenesis. Although chromosomal abnormalities are commonly investigated in corpus callosum malformations (CCM), the contribution of single-gene variants remains insufficiently characterized. This study reports two unrelated patients with CCM carrying novel MAPK8IP3 variants and highlights the associated phenotypic variability.

Methods: Both patients underwent detailed clinical, neurological, and neuroimaging evaluations. Standard karyotyping and array-based comparative genomic hybridization were performed as first-line genetic investigations and yielded normal results. Whole-exome sequencing (WES) was subsequently conducted. Identified variants were interpreted according to the American College of Medical Genetics and Genomics (ACMG) guidelines.

Results: Despite involvement of the same gene, the two patients exhibited markedly different phenotypes. The first patient presented with microcephaly, epilepsy, and complex cortical and brainstem malformations, including pachygyria, cortical dysplasia, brainstem hypoplasia, and corpus callosum hypoplasia. WES identified a de novo missense variant in MAPK8IP3 (c.1735C>T; p.Arg579Cys), classified as likely pathogenic. The second patient showed macrocephaly, congenital heart disease, behavioral disturbances, and severe midline brain anomalies, including complete agenesis of the corpus callosum, holoprosencephaly, colpocephaly, and hydrocephalus. A heterozygous missense variant in MAPK8IP3 (c.3833A>G; p.Lys1278Arg), classified as a variant of uncertain significance, was identified.

Conclusion: These findings expand the phenotypic spectrum associated with MAPK8IP3 variants and support its role in commissural development. They also emphasize significant genotype–phenotype variability and the importance of MAPK signaling in cerebral morphogenesis.

Surdité professionnelle chez le sujet âgé : Entre bruit professionnel et vieillissement auditif

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Introduction: La surdité professionnelle demeure une affection fréquente liée à l'exposition chronique au bruit en milieu de travail. Chez le sujet âgé, l'association avec le vieillissement auditif complique l'évaluation de l'origine et de la sévérité de la perte auditive.

Objectif: Décrire les particularités sociodémographiques, professionnelles, cliniques et audiométriques de la surdité professionnelle chez les sujets âgés.

Méthodes: Il s'agit d'une étude descriptive rétrospective, réalisée sur dix ans et portant sur l'ensemble des travailleurs dans le secteur privé ayant une SP déclarée à la CNAM, et dont les dossiers ont été examinés par la Commission médicale auprès de la CNAM chargée de la réparation des victimes des accidents du travail et des maladies professionnelles dans le secteur privé de la région du Centre Tunisien. Le recueil des données s'est réalisé à partir des dossiers des patients concernés, comportant les données socio-professionnelles et médicales. L'exposition au bruit était évaluée par mesurage du niveau sonore par sonomètre.

Résultats: Au total 527 patients âgés de plus de 50 ans ont été recensés. Une prédominance masculine a été notée (93,3%). L'âge moyen des participants était de 53±2,62 ans. Le secteur d'activité prédominant était celui des bâtiments et travaux publics (BTP) qui représentait 40,1% des cas, suivi par l'industrie du bois (10,1% des cas), et de l'industrie automobile (9,2 % des cas). Le poste d'ouvrier était prédominant (47,1% des cas). L'ancienneté professionnelle moyenne était de 23 ± 11,03 ans. Aucun antécédent personnel pathologique n'a été noté chez 79,31% des participants. Seulement 8,9 % des salariés avaient une gêne sociale liée à la surdité. Les résultats de l'audiogramme ont objectivé une perte auditive moyenne de 57,91 ± 18,53 dB au niveau de l'oreille droite, et une perte auditive moyenne de 59,48 ± 18,08 dB au niveau de l'oreille gauche. La surdité était de perception, bilatérale et symétrique chez 73,7% des participants. Dans 73,2% des cas, le niveau sonore auquel était exposé les participants était ≥ 85db. Seulement 51,7% des cas ont été reconnus en maladie professionnelle.

Conclusion: Chez le sujet âgé, le diagnostic de surdité d'origine professionnelle doit être posé avec prudence, en raison de l'intrication avec le vieillissement auditif. Une évaluation audiométrique rigoureuse et une analyse précise de l'exposition professionnelle sont indispensables.

The Contribution of Clinical Data and Genomic Databases to the Interpretation of Rare Variants

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Introduction: Accurate interpretation of rare genetic variants remains a major challenge in clinical genomics, particularly in pediatric patients presenting with complex and heterogeneous phenotypes. Comprehensive clinical characterization, combined with molecular findings and reference to genomic databases, is essential to establish reliable genotype-phenotype correlations.

Methods: We report two cases illustrating the challenges of variant interpretation.

Trio-based sequencing using the Illumina Novaseq 6000 Platform was performed.

Results: The first case concerns a 6-year-old female patient presenting with congenital heart defects, including coarctation of the aorta and hypoplasia of the aortic arch, associated with intellectual developmental delay and facial dysmorphism. Trio-based sequencing identified a de novo ARID1B (c.3831C>G) variant. Although ARID1B is a gene well known to be associated with neurodevelopmental disorders and congenital anomalies, variant classification required careful comparison with previously reported cases and database entries to support its clinical relevance.

The second case involves a 9-month-old female infant presenting with psychomotor developmental delay, facial dysmorphism characterized by strabismus and thin lips, and a congenital heart defect of the tetralogy of Fallot type. Molecular analysis revealed a novel heterozygous de novo missense variant in the CTCF gene (c.1414T>G). This variant is absent from population databases and predicted to be pathogenic by in silico tools; however, the lack of functional studies and limited published genotype-phenotype correlations complicated its interpretation.

Conclusion: These two cases emphasize the importance of integrating detailed clinical phenotyping, trio-based molecular analysis, and comprehensive database review to overcome uncertainties in variant interpretation. Such an integrative approach is essential to improve diagnostic accuracy and ensure appropriate genetic counselling. Ultrasound showed associated thyroid abnormalities in 32.25% of cases. A total of five patients underwent surgery, including four false negatives and one true negative. This could be explained by: the histological nature (hyperplasia), the multiglandular nature of the lesion, the small size of the glands, associated thyroid abnormalities, and drug interference (calcium supplements and vitamin D).

Conclusion : In SHPT, 99mTc-Sestamibi scintigraphy has limited sensitivity, particularly in multiglandular forms. SPECT/CT partially improves sensitivity, particularly for small size lesions and posterior locations.

Pitfalls of parathyroid scintigraphy when assessing secondary hyperparathyroidism in elderly patients with end-stage renal disease

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Introduction: Parathyroid scintigraphy with 99mTc-Sestamibi is a gold standard method for preoperative localization of pathological parathyroid glands. However, in secondary hyperparathyroidism (SHPT), this technique has reduced sensitivity. The aim of our study was to describe the clinical features of patients with SHPT who had a negative scintigraphy and to evaluate the factors influencing the detectability of pathological parathyroid glands.

Methods: This was a retrospective study including all patients monitored for SHPT who underwent 99mTc-Sestamibi parathyroid scintigraphy between January 2023 and December 2024 at the nuclear medicine department of the Sahloul University Hospital in Sousse. The protocol combined the dual-phase method and single-photon emission computed tomography coupled with computed tomography (SPECT/CT).

Results: Among 188 patients with HPTS who underwent 99mTc-Sestamibi parathyroid scintigraphy, 51 (27%) patients had negative scintigraphy and 31 were included. The mean age of our population was 72 years, ranging from 61 to 90 years. The mean PTH was 1015.17 pg/mL in our series, with 10 patients having levels <800 pg/mL. Seventeen patients (54.8%) were receiving long-term calcium treatment with vitamin D.

Impact thérapeutique de la TEP au 18F-FDG dans le cancer différencié de la thyroïde

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Introduction: Les carcinomes différenciés de la thyroïde (CDT) réfractaires à l'iode radioactif (IRA) sont généralement difficiles à maîtriser chez les personnes âgées avec une évolution rapidement progressive. Cette étude visait à évaluer l'apport de la TEP/TDM au ¹⁸F-FDG et son influence sur les décisions thérapeutiques dans le suivi des CDT.

Méthodes: Il s'agissait d'une étude descriptive rétrospective au service de médecine nucléaire à Sahloul durant la période allant de novembre 2019 au septembre 2024. Nous avons inclus 40 patients suivis pour un CDT ayant bénéficié d'un examen TEP/TDM au 18F-FDG.

Résultats: La TEP était négative dans huit cas parmi les 13 patients qui ont été classés en réponse biochimique incomplète (RBI). Chez cinq patients qui ont été classés en RBI avant la TEP, cet examen a permis d'identifier des adénopathies cervicales d'allure suspecte qui ont été tous opérés avec confirmation de l'origine métastatique dans quatre cas. Pour les autres patients qui ont été classés en réponse morphologique incomplète avant la TEP (24/40), cet outil a permis de confirmer la persistance de la maladie et d'objectiver des nouveaux sites métastatiques.

Les résultats de la TEP/TDM au 18F-FDG ont entraîné une modification du plan thérapeutique dans 35% des cas suite à un sur-classement dans 5 cas (12,5%), un sous-classement dans 3 cas (7,5%) et par l'identification de nouvelles localisations métastatiques.

Conclusions: Après traitement par IRA, la TEP/TDM au ¹⁸F-FDG s'est révélée utile pour la restadification dynamique des CDT. Elle permet d'adapter les stratégies thérapeutiques de manière individualisée et fournit des informations précieuses sur la biologie tumorale.

Paternal aging: Consequences on sperm parameters and ICSI outcomes

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Introduction: Increasingly delayed parenthood has led to a rise in advanced paternal age, prompting questions about its role in male reproductive potential and outcomes of assisted reproductive technology (ART). In contrast to the established decline in female fertility with age, the effects of advancing paternal age remain a subject of debate. To address this, the present study investigates the association between paternal age and standard sperm parameters, as well as key embryological outcomes, specifically within ICSI cycles. The findings are intended to inform clinical counseling for couples undergoing infertility treatment.

Methods: This is a retrospective observational study conducted in the Department of Reproductive Biology at Farhat Hached Hospital from January 2024 to November 2025, including 235 infertile couples who underwent an ICSI cycle. Exclusion criteria were female age >40 years, major testicular pathologies, and azoospermia. Patients were divided into two groups according to paternal age (≤40 years vs >40 years). Statistical analysis was performed using SPSS version 26. Correlations were assessed using Spearman's test, and confounding factors (smoking, abstinence period, varicocele for sperm parameters; female age, AMH, BMI for embryological outcomes) were adjusted using multivariate linear regression models.

Results and Discussion: A significant reduction in ejaculatory volume (2.78 ± 0.92 ml vs 3.12 ± 0.85 ml; $p = 0.04$) and progressive motility ($29.2 \pm 11\%$ vs $35.0 \pm 10.5\%$; $p = 0.026$) was observed in men aged ≥40 years. These associations remained significant after multivariate adjustment for major confounding factors.

Sperm morphology was similar between the two groups and remained unchanged after multivariate adjustment. However, subgroup analysis of men >45 years revealed a significantly higher morphological anomaly index (MAI) (2.43 ± 0.41 vs 1.89 ± 0.37 ; $p = 0.048$), suggesting a possible threshold effect of structural alterations beyond this age.

From an embryological perspective, fertilization rates ($74.20 \pm 24.79\%$ vs $66.11 \pm 34.25\%$; $p = 0.42$) and cleavage rates ($84.11 \pm 7.95\%$ vs $83.9 \pm 6.76\%$; $p = 0.28$) were comparable between the two groups. However, blastulation potential was significantly reduced in men aged ≥ 40 years (36.87% vs 48.22% ; $p = 0.021$). In addition, the proportion of top-quality blastocysts on day 5 was lower in the older group ($43.47 \pm 42.65\%$ vs $53.55 \pm 39.71\%$), although this difference did not reach statistical significance ($p = 0.381$).

Conclusion: Our study highlights a progressive deterioration of functional sperm parameters and an impact on late embryonic development, suggesting a major role of oxidative stress and age-related epigenetic alterations. A comprehensive andrological assessment, including evaluation of sperm DNA integrity, appears essential in men over 40 years of age to enable personalized management in ART.

The Impact of Diabetes Mellitus-Related Oxidative Stress on Male Fertility

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Introduction: Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia due to impaired insulin secretion or action. Increasing evidence links DM to male infertility, with oxidative stress (OS) as a key mechanism impairing sperm quality and hormonal balance. Hyperglycemia activates pathways such as the polyol pathway and advanced glycation end products (AGEs), leading to testicular dysfunction. Diabetic men show poorer semen parameters, disrupted endocrine profiles, and reduced natural and assisted reproductive outcomes. Antioxidants, lifestyle changes, and glycemic control may mitigate these effects.

Methods: This literature review summarizes molecular, endocrine, and clinical evidence on DM-related oxidative stress and its impact on male fertility, along with potential therapeutic strategies including antioxidants, lifestyle modification, and glycemic control.

Results: Studies show DM-induced OS reduces seminal volume, motility, and vitality, with variable effects on concentration and morphology. Increased lipid peroxidation and DNA fragmentation highlight sperm

vulnerability. OS disrupts the hypothalamic-pituitary-gonadal axis, lowering testosterone with primary or secondary hypogonadism patterns depending on comorbidities. Diabetic men have reduced fertility, higher childlessness rates, and poorer ART outcomes, especially implantation. ROS arise from endogenous and exogenous sources. While antioxidants protect sperm, excess may induce reductive stress. Clinical trials report improved semen and hormonal parameters with targeted supplements. Glycemic control, weight loss, diet, and exercise reduce OS and improve fertility potential.

Conclusion: DM impairs male fertility through OS and hyperglycemia-related pathways. Optimizing reproductive outcomes requires multidisciplinary care, including metabolic control, antioxidants, and lifestyle interventions, supported by further long-term studies.

Study of Safety and Tolerability of a Rosemary infusion in Healthy Subjects: Phase I Clinical Trial

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Introduction: *Rosmarinus officinalis* L. (Lamiaceae) is an aromatic evergreen herb widely consumed for its presumed antioxidant and cardiometabolic benefits, yet clinical evidence regarding its safety in humans remains limited.

Objective: This phase I clinical trial evaluated the safety and tolerability of daily rosemary infusion consumption in healthy volunteers through biochemical, lipid, and blood pressure assessments.

Methods: Fifteen healthy Tunisian adults aged 30–64 years consumed a rosemary infusion prepared with two grams of dried leaves in 100 mL of boiled water once daily for 45 days. Blood samples were collected at baseline (Day 0) and post-intervention (Day 45) to measure liver and kidney function markers, lipid profile, glucose, electrolytes, and albumin using a Synchron Unicell DXC 600 analyser. Participants were monitored throughout the study for treatment-related adverse events. Ambulatory blood pressure monitoring was performed on Days 0 and 45 to assess 24-hour systolic and diastolic blood pressure, mean arterial pressure, pulse pressure, and heart rate.

Results: No statistically significant differences were

observed in biochemical, lipid, or ionic parameters between baseline and Day 45 ($P > 0.05$). No adverse events were reported during the intervention period. Rosemary infusion consumption also produced no significant changes in any blood pressure parameters, indicating an absence of hypotensive effects in healthy individuals.

Conclusion: Daily consumption of rosemary infusion for 45 days is safe and well tolerated in healthy adults, with no adverse effects on biochemical markers or normal blood pressure. Further studies with larger sample sizes and extended follow-up are required to confirm safety.