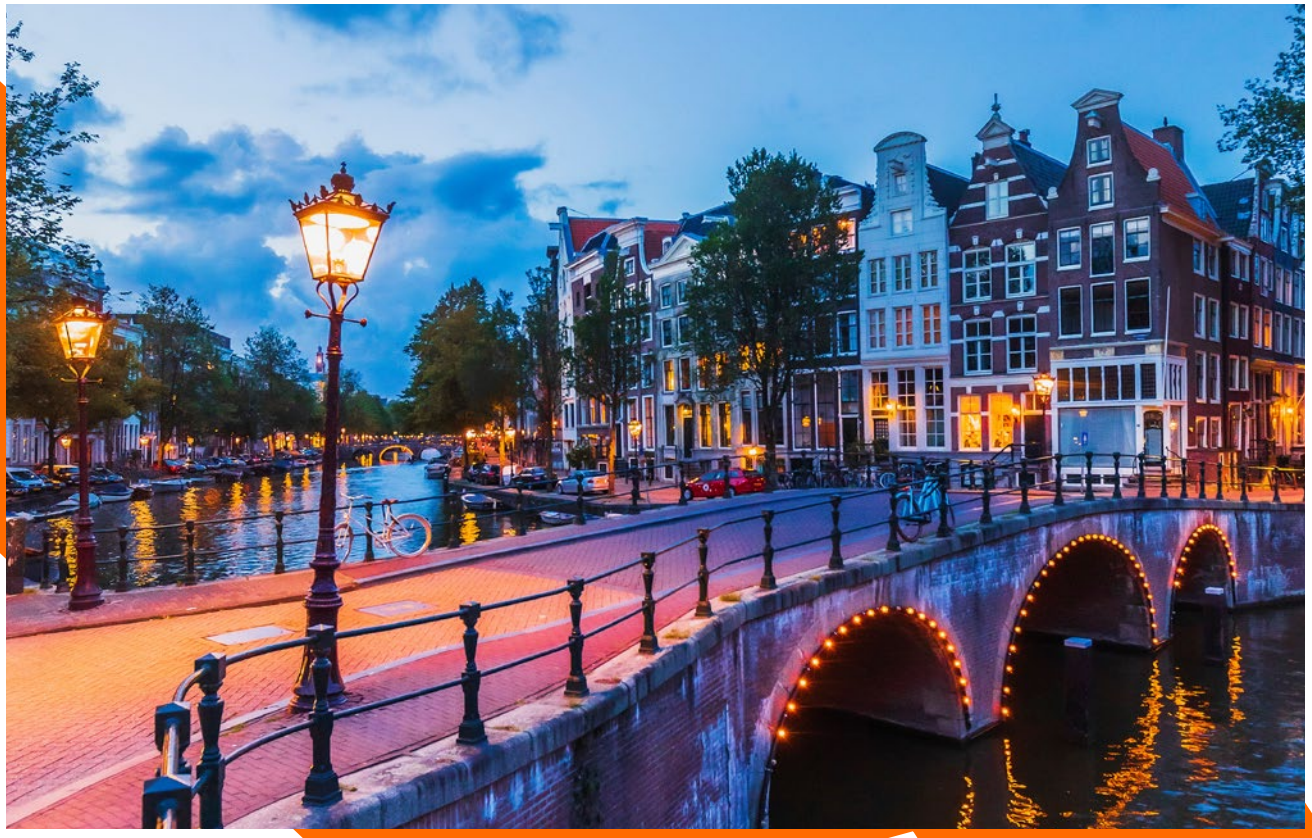
Abstract Highlights

The following highlights cover several innovative and thought-provoking abstracts from the 37th European Association of Urology (EAU) featuring topics such as intravesical treatment in non-muscle invasive bladder cancer, artificial intelligence in recurrent urinary tract infections, and genetic risk in benign prostatic hyperplasia.



Different Responses To Intravesical Treatment In Non-Muscle Invasive Bladder Cancer Subtypes

RESEARCHERS have identified a clinical tool for enhanced identification of high-risk patients with non-muscle invasive bladder cancer (NMIBC) at high risk of progression, in a study presented at the European Association of Urology (EAU) in Amsterdam, the Netherlands between 1st–4th July 2022. Currently, the proposed treatment for high-risk NMIBC is intravesical Bacillus Calmette-Guérin (BCG) therapy; however, only one-half of patients with NMIBC benefit from this therapy. The risk classification is centred on the characteristics of the clinicopathology, and the understanding of molecular characteristics of BCG treatment failures is low. The study, using transcriptome analysis, was aimed at enhancing the risk stratification in patients with NMIBC, and determining the molecular association with treatment failure.

A uropathologist reviewed the tumours of patients in the study with primary high-risk NMIBC who had undergone BCG therapy. The patients were divided into two cohorts. Cohort A included n=132 patients with BGC-naïve tumours (n=69 non-responders versus n=63 responders), and n=44 patients after BCG therapy relapse. RNA from the tumour tissues was isolated, containing over 80% of cancer cells, and was used for RNA-sequencing. Progression-free survival was the primary endpoint and a consensus clustering was utilised to establish the molecular subtypes. In order to further explore the subtypes linked to progression-free survival, the researchers performed differential expression, pathway, immune deconvolution, and regulon analyses. The results were verified using an independent cohort B group that included n=151 patients with BCG-naïve tumours. The results from the RNA-sequencing data showed that there were BCG response subtypes (BRS): BRS1–BRS3. The patients with BRS3 tumours had a lower progression-free survival rate compared to patients with BRS1 or BRS2. The association of the BRS subtypes and progression-free survival rate was verified by cohort B group. This study demonstrated an improvement in the identification of high-risk patients with NMIBC at high risk of progression of the disease, and could be used to develop new therapies for specific subtypes in the future. ●

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Could Artificial Intelligence Guide Antibiotic Choice in Recurrent Urinary Tract Infections?

IN CURRENT practice, the management of patients with recurrent urinary tract infections (rUTI) is difficult, particularly as the natural history of the infection is not completely understood. Artificial intelligence (AI), which is providing promise in many areas across the healthcare sector, could be used to guide antimicrobial choice in cases of rUTIs.

Researchers carried out a study across Urology departments at three different sites: the Santa Chiara Regional Hospital, Trento, Italy; the University of Trieste, Italy; and Oslo University Hospital, Norway. Investigators aimed to define a neural network that has the ability to predict both the clinical and microbiological efficacy of antimicrobial treatment, and which could be used as standard in the clinical practice setting. They included records from a large cohort of 1,043 females affected by rUTI between January 2012–December 2020. All of these patients had undergone antimicrobial treatment for their uncomplicated lower urinary tract infections.

Microbiological and clinical data was collected from both the initial appointment and the first follow-up consultation after the symptomatic episode. Researchers included all available data regarding the previous use of both antibiotics and antibiograms. Data were analysed using NeuralWorks Predict (NeuralWorks Technologies, Pune, Maharashtra, India) software, and were compared with univariate and multivariate analysis results.

Following several initial stages of running AI learning and prediction processes, researchers concluded that the use of artificial neural networks in females with recurrent cystitis had a sensitivity of 87.8%, and a specificity rate of 97.3% when predicting the clinical and microbiological benefits of the prescribed antimicrobial drug during the follow-up consultation.

Both AI and statistical analyses discovered that previous use of fluoroquinolones (hazard ratio [HR]: 4.23; p=0.008) and cephalosporins (HR: 2.81; p=0.003) in the last 3 months, along with the presence of cotrimoxazole-resistant *Escherichia coli* (HR: 3.54; p=0.001), were the most influential variables which affected the output decision when predicting fluoroquinolone-based therapy failure.

Tommaso Cai, Santa Chiara Regional Hospital, believes that the study was able to demonstrate both the reliability and feasibility of using AI applications in guiding antimicrobial choice in patients with rUTIs. With its effectiveness in predicting both performance and outcomes, it is hoped that AI could also help to achieve antimicrobial stewardship principles. ●

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Analysis of Treatment Persistence Rates in Female Patients with Overactive Bladder

REAL-WORLD data analysing treatment persistence in females commenced on therapy for overactive bladder (OAB) has revealed that 1-year treatment persistence rates are lower than previously reported.

A retrospective cohort study presented at the 37th Annual EAU Congress in Amsterdam, the Netherlands, on 3rd July 2022, by Karin Lifshitz, Department of Urology, Tel Aviv Medical Centre, Israel, showed that rates of 1-year treatment persistence dropped progressively throughout the year, and were lower than previous reports suggested.

The study included 46,079 females who had been commenced on either anticholinergic or β3–adrenoreceptor agonist treatment for OAB between 2010 and 2020, with the aim of understanding true treatment persistence rates in this patient cohort. Patients were classified as not persisting with treatment if they had not refilled a prescription for 90 days. Advanced data-mining techniques were used to obtain information from the largest regional provider's medication purchase database for all females who had commenced OAB medication over the 10-year time period.

The findings from this study showed that overall treatment persistence progressively reduced from 49% at 30 days to 9% at 1 year. Persistence rates were highest with mirabegron (β3–adrenoreceptor agonist) and oxybutynin (anticholinergic) at 10% and 11%, respectively. This is lower than the persistence rates of 40% for β3–adrenoreceptor agonists and 25% for anticholinergics reported in previous studies. Persistence rates for all other medications in this study was 4%. The authors also identified that those who persisted with treatment were older than those who did not persist with treatment by 5.3 years.

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Whilst OAB therapeutics have proven efficacy, rates of overall 1-year treatment persistence in this study were low, at 9%. Further research to elucidate the underlying reasons behind this could be performed in order to improve management and treatment pathways for patients with OAB. ●

Genetic Risk in Benign Prostatic Hyperplasia

GENES are driving the pathophysiology of benign prostatic hyperplasia (BPH), according to Richard J. Bryant from the Nuffield Department of Surgical Sciences, University of Oxford, UK, who presented data on a large, genome-wide study at EAU22.

BPH is a common condition in males who are middle-aged and older, and causes significant morbidity. Despite this, there is an unmet need to identify the condition's genomic drivers that lead to surgery. The identification of new pharmacological interventions is also important, as current treatments only consist of a few agents.

Bryant and colleagues conducted a study of BPH by using information from three databanks: 126,082 subjects from the UK Biobank; 44,093 from the Japanese biobank RIKEN; and 756,878 from 23andMe. This came to 110,916 cases of BPH and 816,137 controls.

Creating a BPH genetic risk score, the researchers were able to assess the prognostication of specific genes. They also investigated selected genes using differential expression between single cell subtypes in BPH samples and those from a normal prostate.

The researchers discovered a total of 17 loci were associated with BPH, and only two of them were associated with males with Western European and Japanese origin, suggesting ethnicity-specific risk alleles. This study also illustrated that associated genes had differential expression in cells that derived from BPH compared with normal prostate, and demonstrated how the *NKX3.1* homeobox gene plays a role in BPH in basal epithelial cells.

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Some genes in this analysis are tractable to drug-repurposing or therapeutic targeting, representing new targets for development and treatment. This is important for males with BPH who were treated surgically, as they had a higher genetic risk score than those who were not surgically treated.

Revealing potential candidates for future therapeutic development, this study indicates that genetic risk scores correlate with BPH severity and the need for surgical treatment. Understanding the importance that genes play in the pathophysiology of BPH is a step towards personalised medicine.