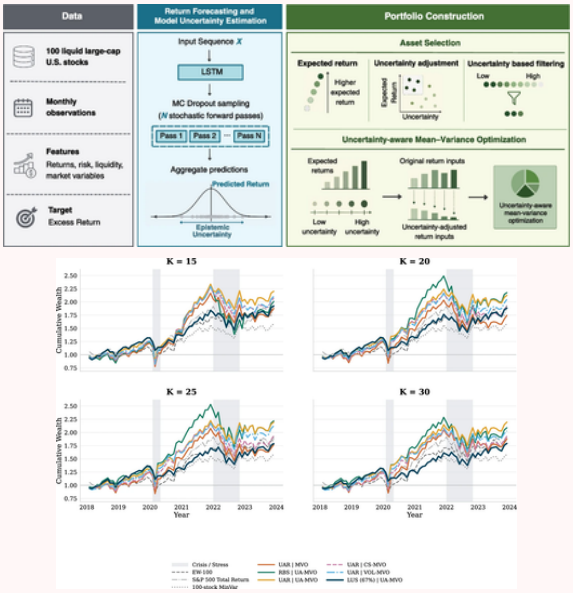
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Research Bulletin

October 2026

NEW MODEL DEVELOPED TO ACCOUNT FOR FORECAST UNCERTAINTY IN INVESTMENT DECISIONS

A method has been developed to assess the reliability of deep learning–based return forecasts in stock portfolio construction. For each stock, the model estimates both the expected return and the uncertainty of that estimate, then uses this information to guide stock selection and capital allocation. An evaluation of 100 stocks selected from the S&P 500 over the 2018–2023 period found that forecasts with higher uncertainty tended to have larger errors in the following period. Portfolios that account for uncertainty generally achieved higher returns and lower downside risk.



Etcil, M., Kolukısa, B., & Bakır Güngör, B. (2026). Uncertainty-aware stock selection and portfolio optimization with deep learning-based return prediction. *Annals of Operations Research.* https://doi.org/10.1007/s10479-026-07448-8

USERS WITH GREATER AWARENESS OF FAKE NEWS ARE MORE LIKELY TO VERIFY INFORMATION

Table 2. EFA findings of the trust in social media content scale.

Factor/Item	*M*	*SD*	FL	EV	E	a
Institutional Trust				27.18	5.16	0.893
INT1	3.38	0.94	0.864			
INT2	3.22	0.92	0.862			
INT3	3.33	0.94	0.794			
INT4	3.48	0.92	0.773			
INT5	3.54	0.88	0.770			
Mean	3.39	0.77				
Disinformation				18.66	3.54	0.854
DS1	3.53	0.98	0.847			
DS2	3.87	0.94	0.825			
DS3	3.82	0.91	0.798			
DS4	3.89	0.92	0.796			
Mean	3.78	0.78				
Verification				9.34	1.77	0.821
VR1	3.94	0.95	0.822			
VR2	3.81	0.98	0.801			
VR3	3.39	1.24	0.785			
VR4	3.88	1.02	0.782			
Mean	3.76	0.85				
Individual Trust				9.07	1.72	0.781
IT1	2.66	0.92	0.846			
IT2	2.99	0.99	0.833			
IT3	2.36	0.94	0.729			
IT4	3.06	1.03	0.551			
Mean	2.77	0.76				
Bias				5.30	1.01	0.754
BI1	2.85	0.89	0.853			
BI2	3.02	0.88	0.687			
Mean	2.93	0.79				
Total Variance Explained	69.55%					

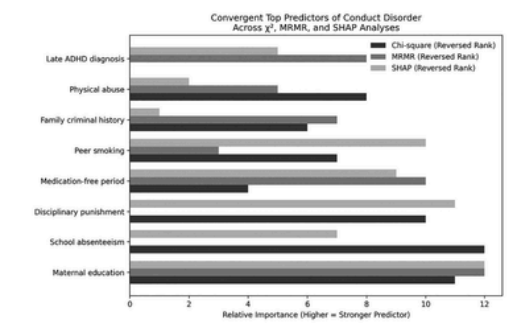
Note: KMO = 0.832; $\chi^2 = 4922.77$; df = 171; $p < .001$. Scale: 1 = Strongly Disagree; 5 = Strongly Agree. FL = Factor Loading; EV = Explained Variance (%); E = Eigenvalue; a = Cronbach's Alpha.

A study in Türkiye examined the relationship between awareness of fake news on social media, trust in content, and news-following habits. The mixed-methods study included 541 survey participants, with in-depth interviews also conducted with 16 people. The findings showed that 64% of participants had a high level of awareness, while 36% had a moderate level. Those with greater awareness were significantly more likely to verify information and less likely to trust individual sources. The study highlights the need to design media literacy initiatives around behavior.

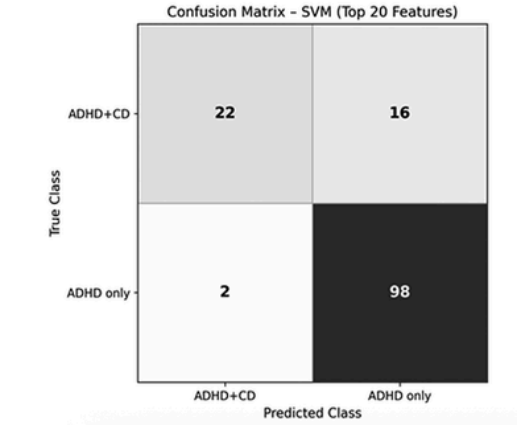
Yaşar, İ. H., Uğurhan, Y. Z. C., Özer, S., & Uluç, M. (2026). Fake news awareness, trust, and social media usage in the age of disinformation: Insights from a mixed-methods study. *Atlantic Journal of Communication.* https://doi.org/10.1080/15456870.2026.2739414

MACHINE LEARNING IDENTIFIES FACTORS ASSOCIATED WITH CONDUCT DISORDER IN ADHD

Machine learning methods were used to identify factors associated with conduct disorder in adolescents diagnosed with attention-deficit/hyperactivity disorder (ADHD). The study analyzed 99 variables for 138 adolescents aged 11–18. Key factors included lower maternal education, corporal punishment, school absenteeism, periods without medication, smoking among peers, and a history of criminal behavior in the family. The findings may support comprehensive clinical assessments, but the study emphasized that they cannot be used to predict future conduct disorder.



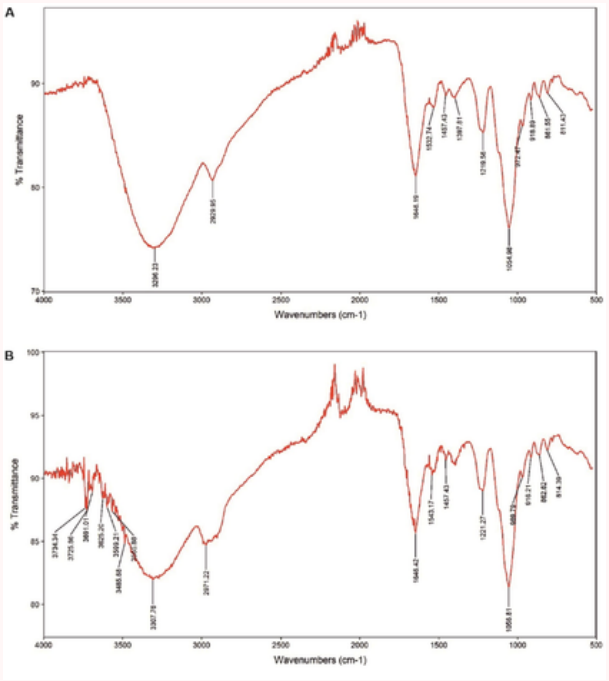
Convergent top predictors of conduct disorder identified across χ^2, mRMR, and SHAP analyses.



Confusion matrix for the SVM model (Top 20 features).

Çağır, B., Kurban, R., & Özmen, S. (2026). Machine learning–based classification of conduct disorder comorbidity in youth with ADHD. *Brain and Behavior, 16*(9), Article e71784. https://doi.org/10.1002/brb3.71784

SUGARS FROM PROBIOTIC BACTERIA ACCELERATED WOUND HEALING IN A HIGH-SUGAR ENVIRONMENT



To address the delayed healing of diabetic wounds, researchers tested the effects of sugar-based molecules derived from probiotic bacteria in a laboratory setting. The molecules were applied together with fluid secreted by stem cells obtained from adipose tissue. In skin cells kept in a high-glucose environment, the wound closure rate rose from 12% to 68% over 48 hours. Levels of harmful reactive oxygen species and cell death also decreased. The molecules were found to be non-toxic to the cells. The findings are still at the preclinical stage.

Bicer, M., Akdur, M., Battal, E., Sener, F., Yilmaz, I., & Fidan, Ö. (2026). Probiotic-derived exopolysaccharides enhance mesenchymal stem cell-mediated fibroblast repair under hyperglycemic conditions. *ACS Omega, 11*(40), 61586–61599. https://doi.org/10.1021/acsomega.6c07182

NEW COMPUTATIONAL TOOL DEVELOPED TO IDENTIFY GENES ASSOCIATED WITH DRUG RESISTANCE

A computational tool called miRDrug was developed to analyze relationships among microRNAs, diseases, and drugs. By integrating information from three biological databases, the researchers identified genes that intersect with drug resistance pathways. The approach first grouped the genes, then ranked the groups and built predictive models using the highest-ranked ones. When tested on ten gene expression datasets, miRDrug was shown to distinguish patients from healthy individuals with high accuracy. The findings may contribute to research on drug resistance in cancer treatment.

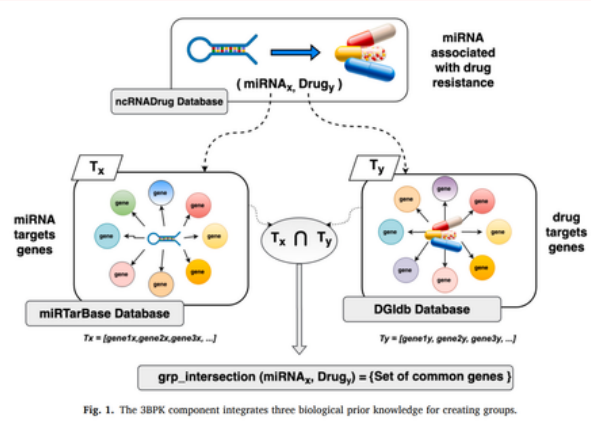
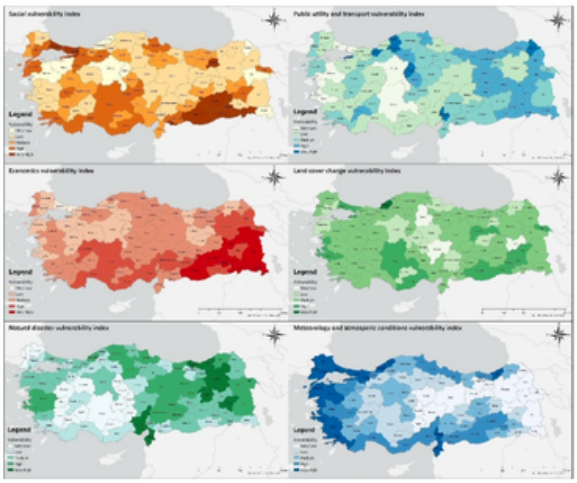


Fig. 1. The 3BPK component integrates three biological prior knowledge for creating groups.

Qumsiyeh, E., Bakir-Gungor, B., & Yousef, M. (2026). miRDrug: Comprehensive analysis of the shared genes within miRNA-drug pairs using grouping, scoring, and modeling approach. *Heliyon, 12*, Article e45548. https://doi.org/10.1016/j.heliyon.2026.e45548

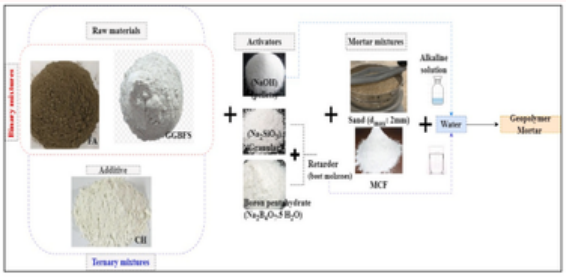
TURKIYE'S MOST CLIMATE-VULNERABLE CITIES IDENTIFIED AND MAPPED

The vulnerability of cities in Türkiye to climate change was assessed by combining two multi-criteria decision-making methods. A Climate Change Vulnerability Index was developed for all 81 provinces using socioeconomic and environmental indicators. The indicators' weights were determined using a method based on stakeholder input. The findings showed that 12% of provinces fell into the very high vulnerability category and 21% into the high category. Cities in the southeast, as well as along the northern, western, and southern coasts, were found to be most at risk. Zonguldak, Hatay, and İstanbul were identified as the three most vulnerable cities.


Fig. 3 Vulnerability to climate change according to six forms of capital in Türkiye

Ustaoglu, E., Bovkir, R., Sisman, S., & Aydinoglu, A. C. (2026). Climate change vulnerability assessment in Türkiye: An integration of two different multicriteria decision analysis methods (BWM and TOPSIS). *Mitigation and Adaptation Strategies for Global Change, 31*, Article 87. https://doi.org/10.1007/s11027-026-10358-6

PRINTABILITY AND ENVIRONMENTAL IMPACT OF 3D-PRINTED CEMENT-FREE MORTARS ASSESSED





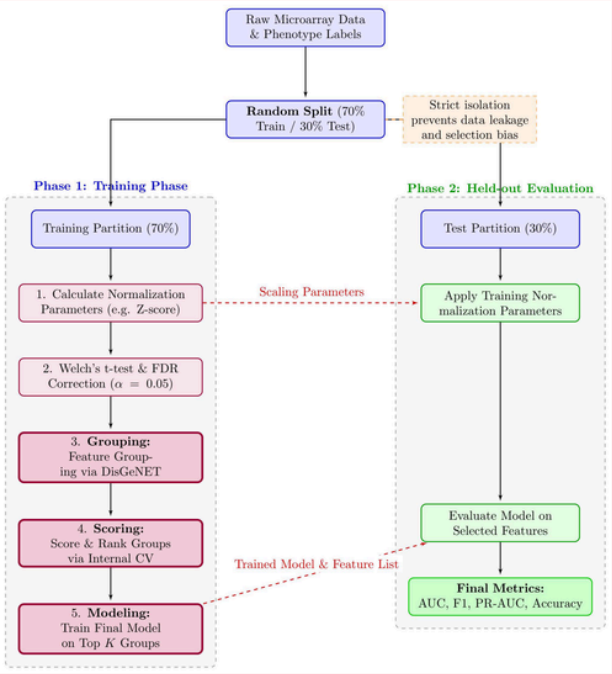
Mortars using fly ash and blast furnace slag instead of cement were developed for 3D-printed construction. Nine mixtures containing calcium hydroxide and microcalcite were assessed for flowability, setting time, layer buildability, and strength. The two most promising mixtures were then printed.

Increasing the sodium hydroxide concentration was found to improve strength and internal structure. A life cycle assessment showed that, compared with cement-based mortar, these mixtures had lower environmental impacts in most categories. The greatest impact came from sodium hydroxide production.

Ketema, A. F., Örklemez, E., İlkentapar, S., Durak, U., Özmen, Ö., Uzal, N., Uzal, B., Karahan, O., & Atiş, C. D. (2026). Influence of NaOH molarity on the printability, mechanical performance, and environmental impact of calcium hydroxide- and micro-calcite-containing fly ash–GGBFS mortars for extrusion-based 3D printing. *Journal of Building Engineering, 133,* 117621. https://doi.org/10.1016/j.jobe.2026.117621

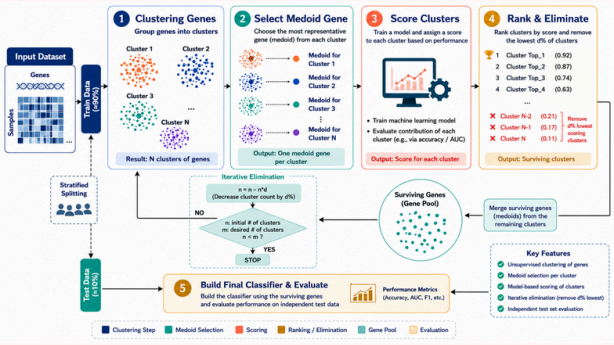
OPEN-SOURCE SOFTWARE DEVELOPED TO IDENTIFY CANCER BIOMARKERS

A method was developed to identify candidate cancer biomarkers from gene expression data by grouping genes according to known disease–gene associations. Across 100 repeated trials on seven cancer datasets, the method achieved an average classification performance of 0.84, rising to 0.99 on the acute myeloid leukemia dataset. In five datasets, the selected genes were confirmed to be significantly more associated with the disease than randomly selected genes. The method is available as open-source software with a browser interface and command-line support.



Yousef, M., Allmer, J., Inal, Y., Temiz, M., & Bakir-Gungor, B. (2026). Knowledge-driven feature selection with the Grouping–Scoring–Modeling framework for biomarker discovery in high-dimensional transcriptomic data. *Applied Sciences, 16*(18), 9043. https://doi.org/10.3390/app16189043

NEW METHOD DEVELOPED FOR GENE EXPRESSION CLASSIFICATION USING FEWER GENES



A new feature selection method was developed to reduce the number of genes required for disease classification in high-dimensional gene expression data. Instead of using calculated mean values to represent gene clusters, the method selected actual genes from each cluster. Experiments on 17 gene expression datasets showed that the new approaches selected approximately 46–51% fewer genes and reduced computational time compared with previous methods, while largely maintaining classification performance.

Bulut, N., Qaqish, B. F., Bakir-Gungor, B., & Yousef, M. (2026). Medoid-based SVM-RCE: Efficient feature selection for high-dimensional gene expression data analysis. *Applied Sciences, 16*(18), 9045. https://doi.org/10.3390/app16189045

THE EFFECT OF HEAT TREATMENT ON THE GRINDABILITY OF GRANITE QUARRY WASTE INVESTIGATED

The effects of heat treatment up to 600°C on granite quarry waste were investigated to improve its potential for reuse. Seven waste samples from quarries in Türkiye were tested for density, porosity, compressive strength, and grinding resistance. Increasing temperatures reduced strength, increased porosity, and lowered the energy required for grinding. The effects varied across materials and properties, and mathematical models were developed to predict grinding behavior.



Fig. 1. Sampling locations of the granite waste materials

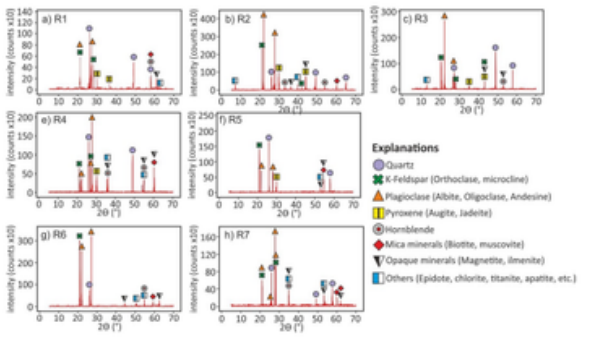


Fig. 2. Typical XRD patterns of the granite waste materials

Köken, E., Ince, I., Marulcuoğlu, H., Strzalkowski, P., & Özarslan, A. (2026). Thermal treatment of granite quarry waste: Numerical integration–based thermal quality assessment and Bond Work Index (BWI) modelling. *Physicochemical Problems of Mineral Processing, 62*(4), 231190. https://doi.org/10.37190/ppmp/231190

BORON WASTE USED AS A SUBSTITUTE FOR CHEMICAL ADDITIVES IN CEMENT-FREE MORTARS

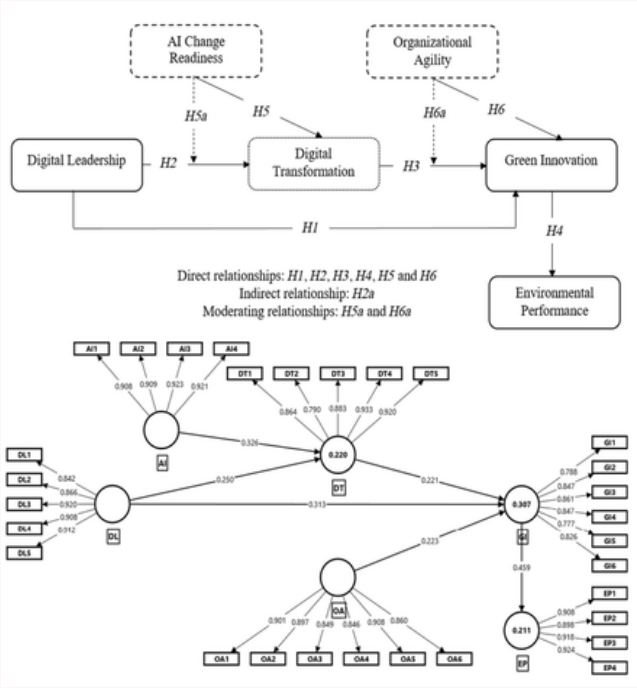


The potential use of colemanite, tincal, and borogypsum waste from boron processing plants as substitutes for chemical activators in cement-free mortars was investigated. A total of 26 blast furnace slag-based mortar mixtures were prepared by replacing 10–40% of sodium metasilicate with boron waste. Workability, water absorption, strength, and microstructure were evaluated. Replacement levels of 10–20% maintained or improved strength, while higher levels increased porosity. Tincal waste showed the best performance, and carbon emissions were significantly reduced compared with conventional cement-based mortar.

Örklemez, E., İlkentapar, S., Durak, U., Gülçimen, S., Uzal, N., Uzal, B., Karahan, O., & Atiş, C. D. (2026). Circular valorization of boron processing wastes as alternative activators in one-part alkali-activated mortars: Mechanical performance, reaction mechanism and life cycle assessment. *Sustainable Chemistry and Pharmacy, 54,* 102582. https://doi.org/10.1016/j.scp.2026.102582

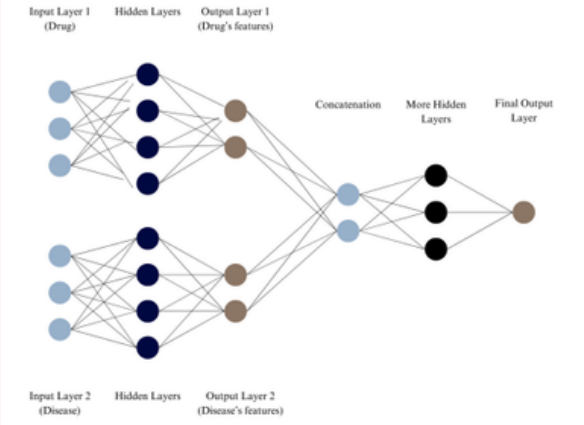
THE IMPACT OF DIGITAL LEADERSHIP ON ENVIRONMENTAL PERFORMANCE IN HOSPITALS INVESTIGATED

The impact of digital leadership on environmental performance was examined using survey data from 480 doctors, nurses, and administrative staff across five hospitals in Guangzhou, China. Findings showed that digital leadership promoted digital transformation and green innovation, while green innovation improved environmental performance. Organizational agility strengthened the relationship between digital transformation and green innovation. However, AI readiness did not play a significant role in this relationship.



Lin, D., Murad, M., Zhang, X., & Shah, S. H. A. (2026). Enhancing environmental performance in healthcare organizations through digital leadership: The roles of digital transformation, AI change readiness, and organizational agility. *Journal of Health Organization and Management,* 1–27. https://doi.org/10.1108/JHOM-05-2026-0660

AI MODEL DEVELOPED TO IDENTIFY NEW USES FOR EXISTING DRUGS

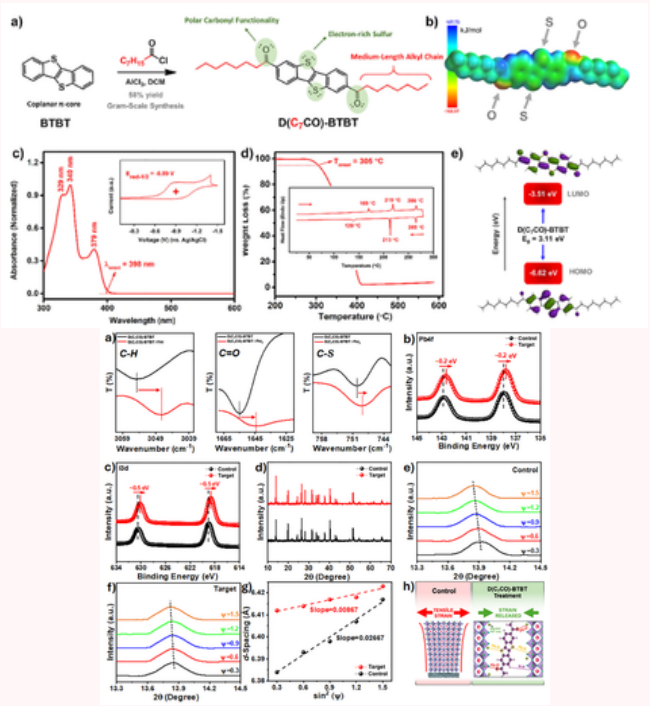


A deep learning model was developed to identify potential new therapeutic uses for existing approved drugs. Trained on drug–disease associations extracted from biomedical literature, the model achieved 87.66% validation accuracy and 83% test accuracy. It also reassessed drug–disease pairs from discontinued clinical trials, with several highly ranked predictions supported by recent literature. The approach could accelerate candidate identification in the early stages of drug development.

Alqershi, A., & Bakal, G. (2026). A Siamese Neural Network framework for computational drug repositioning using literature-derived biomedical knowledge. *Journal of Computational Science, 101*, 103029. https://doi.org/10.1016/j.jocs.2026.103029

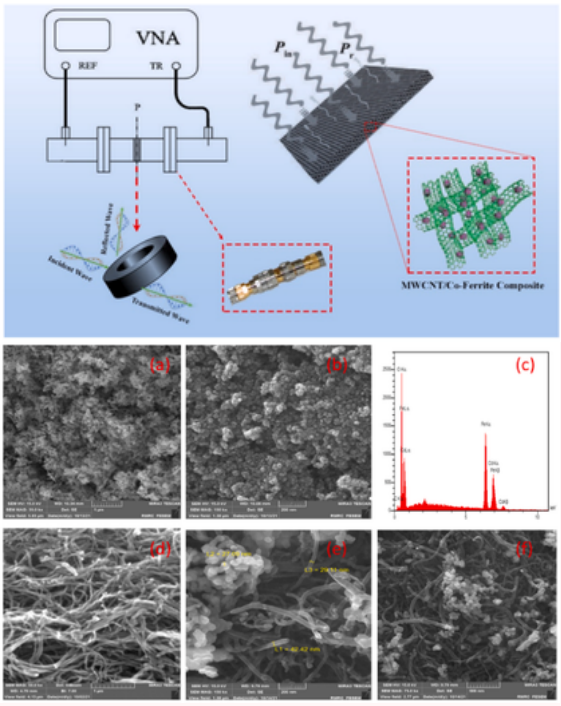
DURABLE PEROVSKITE SOLAR CELL DEVELOPED WITH OVER 25% EFFICIENCY

A new organic molecule was designed and synthesized to improve the stability of perovskite solar cells against moisture, heat, and continuous illumination. The molecule binds to grain boundaries in the perovskite layer, reducing structural defects and crystal strain. The resulting solar cells achieved a power conversion efficiency of 25.02%, while larger 1 cm² cells reached 23.34%. Unencapsulated cells retained over 82% of their initial efficiency after 1,000 hours of continuous illumination at 85°C, demonstrating improved durability.



Camizci, E., Deneme, İ., Xu, B., Coi, M., Usta, H., & Sonmezoglu, S. (2026). Molecular coordination–driven photothermally stable FACs-based perovskite solar cells with efficiency over 25% via dicarbonyl-functionalized thienoacene small molecule. *Advanced Functional Materials*, e78760. https://doi.org/10.1002/adfm.78760

NEW MICROWAVE-ABSORBING NANOCOMPOSITE MATERIAL DEVELOPED FOR SATELLITE FREQUENCIES

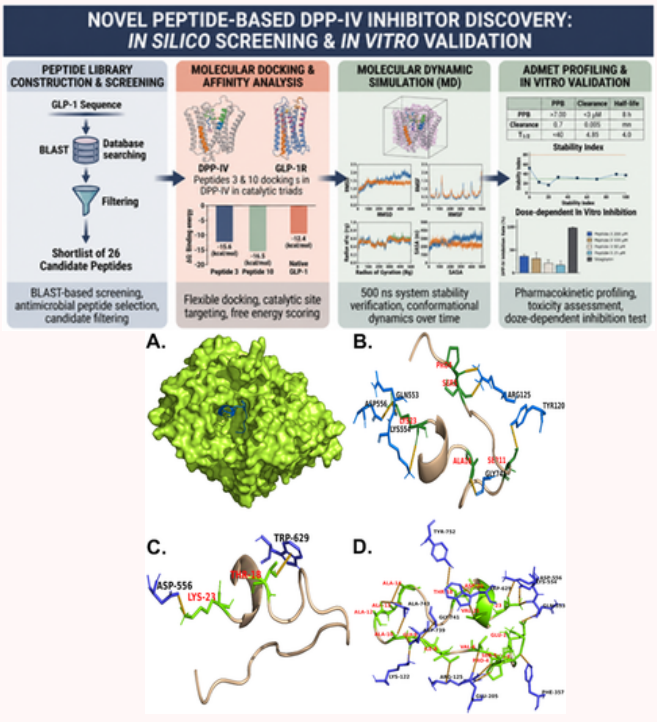


Nanocomposite materials consisting of multi-walled carbon nanotubes, cobalt ferrite, and epoxy resin were developed to reduce electromagnetic interference between electronic devices. Samples with varying carbon nanotube concentrations were analyzed for their structural, magnetic, and microwave absorption properties across the S, C, X, and Ku frequency bands used in satellite communications. Results showed that increasing nanotube content did not necessarily improve absorption, with optimal performance achieved at intermediate concentrations. These materials were identified as promising candidates for satellite and high-frequency communication applications.

Nikmanesh, H., Khani, O., Erdem, T., Salazar, D., & Alvarez-Botero, G. (2026). Tuning the microwave absorption performance of MWCNT/$CoFe_2O_4$ composites by controlling multi-walled carbon nanotube content. *Ceramics International.* https://doi.org/10.1016/j.ceramint.2026.10.185

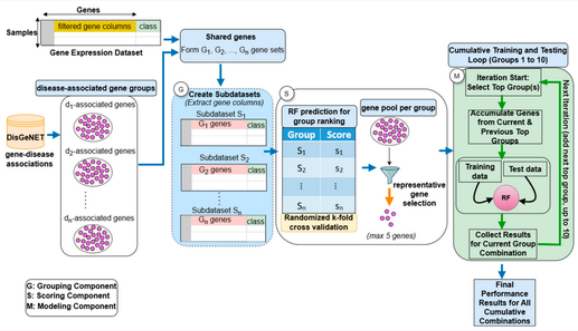
NEW NATURALLY DERIVED PEPTIDE CANDIDATES IDENTIFIED FOR TYPE 2 DIABETES

Peptides capable of inhibiting DPP-IV, an enzyme that breaks down the blood glucose-regulating hormone GLP-1, were investigated for type 2 diabetes. A total of 26 candidates from microbial and animal peptide databases were evaluated computationally for binding affinity, drug-like properties, and stability. Two peptides showed stronger binding to DPP-IV than native GLP-1. Laboratory testing revealed that one peptide inhibited enzyme activity by 36.2% at a concentration of 200 µM. Further studies are needed to validate these findings.



Calis, B., Zanchi, F. B., Canakcimaksutoglu, B., Yetiman, A. E., & Fidan, O. (2026). Discovery of novel peptides as DPP-IV inhibitors: In silico screening, molecular dynamics simulations, and preliminary in vitro evaluation. *ACS Omega, 11*(39), 60300–60313. https://doi.org/10.1021/acsomega.6c08022

A NEW DISEASE-INFORMED GENE SELECTION METHOD WAS DEVELOPED

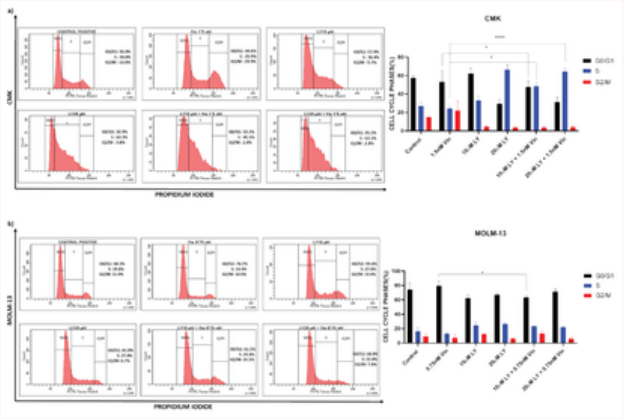


GeDiRep was developed to identify small groups of informative genes for disease classification in high-dimensional gene expression data with limited samples. The method groups genes based on known gene–disease associations and selects the most informative genes from each group. Across eight cancer-related datasets, GeDiRep reduced the average number of selected genes from 40.3 to 8.3 compared with the G-S-M method, while increasing average classification performance from 0.83 to 0.87. However, the improvement was not statistically significant. The biological functions of the selected genes were also examined through network analyses.

Kuzudisli, C., Qaqish, B. F., Bakir-Gungor, B., & Yousef, M. (2026). A disease-guided representative gene selection framework for high-dimensional gene expression analysis. *Mathematics, 14*(18), 3281. https://doi.org/10.3390/math14183281

THE COMBINED EFFECT OF TWO COMPOUNDS AT LOW DOSES AGAINST LEUKEMIA CELLS WAS INVESTIGATED

The combined effects of vinblastine, a plant-derived chemotherapy drug, and LY294002, a PI3K-Akt-mTOR pathway inhibitor, were investigated in acute myeloid leukemia cells. In two leukemia cell lines, the low-dose combination showed synergistic effects, reducing cell viability and increasing cell death more effectively than either compound alone. Effects on the cell cycle and BECLIN-1 gene expression varied between cell lines. These findings provide preliminary evidence for further investigation of this therapeutic approach.



Ayvaz, H. B., & Gencer Akçok, E. B. (2026). Combinatorial antitumor effect of vinblastine and the PI3K-Akt-mTOR pathway inhibition in AML cells. *FABAD Journal of Pharmaceutical Sciences, 51*(2), 639–656. https://doi.org/10.55262/fabadeczacilik.1851892

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