

# TECH SCAN

ANTIMICROBIAL RESISTANCE TECHNOLOGY



## Antimicrobial Resistance (AMR)

Technology represents a vital frontier against the spread of infectious diseases since constantly evolving microorganisms threaten to outstrip the efficacy of traditional treatments.

Antimicrobial resistance occurs through mechanisms such as genetic mutations, gene transfer, efflux pumps, and target modifications, enabling microorganisms to withstand the effects of antimicrobial drugs and persist despite treatment. As a result, "super-bugs" that are resistant to conventional antibiotics and other antimicrobial treatments proliferate. The repercussions are severe: prolonged hospital stays, higher medical expenses, elevated rates of morbidity and mortality, and a substantial strain on global healthcare systems.

As AMR becomes a key issue, innovation is crucial for developing effective strategies to combat resistant pathogens, which results in a surge of patents covering various aspects of AMR. From novel antibiotics and alternative medications to cutting-edge diagnostic tools and surveillance systems, these patents embrace an array of approaches.

Hence, combating AMR requires a multifaceted strategy where novel technology and new patents are essential components. By conducting advancing research and developing feasible solutions, we can improve our ability to manage and overcome the challenges posed by resistant microorganisms.

# INNOVATION TIMELINE

2020

New antibiotics and alternative treatments, such as bacteriophages, are being researched

2010

WHO declares AMR a global health threat

2000

Linezolid introduced, the first oxazolidinone antibiotic

1990

Vancomycin-resistant enterococci identified

1980

Vancomycin introduced, an antibiotic for treating

1961

Methicillin-resistant *Staphylococcus aureus* is identified

1960

Methicillin introduced, the first penicillinase-resistant penicillin

1950

Tetracycline introduced, a broad-spectrum antibiotic

1945

Penicillin was mass-produced during World War II

1940

Soil bacteria are tested for antibiotic properties

1930

Sulphonamides discovered, the first broad-spectrum antimicrobials

1928

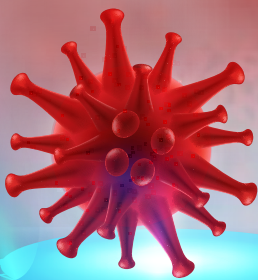
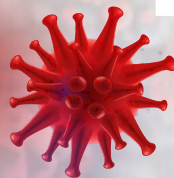
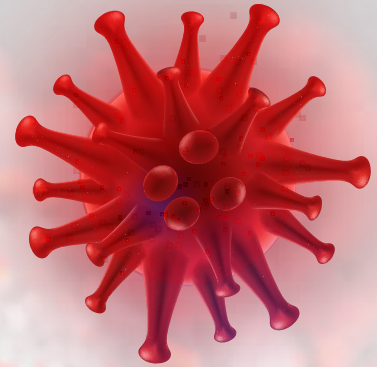
Alexander Fleming discovers penicillin, the first modern antibiotic

1907

P. Ehrlich synthesizes Salvarsan, the first antimicrobial treatment for syphilis

1877

L. Pasteur and R. Koch describe antibiosis



# PATENTABLE ASPECTS

## DIAGNOSTIC DEVICES

- Biosensors
- Microfluidics Devices
- Multiplex PCR Kits
- Impedance-Based Detection Systems

## NOVEL ANTIMICROBIAL AGENT

- Antimicrobial Peptides
- Antimicrobial Polymer Compositions
- Aqueous Hop Extracts
- Antimicrobial Alcohol Gel Formulation

## AMR STATUS DETERMINATION DEVICE

- Novel Testing Apparatus
- Diagnostic Models
- Sensors
- Data Analysis Algorithms

## ANTIMICROBIAL COATINGS AND SURFACES

- Copolymer Graft
- Nanomaterial Incorporation
- Surface Modifications

## ANTIMICROBIAL DELIVERY SYSTEM

- Microneedle Patches
- Smart Release Capsule
- Electrospun Nanofibers

## GEOGRAPHIC AMR TRACKING

- Data Collection Method
- Apparatus Health Information System
- Analytical Algorithms and Visualization Tools
- Predictive Modelling

## LIGHT-BASED ANTI-INFECTIVE APPROACHES

- Antimicrobial Blue Light
- Antimicrobial Photodynamic Therapy
- Germicidal Ultraviolet Irradiation
- Dual Wavelength Irradiation Antimicrobial Treatment
- Laser-Induced Shockwave Treatment

## ANTIMICROBIAL FACE MASK

- Antimicrobial polymer
- Natural compounds
- Fabric Composition
- Coating Technology

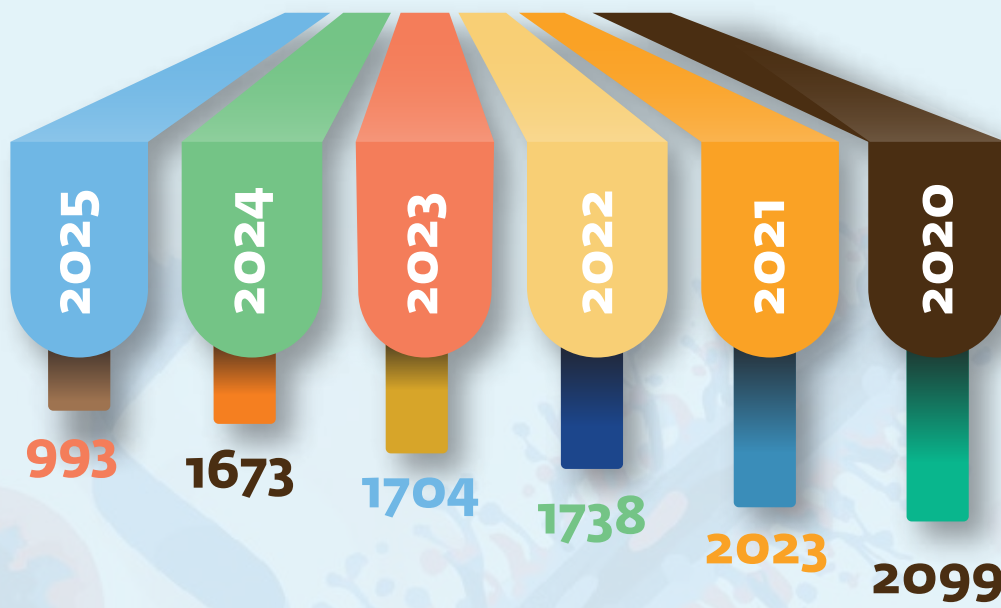
## AI in Antimicrobial Resistance Technology

- Machine Learning Algorithms
- DL/ML for AMR Detection
- Predictive Modelling
- Bioinformatics Pipeline
- Virtual Screening

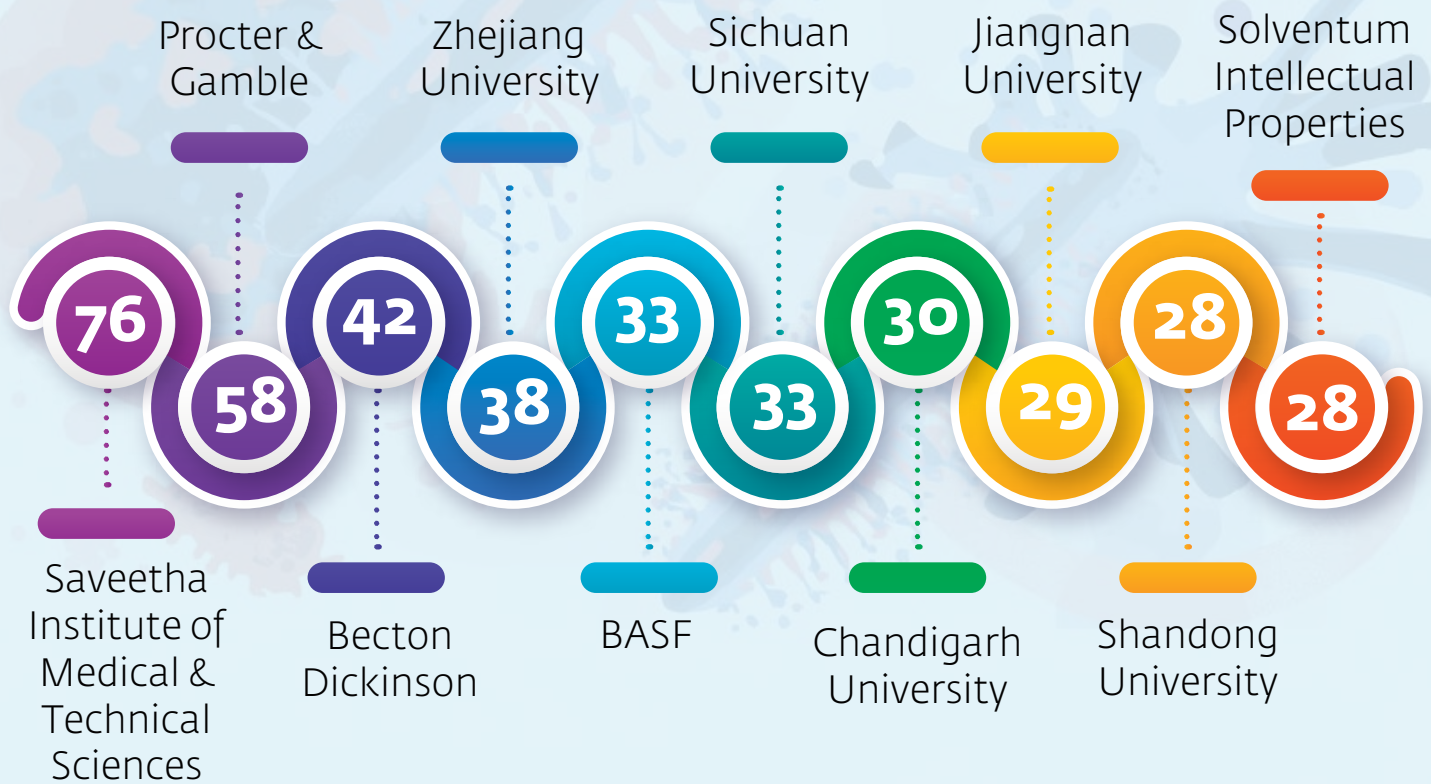
## Flow Management Implant

- Bioactive Coatings
- Drug Release Mechanism
- Antibiotics Impregnated Catheter
- Self-Cleaning Surface

# PATENT STATISTICS



## TOP APPLICANTS

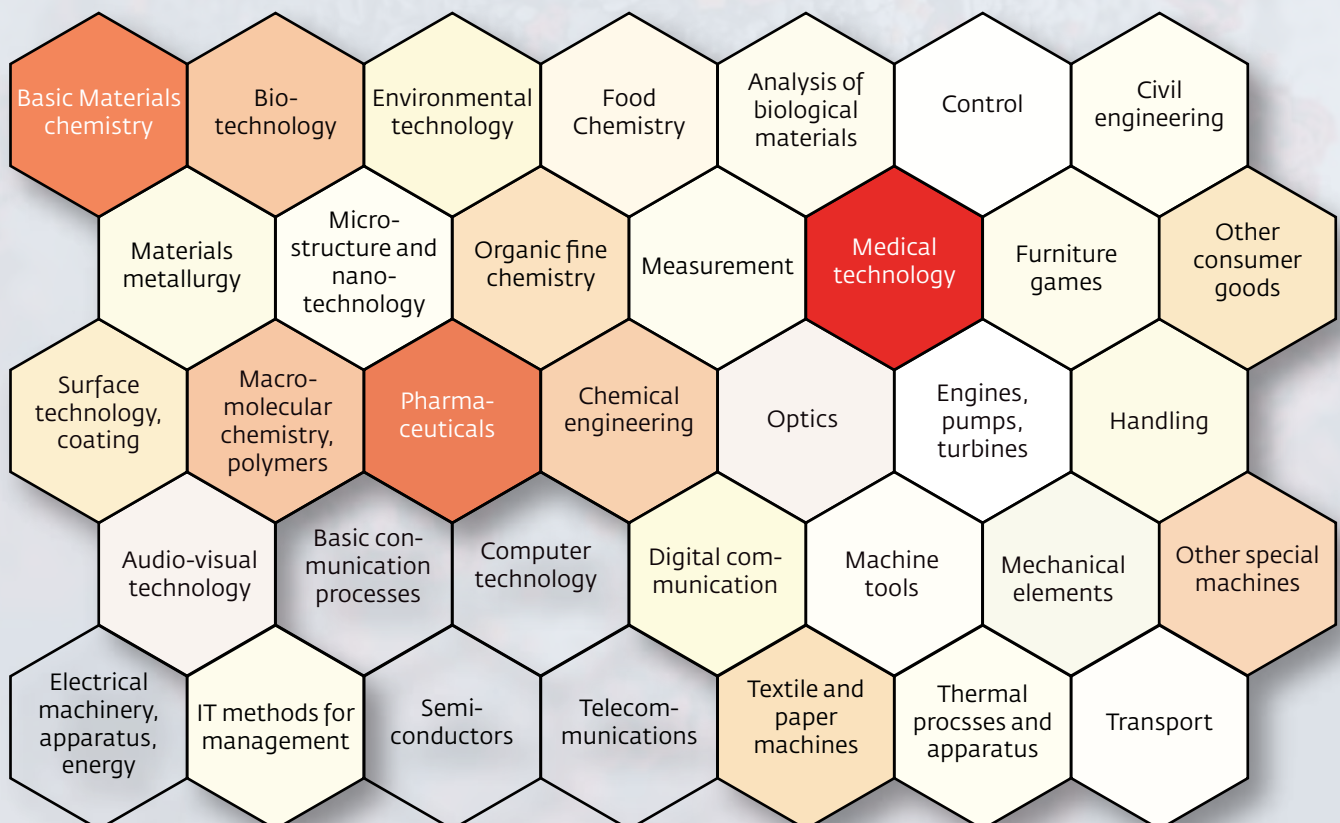


Database: Questel Orbit  
Data Range: 01/01/2020 - 31/10/2025

# PATENT LANDSCAPE



# TECHNOLOGY DOMAIN



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# NOTABLE INNOVATIONS

| Patent Application | Priority date | Title                                                                                                                                                           | Assignee                                                             |
|--------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| IN538770           | 2021-12-17    | Environmentally Safe Antimicrobial Coating Composition and Method of Preparation Thereof                                                                        | DRDO - Defence Research & Development Organisation                   |
| EP4432831          | 2022-11-18    | Multidrug Antimicrobial Coating                                                                                                                                 | UMC Utrecht Holding                                                  |
| CN114059346        | 2021-09-17    | Method for Preparing Regenerated Polyester Fibers by a Plasma Antibacterial Technology                                                                          | Sincetech Science & Technology                                       |
| CN117777810        | 2023-12-11    | Metal Anticorrosive Paint based on Long-acting Slow-Release Antibacterial Technology as Well as Preparation Method and Application of Metal Anticorrosive Paint | Haikou Substation Transportation Inspection Branch Hainan Power Grid |
| CN120795790        | 2025-08-18    | Antibacterial Low-Surface-Energy Antifouling Paint and Application Thereof                                                                                      | Dongfang Electric Fujian Innovation Research Institute               |
| IN202541055791     | 2025-06-10    | An electrochemical wastewater system for mitigating antimicrobial resistance                                                                                    | Indian Institute of Technology Madras                                |
| IN202541029708     | 2025-03-28    | Automated Antimicrobial Susceptibility Testing Device Using Disc Diffusion Method                                                                               | Sri Manakula Vinayagar Medical College & Hospital                    |
| US11505835         | 2015-06-12    | Method for Determining the Identity and Antimicrobial Susceptibility of a Microorganism                                                                         | Q Linea Linea Q Queue Linea Av                                       |
| US20240301477      | 2019-12-03    | A biosensor device, system and kit for detecting infection and antimicrobial resistance                                                                         | Ramja Genosensor Private                                             |

# WHITESPACES

Quorum  
Sensing-Targeting  
Drugs

Novel  
Biomarkers  
Identification

AI-Tools Assisting  
Healthcare Providers  
in Making Informed  
Decisions

Bacteriophages as a  
Therapeutic Solution

Synergistic  
Drug  
Combinations

Carbon Quantum  
Dot-Based  
Detection

Real-Time  
Monitoring of  
Microbial Resistance

Conjugated  
Short-Chain  
Antibacterial Peptides

Whole Genome  
Sequencing for  
developing  
Antimicrobial Drugs

Antibiotic-Immune  
Modulator  
Combinations

Microbiome  
Modulation to  
Prevent Infections

Microfluidics with pH &  
Redox-Sensitive Indicator  
Dyes for Sensitive Detection

CRISPR-Based  
System to Disrupt  
Resistance Genes

Controlled Release  
Compositions to  
Maintain  
Therapeutic Levels

Surface Modified  
Implants by Beam  
Irradiation to Inhibit  
Bacterial Colonization

Self-Sterilizing, Thermally  
Activated Surface to  
Disrupt Pathogen

Database: Questel Orbit

If you would like to learn more about any of these areas or have specific questions, we're here to provide further information and insights. Our team is dedicated to driving progress and staying at the forefront of **ANTIMICROBIAL RESISTANCE TECHNOLOGY**.

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