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**Literature Review SummaryReport:**

**Article 1**

**Title and Author(s)**

"Mechanisms of Antibiotics Resistance in Bacteria" – Hasan Thualfakar Hayder Hasan, Al‑Harmoosh (2020) Sys Rev Pharm 11(6): 817‑823

**Theoretical Perspective**

The paper adopts a multifaceted review framework, integrating microbiological, genetic and pharmacological lenses to classify resistance into four principal forms: natural (intrinsic), acquired, cross‑resistance, and multidrug resistance (MDR). It treats resistance as an evolutionary adaptation driven by both chromosomal mutations and mobile genetic elements (plasmids, transposons, integrons).

**Aim & Objectives**

The aim is to highlight the most prevalent resistance mechanisms and to underscore the growing global health issue posed by bacterial adaptation to both old and newly discovered antibiotics.

Objectives:

-Classify the major forms of antibiotic resistance:natural (intrinsic), acquired, cross‑resistance, and multidrug resistance (MDR) .

-Identify and describe the principal molecular mechanisms that bacteria employ to evade antibiotics, including enzymatic inactivation, target modification, reduced membrane permeability, active efflux, and alternative metabolic pathways.

-Highlight the role of extrachromosomal genetic elements (plasmids, transposons, integrons) in disseminating resistance genes across bacterial populations.

-Provide a comprehensive, up to date review of the literature on these mechanisms to inform surveillance, drug-development and antimicrobial stewardship strategies.

**Methodology**

As a systematic literature review, the authors compiled and synthesized data from peer reviewed studies, clinical isolates, and genomic analyses. No primary sampling was performed; instead, the methodology relied on *comprehensive bibliographic mining* and categorization of reported mechanisms.

**Key Findings**

-Enzymatic inactivation (β-lactamases, aminoglycosidases, chloramphenicol acetyltransferases) is the most common mechanism.

-Target modification (e.g., PBP alterations in MRSA via *mecA*, ribosomal mutations) reduces drug binding.

-Reduced membrane permeability—porin loss (e.g., OprD mutation in *P. aeruginosa*)—limits uptake.

-Active efflux pumps (tetracycline, quinolones, macrolides) expel drugs from the cell.

-Alternative metabolic pathways (e.g., folic-acid synthesis bypass conferring sulfonamide resistance) provide additional protection.

-Extrachromosomal elements (plasmids, integrons) disseminate resistance genes across species.

**Implications**

The review stresses that MDR definitions (resistance to ≥ three antimicrobial classes) must guide surveillance and stewardship programs. It calls for targeted drug design that circumvents enzymatic degradation, exploits novel uptake pathways and mitigates horizontal gene transfer. Ultimately, integrating genomic monitoring with rational antibiotic use is essential to curb the accelerating resistance crisis.

## Conclusion

The authors conclude that multidrug resistant (MDR) bacteria,defined as resistance to ≥ three antimicrobial classes,emerge through a suite of mechanisms (β-lactamase production, target site alteration, reduced membrane permeability, active efflux and metabolic bypass) and that horizontal transfer of plasmid borne resistance genes accelerates their spread. Effective surveillance, stewardship and the development of therapeutics that target these specific mechanisms are essential to curb the growing global resistance crisis.

## Reference

Hasan, H., Al-Harmoosh, A., & Thualfakar, H. R. A. (2020). *Mechanisms of antibiotics resistance in bacteria*. Systematic Review in Pharmacy, 11(6), 817-823. https://doi.org/10.31838/srp.2020.6.118

**Article 2**

**Title & Authors**

*A review on prescription and non-prescription appetite suppressants and evidence-based methods to treat overweight and obesity.* Al-Snafi, A. E., Singh, S., Bhatt, P., & Kumar, V. (2022). GSC Biological and Pharmaceutical Sciences, 19(3), 148-155.

**Theoretical Perspective**

The authors adopt a public health/clinical pharmacology framework that treats overweight and obesity as chronic, multifactorial diseases (BMI $\geq 25$ kg/m²) requiring combined lifestyle modification and pharmacologic appetite control. The review categorises agents by regulatory status (prescription vs. non-prescription) and mechanistic class (central catecholaminergic vs. serotonergic pathways).

**Aims/Objectives**

-To compile and evaluate both prescription and over the counter (OTC) appetite suppressing compounds for the treatment of overweight (BMI 25-30) and obesity (BMI $\geq 30$).

-To describe each agent's mechanism of action, dosing, and safety profile.

-To assess clinical efficacy data,particularly the proportion of patients achieving $\geq 5$ % weight loss over 12 months ,when these agents are used alongside caloric-restriction and exercise.

-To provide evidence-based guidance for clinicians on selecting appropriate pharmacotherapy.

**Methodology**

A systematic narrative review was performed. The authors searched peer-reviewed journals, drug monographs, and regulatory agency reports up to June 2022, extracted data on drug class,

pharmacodynamics, clinical trial outcomes and adverse event rates and organized the information into prescription and non‑prescription tables. No original experiments were conducted.

**Key Findings**

-Prescription agents – Liraglutide (Saxenda) acts on intestinal GLP‑1 receptors to promote satiety; Naltrexone modulates the reward system; the phentermine‑topiramate combination (Qsymia) reduces appetite via central catecholamine stimulation. A meta‑analysis of five FDA‑approved drugs (including orlistat) showed all outperform placebo in achieving ≥ 5 % weight loss, with phentermine‑topiramate and liraglutide yielding the highest response rates.

-Non‑prescription agents – Fenugreek seeds (45 % insoluble fiber) slow carbohydrate/fat absorption; green‑tea extract provides catechins and caffeine that boost thermogenesis; almonds (high fiber, magnesium) increase satiety; ginger has modest anti‑nausea and appetite suppressing effects; yerba mate and dark coffee (high caffeine) further diminish hunger‑.

-Clinical criteria – Prescription suppressants are recommended for patients with BMI ≥ 27 kg/m² plus at least one obesity‑related comorbidity (e.g., hypertension, type 2 diabetes) or for any BMI ≥ 30 kg/m². Contra‑indications include pregnancy, certain drug interactions, and uncontrolled psychiatric illness.

-Benefits – When combined with diet/exercise, pharmacologic therapy can produce 5‑10 % reductions in baseline body weight, improving glycemic control, blood pressure, lipid profiles, and reducing obesity‑related complications such as sleep apnea and joint pain.

**Implications**

The review underscores that effective obesity management requires an integrated approach: lifestyle modification remains foundational, but FDA approved prescription suppressants,particularly phentermine‑topiramate and liraglutide offer the most robust weight loss outcomes. OTC nutraceuticals may serve as adjuncts, especially for patients unable or unwilling to use prescription drugs, but their efficacy is modest and evidence less consistent.

Clinicians should apply the BMI-based prescribing algorithm, monitor for adverse effects, and consider patient preferences when selecting an appetite suppressant regimen.

## Conclusion

The review finds that, when combined with diet and exercise, FDA-approved prescription suppressants (especially phentermine-topiramate and liraglutide) achieve the highest rates of ≥ 5 % weight loss, whereas over the counter nutraceuticals offer modest, adjunctive benefits. Clinical use should follow the BMI-based prescribing algorithm and monitor safety, while future research must focus on safer, more effective agents.

## Reference

Al-Snafi, A. E., Singh, S., Bhatt, P., & Kumar, V. (2022). A review on prescription and non-prescription appetite suppressants and evidence-based methods to treat overweight and obesity. *GSC Biological and Pharmaceutical Sciences, 19*(3), 148-155. https://doi.org/10.30574/gscbps.2022.19.3.0231