Drug resistance in parasites: a growing threat to global health.

Nisha Patel*

National Institute of Parasitic Diseases, India

Introduction

Drug resistance in parasites is a mounting challenge that threatens the effectiveness of current treatment strategies for parasitic diseases. With millions of people worldwide affected by parasitic infections such as malaria, leishmaniasis, and schistosomiasis, the emergence of resistant parasite strains has serious implications for public health, particularly in resource-limited settings [1, 2, 3, 4].

Resistance typically arises due to the prolonged or inappropriate use of antiparasitic drugs, which exerts selective pressure on parasites, enabling the survival and proliferation of resistant variants. For example, *Plasmodium falciparum*, the parasite responsible for the deadliest form of malaria, has developed resistance to chloroquine, sulfadoxine-pyrimethamine, and, more recently, even to artemisinin-based combination therapies (ACTs) in some regions. Similarly, resistance to benzimidazoles in soil-transmitted helminths and to pentavalent antimonials in *Leishmania* species has been reported [5, 6].

Mechanistically, parasites develop resistance through genetic mutations, altered drug uptake or efflux, metabolic bypass [7, 8, 9, 10], or enhanced drug detoxification. These adaptations reduce drug efficacy, complicate treatment regimens, and can lead to increased transmission and mortality.

Addressing this issue requires a multipronged approach: investing in surveillance systems to detect resistance early, promoting rational drug use, developing new antiparasitic agents, and integrating alternative therapies, such as immunotherapy and vaccines. In addition, strengthening health systems and ensuring access to quality diagnostics and treatment remain vital.

Conclusion

Drug resistance in parasites is an evolving threat that demands global attention and coordinated efforts. Sustained research, innovation, and policy interventions are essential to preserve the gains made in controlling parasitic diseases and to ensure effective therapies remain available for future generations.

References

1. Bethony J, Brooker S, Albonico M, et al. Soil-transmitted helminth infections: ascariasis, trichuriasis, and hookworm. Lancet. 2006;367(9521):1521-32.
2. Brunetti E, Kern P, Vuitton DA, et al. Expert consensus for the diagnosis and treatment of cystic and alveolar echinococcosis in humans. Acta Trop. 2010;114(1):1-16.
3. Craig PS, Budke CM, Schantz PM, et al. Human echinococcosis: a neglected disease? Trop Med Health. 2007;35(4):283-292.
4. Crompton DW. The public health importance of hookworm disease. Parasitol. 2000;121(S1):S39-50.
5. Garcia LS, Procop GW. Diagnostic medical parasitology. Manual Commer Method Clin Microbiol Intern Edit. 2016;284-308.
6. Hotez PJ, Brindley PJ, Bethony JM, et al. Helminth infections: the great neglected tropical diseases. J Clin Invest. 2008;118(4):1311-21.
7. Jenkins DJ, Romig T, Thompson RCA. Emergence/re-emergence of Echinococcus spp.--a global update. Int J Parasitol. 2005;35(11-12):1205-1219.
8. McManus DP, Zhang W, Li J, et al. Echinococcosis. Lancet. 2003;362(9392):1295-1304.
9. Torgerson PR, Deplazes P. Echinococcosis: diagnosis and diagnostic interpretation in population studies. Trends Parasitol. 2009;25(4):164-170.
10. Yansouni CP, Merckx J, Libman MD, et al. Recent advances in clinical parasitology diagnostics. Curr Infect Dis Rep. 2014;16:1-8.

***Correspondence to:** Nisha Patel, National Institute of Parasitic Diseases, India, E-mail: nisha.patel@nips.gov.in

***Received:** 25-Jun-2024, Manuscript No. AAPDDT-25-166528; **Editor assigned:** 28-Jun-2024, PreQC No. AAPDDT-25-166528 (PQ); **Reviewed:** 11-Jul-2025, QC No. AAPDDT-25-166528; **Revised:** 16-Jul-2025, Manuscript No. AAPDDT-25-166528 (R); **Published:** 22-Jul-2025, DOI:10.35841/aapddt-10.3.233*

***Citation:** Patel N. Drug resistance in parasites: a growing threat to global health, J Parasit Dis Diagn Ther. 2025; 10(3):233*