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Heat Shock Protein in Periodontal Health and Disease



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DeepScience

Published, marketed, and distributed by:

Deep Science Publishing, 2026
USA | UK | India | Turkey
Reg. No. MH-33-0658412
www.deepscienceresearch.com
editor@deepscienceresearch.com
WhatsApp: +91 7977171947

ISBN: 978-93-7185-499-3

E-ISBN: 978-93-7185-432-0

<https://doi.org/10.70593/978-93-7185-432-0>

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Citation: Firdose, R., Babitha, G. A., Bhuyan, J. P., Singh, A. K., & Reddy, K. K. (2026). *Heat Shock Protein in Periodontal Health and Disease*. Deep Science Publishing. <https://doi.org/10.70593/978-93-7185-432-0>

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Preface

The living systems are prone to several environmental, physiological and pathological stressors that cause a challenge to the cellular integrity and functions. The heat shock response is one of the most important, evolutionally preserved, and commonly found mechanisms of cell survival under such stress, and it is mediated by a group of proteins called heat shock proteins (HSPs). The protein is important in cellular homeostasis where it guarantees that proteins are properly folded, aggregation of damaged proteins is avoided as well as cellular recovery after injury due to stressors. In the last few decades, much work has been done in the large-scale research on heat shock proteins well past their discovery as molecules that become heat-induced. As can now be seen, HSPs play a large variety of biological roles, among which immune modulation, apoptosis, inflammation, tissue repair, and cellular signaling. Their manifestation and role are both closely related to the physiological adaptation as well as the etiology of many diseases affecting the body as a whole.

HSP has been taking on a greater action in directing the field of oral health sciences, especially periodontology and dentistry. Periodontal diseases are associated with chronic inflammation and destroyed periodontal tissues, and they cause a high cellular burden to periodontal tissue. Heat shock proteins become one of the main mediators of the host response, which helps in cytoprotective activity, immune response control, and regulation of inflammatory response. Knowing their part helps to gain a lot of information on the mechanisms of the disease, the diagnostic indicators and any-therapeutic approach.

The objective of this book is to present a well-organized account of heat shock proteins, starting with its historical context, categorization, structure, molecular processes, and its functional aspect in a systemic status, as well as oral health. Special stress has been put on individual HSP families such as small heat shock proteins, HSP40, HSP47, HSP60, HSP70, and HSP90 and its biological importance. Hospitality has also discussed the application of heat shock proteins in the fields of dentistry, periodontics, and vaccine development to ensure that it determines their relevance to translation compartments and clinical systems. The material has been written keeping in mind the interest of the undergraduate and postgraduate students, researchers, and clinicians in having a simple and succinct explanation of heat shock proteins and their growing role in the biomedical disciplines. This book is an attempt to fill the gap between the basic molecular biology and the clinical application through the introduction of basic ideas and the latest research findings.

We also hope that this work will trigger the further interest and research in the area of heat shock proteins and provoke their consideration regarding the development of both the systemic and oral healthcare.

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