**Disinfection Using Ultraviolet Radiation as an Antimicrobial Agent: A Review and Synthesis of Mechanisms and Concerns**

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**Abstract**

Control of microbes in sensitive health care settings cannot be maintained without effective disinfection methods. Recently, increasing microbial resistance to common chemical agents, including antibiotics, has required the implementation of new approaches to disinfection where such sanitary practices are critical. Pharmaceutical manufacturers and many interrelated industries also have a need for effective disinfection and sanitation strategies. As a result, standard practices that direct and maintain effective microbial controls are established. These practices exploit a thorough understanding of biological processes and manipulate them to preserve the quality and safety of a valuable product. Most biological processes are delicately balanced with their surroundings, or environment. When changes are made to the environment during disinfection, damaged microbes may respond by repairing the immediate damage or by adapting their biological processes through developing a resistance. Unless sound disinfection procedures are consistently applied, new strains of environmental microbes that can utilize multiple resistance markers may be artificially selected. Examples of related drug resistance are currently being studied and managed in many large hospitals, but non-chemical methods are also subject to similar concerns. Here, we review the use of ultraviolet-based disinfection practices, the biological basis for them, and some potential desensitization issues that may develop. Finally, we suggest some approaches to study and practically address these effects.