Austin Journal of Public Health and Epidemiology

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Austin Publishing Group

Short Communication

Molecular Biology Impact in Oral Health Profession: A Look into the Future

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Received: September 10, 2015; **Accepted:** September 23, 2015; **Published:** October 16, 2015

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Oral health practice has now entered the era of "evidence based dentistry," characterized by an increasing societal belief around the world that clinical practice should be based on scientific information. The Centre for Molecular Biology of Oral Diseases has been founded in many top dental schools around the globe as a multidisciplinary unit devoted to understanding basic patho-biological mechanisms relevant to oral diseases. Molecular biology, the human genome project, transcriptomes and proteomes have recently opened vast opportunities for translation of basic science discoveries to oral health care at the chair side and bedside through the intermediary process of clinical research [1]. Molecular biology is the study of biological processes at the submicroscopic and molecular level of various events in the flow of genetic information taking into consideration the process of replication, transcription and translation of the genetic material. This field of life sciences overlaps with other areas of biology and chemistry, particularly molecular genetics and biochemistry. Molecular biology is mainly concerned with understanding the interactions between the various systems of a cell, including the interactions between DNA, RNA and proteins as well as their regulation at the molecular level. The basic concept of molecular biology is to investigate the organisms at the sub-cellular and macromolecular level. As more is learned about the workings of genes and how changes in gene structure enhance or damage the usual functions of living organisms, the diagnosis and treatment of disease now became increasingly gene-centred. The practice of medicine including oral health "over the next several years will become less acute and episodic in its focus towards more preventive and individualized. The implementation of genetic engineering in medicine will have a similar effect on the practice of dentistry [1]. It is likely that young dentists during their professional lifetime will be able to control the pathogenicity of dental infectious agents, restore and reconstruct damaged and lost dental tissues through bioengineering methods and build dental structures that are able to resist the destructive elements of dental disease. In 2003 completion of the Human Genome Project elevate the science of biology to primacy and herald the start of a scientific era that will, in the near future, fundamentally change the methodology of dental patient care. The deciphering of the genome, the impending understanding of protein construction and the continuing investigations of cellular function portend momentous changes in the art and practice of the dental sciences [2]. Genetic bioengineering will impact all phases of dental practice. Most significant will be the interaction between dentists and patients as new systems of diagnosis, prevention and treatment develop in future. Baum and Mooney [3] explained, "Tissue engineering will have a considerable effect on dental practice during the next 25 years. The greatest effect will likely be related to the repair and replacement of mineralized tissues, the promotion of oral wound healing and the use of gene transfer adjunctively." Researchers at the University of Michigan School of Dentistry reported that they used engineered skin and gingival cells to produce bone with the same spongy interior, hard outer coating and marrow center as naturally developed bone [4]. Scientist Robert Freitas explained that nano-biotechnology, which involves the use of precise, molecular-sized robotic devices to control matter at the atomic and molecular level, could result in the manufacturing of instruments that are able to build and install "a biologically autologous whole-replacement tooth that includes both mineral and cellular components" [5]. How people differ genetically may explain why a given therapy, such as osseous surgery, is Successful with one patient, yet fails to the periodontal disease of another. No longer will "one size fits all" be the methodology of patient care. Treatment will be tailored carefully to meet the specific needs of the patient, and adjusted as dictated by his or her genetic profile. The promise of tissue engineering in dentistry is great, but there exist major challenges that must be met in the next few decades for this new field to reach its potential application. Some of the main challenges lie not on the scientific side, but in the application of the technology. Once we fully understand how we can recreate functional, viable new tissues in the laboratory, how will we then be able to translate this knowledge to the patient population at large? A major issue will be the cost of these new therapies. Will industry be able to produce tissue products in a cost-efficient manner so the patient can afford this type of treatment? Secondly, in order for the new technology to reach the general masses, there will need to be health care centers and institutes capable of applying these engineered products. Individuals sufficiently trained to utilize these therapies will clearly be required, necessitating new training programs for these scientists, clinicians, and support teams. Another major challenge lies in the ethical concerns regarding engineering tissues. Relevant ethical issues include the source of cells (patient's own *vs.* donated cells) and type (adult-donor *vs.* fetal cells). In addition, on what basis will it be decided who receives these new tissue therapies (according to need, ability to pay, etc.)? It is also unclear how third-party groups will react to the new technology and what they will cover. Needless to say, many different perspectives on these questions exist, based on individual, cultural, and scientific principles. This will be undoubtedly an exciting time in dentistry and the biomedical community at large. In few decades, dentistry as we know it today will be remarkably different,

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Citation: Chaudhari PK and Nandita K. Molecular Biology Impact in Oral Health Profession: A Look into the Future. Austin J Public Health Epidemiol. 2015; 2(2): 1022.

as it is now different from the way it was twenty-five years ago. Many dental schools and postgraduate programs are currently evaluating curriculum content in light of the public's oral health care needs and in light of the many advances in genetics, cell and molecular biology, and the materials sciences. Once the general publics are aware of newer and better treatments, they will not accept anything less. The well-informed clinician capable of incorporating this technology into his or her practice will continue to thrive in the future.

References

1. Maheshwari S, Verma SK, Tariq M, Prabhat KC, Kumar S. Emerging trends in oral health profession: The molecular dentistry. Biology and Medicine. 2010; 4: 56-63.
2. Yeager AL. Where will genome lead us? Dentistry in the 21st century. JADA. 2001; 132: 801-807.
3. Baum BJ, Mooney DJ. The impact of tissue engineering on dentistry. JADA. 2000; 131: 309-318.
4. Skin, gingiva used to create new bones (news). JADA. 2000; 131: 874.
5. Freitas RA Jr. Nanodentistry. JADA. 2000; 131: 1559-1565.

Austin J Public Health Epidemiol - Volume 2 Issue 2 - 2015
ISSN : 2381-9014 | www.austinpublishinggroup.com
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Citation: Chaudhari PK and Nandita K. Molecular Biology Impact in Oral Health Profession: A Look into the Future. Austin J Public Health Epidemiol. 2015; 2(2): 1022.