

“Omics” : The Science for Future

Viroj Wiwanitkit

บทคัดย่อ

ด้วยความเจริญก้าวหน้าของวิทยาการทางด้านคอมพิวเตอร์ในปัจจุบัน โอมิกส์จัดเป็นวิทยาการใหม่ทางวิทยาศาสตร์ที่มีจุดเริ่มต้นมากจากความสำเร็จของโครงการจีโนม โอมิกส์เป็นศาสตร์ที่ผสมผสานระหว่างวิทยาศาสตร์กายภาพและชีวภาพ การผสมผสานศาสตร์ดังกล่าวก่อให้เกิดศาสตร์โอมิกส์แรกคือ จีโนมิกส์ และทำให้เกิดศาสตร์ในกลุ่มโอมิกส์มากมายในปัจจุบัน ในบทความปริทัศน์นี้ผู้นิพนธ์ได้อภิปรายและนำเสนอเกี่ยวกับศาสตร์ในกลุ่มโอมิกส์ที่น่าสนใจ

คำสำคัญ: โอมิกส์, วิทยาศาสตร์

Abstract

With the advent in computational technology, the “omics” becomes the new phase of present science. Starting from the complete of genome project, the integration between physical and biological science occurred. Such combination resulted in the first omics science, genomics. After that there are several new omics science. In this brief article, the author discusses and present on some interesting omics sciences.

Key words : omics, science

Introduction

The classical way of science has its standard approach. Either in vivo or in vitro manipulation can be selected as a way to any the scientific query. However, such actual experiments usually take times. How to perform an accurate and effective study to explain a scientific phenomenon becomes the challenge in science for many years. With the advent in computational technology, the “omics” becomes the new phase of present science. Starting from the complete of genome project, the integration between physical and biological science occurred. Such combination resulted in the first omics science, genomics. After that there are several new omics science. In this brief article, the author discusses and present on some interesting omics sciences. (Haarala & Porkka, 2002; Mäkelä, & Porkka, 2002; Wiwanitkit, 2008)

Genomics

Genomics is the oldest omics science. As already mentioned, genomics is the use of computational approach for helping answer the scientific query. When the genome project is complete, it is no doubt that there are heaps of data. The use of computational technique to help scientist manage the genetics question is the answer to the basic question how to manage the data. There are several subtypes of genomics. The two

main types are structural and functional genomics. The structural genomics is the application for clarification or prediction for gene structure whereas the functional genomics is the application for clarification or prediction for gene function. In addition, using genomics for comparison between two issues is also possible and this is called comparative genomics. With more advanced applications, several hybrid genomics sciences have been launched. The good examples include nutrigenomics, toxigenomics and pharmacogenomics. (Wiwanitkit, 2008; Kelly,1989; Rubin & Barsh, 1996; Dizikes, 1995)

Proteomics

Protein is the final product of genetics process. The study on protein is an actual challenge. When the genomics was launched, the scientists realize the need for another omics science for management of protein data. Similar to genomics, there are several subtypes of proteomics. The two main types are structural and functional genomics. The structural proteomics is the application for clarification or prediction for gene structure whereas the functional proteomics is the application for clarification or prediction for protein function. (Wiwanitkit, 2008; Müllner, et al., 1998; Quadroni, & James,1999; Blackstock, & Weir,1999)

Interactomics

Interaction is the basic phenomenon in science. The application of the computational approach for the query on interaction is also possible. The interactomics is more complex than simple genomics and proteomics. The interaction and pathway can be manipulated with use of interactomics. (Wiwanitkit, 2008; Ito, 2005; Cesareni, et al., 2005)

Transcriptomics

When one studies on the tract between gene to protein, the transcription and transcriptome is usually common issue to be discussed. Recently, the scientists also focused on this issue and the specific omics science, transcriptomics, was launched. The transcriptomics becomes the new tool that can be helpful for the scientist in the present day. (Wiwanitkit, 2008; Ito, 2005; Ducancel, et al., 2014)

Metabolomics

Metabolism is the common scientific issue in biochemistry. To study the metabolism the application of computational approach by the new omics science namely metabolomics is possible. Based on metabolomics, systemics is another new science based on the concept of systems thinking. The

systemics can help explain the complex relationship such as a pathogenesis of a medical disorder. Now, there are several new tools in systemics that can be helpful for the scientist for answer the difficult system question. (Wiwanitkit, 2008; Hegde, et al., 2004; German, et al., 2002; Fiehn, 2002)

Metallomics

First, the use of omics science is usually focuses on organic molecules but the extension to inorganic molecules is also existed. The study of metal by the technique namely metallomics is possible and the extension to the study on linkage between metal and protein by newer technique namely metallo-proteomics is also available at present. (Wiwanitkit, 2008; Shi, & Chance, 2008; López-Barea & Gómez-Ariza, 2006).

Venomics

Venom is a specific molecule that is widely studied in bioscience and medical science. The application of computational approach on the study of venom is also presently available and it is namely venomics. This technique becomes an interesting focus in medical science at present. (Wiwanitkit, 2008; Ménez, et al., 2006; Calvete, 2009)

Nutriomics Nutrient is another specific molecule that is widely studied in bioscience and medical science. Similar to the case of venom, the application of computational approach on the study of nutrient is also presently available and it is namely nutrionomics. The extension on the linkage between nutrient and gene namely nutrigenomics is also available, This technique becomes another interesting focus in medical science at present. (Wiwanitkit, 2008; Epriliati, et al., 2009; Epriliati, et al.,2009)

Conclusion

At present, there are many omics sciences. Those “omics” can be useful for scientific society (Evans GA. , 2000). It can be useful for both clarification and prediction of scientific problems. To be updated, the scientist has to prepare, learn and use the new omics sciences effectively.

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