

The Guest Speaker, Dr. Brian Chung Hon-Yin (鍾侃言醫生), Clinical Associate Professor of Paediatrics and Adolescent Medicine, Department of Obstetrics & Gynaecology, Subtheme Coordinator (Genetics of Disorders) at the University of Hong Kong was briefly introduced by our Second V.P. Elizabeth Cheng. He spoke to us on “Genomic medicine in Hong Kong.”

[Download here for a summary of the talk]

Dr. Brian Chung is a recent convert to the Catholic Church. He graduated from St. Joseph's College in Hong Kong and the University of Hong Kong. He went to the Hospital For Sick Children at the University of Toronto for further training before returning to the University of Hong Kong, where his work is now divided between (i) Teaching, (ii) Research, and (iii) Educating the public. His specialty is Bio genomics. The talk is too technical for full recording and Dr. Chung has promised to provide our Club with a handwritten copy of his talk for use at our 2020 Serra Convention. A brief summary of the talk is as below: -

(A) Definition

Genetics is the study of individual genes. The whole spectrum of genes is referred to as Genome. Biogenomics is the study of the society as a whole due to the effect of abnormal on mutated genes.

(B) Human Genome

A normal human being has 23 chromosome plus sex chromosomes (xx or xy). No two individual persons has the same genome (they maybe 99% the same). All living things have genes consisting of four basic amino acids

T Thyrnine

C Cytosine

A Adenine

G Guanine

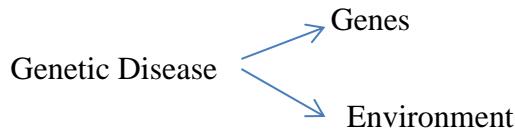
The human gene is in the form calices with 6,000,000 to 10,000,000 genetic variations. If we unwind the human genome into single strands, it is equal to 6 times the distance between our earth and the moon. Thus the human genome is a really complicated structure to be analyzed and studies.

(C) Mutations

Frequent abnormal changes may occur in the sequence (or arrangement) of the human genome. These changes often result in genetic disorders resulting in various diseases. These diseases may be due to Single Gene Disorder or Multi-Gene Disorder.

(D) Genetic Diseases

Diseases may be caused by genetic disorder. Environment also plays an important role. Thus



Genetic diseases are very complex, but rare (i.e. Low Occurrence). Take the example of a rare heart disease that causes sudden death in young individuals (Congenital Long QT Syndrome) – this causes 12 deaths weekly in the U.K., but can be managed if identified early with the use of a cardiac pacer.

(E) Impact on Healthcare System

A genetic disease is a disease with low occurrence, but still causes a major impact in the Hong Kong Healthcare System: -

1.5% → 3.2% → 4.3% → HK 1.6 billion dollars

Existence      hospitalization      hospital cost      annually

There are at present only 5 hereditary medical experts in Hong Kong – genomics is a new medical specialty for these rare diseases.

(F) Genomic Medicine in Hong Kong

Most of the statistics in current medical literature applies to the Caucasian population. It is a new field and therefore with less statistics from the Chinese population. At present, the doctors in this field are hoping to integrate genetics or genomic medicine into main stream paediatrics. A form of childhood epilepsy may be caused by neurological or cardiac causes (due to genetic composition) with different modes of treatment. Genetic diseases have low occurrence resulting in rare diseases, with 90% of them not yet diagnosed.

Treatment of genetic diseases may be very costly. Take the case of Mucopolysaccharidosis VI – the medicine to treat this condition costs HK\$30,000 per week for a child. As the child gains in weight, the dosage increases and so does the cost. The ideal situation is for Individualized Drug Therapy (IDT).

The diagnosis of genetic disease is often very quickly done, e.g. spinal Muscular Atrophy (SMA) can be done in 1 day.

(G) CRISPR Gene Editing and Beyond

Sickle Cell Anaemia or Thalassemia is due to the wrong positioning of one amino acid in the gene. ~~GTG~~ GAG. Theoretically, if we correct this mal-position, we can prevent this illness. In practice, it is not as simple as this as changing the location of the amino acid in one gene may also cause a change in other genes, resulting in some unknown or maybe more serious disease entities. This is the real disagreement or moral arguments against gene editing without a supervisory over-seeing agency.

At present, the Prevention of Genetic Diseases has three strategies:-

- (a) Adoption of child by two affected parents
- (b) Pre-implantation genetic diagnosis
- (c) Genomic gene therapy (with risk of affecting countless future generations). This is where disagreement occurs.

At the University of Hong Kong medical school, Dr. Brian Chung now holds medical humanities classes for new students.

There was sharing by Serrans Gabriel Chung and Michael Lau after this most interesting talk.