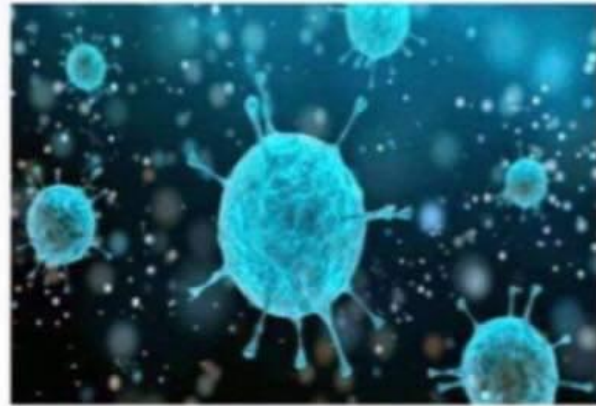


# Lecture 15

Second Year  
Passion Batch



MICROBIOLOGY

**Saba nabeel**

# Normal Flora

## HUMAN MICROBIOME IN HEALTH AND DISEASE



Dr. Waleed Al Momani, MLT, PhD

- Microbial ecology is the study of the numerous interrelationships between microbes and the world around them.
- Microbes interact with humans in many ways and at many levels.
- The most intimate association that we have with microbes is their presence both on and within our bodies

# Symbiotic Relationships Involving Microorganisms

- Symbiosis is defined as the living together or close association of two dissimilar organisms (usually two different species).

normal flora can develop symbiosis between different species

symbiosis = change Koch definition which indicates that a single microorganism is responsible for a single disease

symbiosis identify super infection or multiple infection أكثر من كائن ممكن يكون مسؤول عن مرض معين

symbiosis = التكافل

- Neutralism
- Commensalism
- Mutualism the most important there is gain and loss  
فائدة مشترك مثل البكتيريا الطبيعية والانسان
- Parasitism

# Indigenous Microbiota of Humans

normal flora =microbiome =bioneme 'the same definition "  
microbes in or on the human body

- A person's indigenous microbiota (sometimes referred to as the human microbiome or human bioneme) includes all of the microbes (bacteria, fungi, protozoa, and viruses) that reside on and within that person

- During pregnancy, the human fetus lives in a remarkably protected and for the most part sterile environment

first exposure to microbes = during birth < birth canal contain many microbes

so as humans we start establishing normal flora from the first direct contact with the external environment

from birth until 2 years mainly

sometimes it needs 5 years to develop the normal flora depending on : exposure and environment

الخوف الزائد على الطفل ومنعه من التعرض للبيئة الخارجية يؤدي الى زيادة الفترة المطلوبة لبناء البكتيريا الطبيعية

- Over the next few years, communities of organisms (microbiota or normal flora) form on the surfaces of the skin, nares, oral cavity, intestines, and genitourinary tract.

اللمس والتذوق من الطرق التي يستخدمها الطفل للتعرف على البيئة الخارجية  
which help in building normal flora faster











higher exposure >> building normal flora faster

best way to establish normal flora is by having real infection >> leads to immune response and building more normal flora  
also bacteria found in food can help in building normal flora  
a little of it not necessary to cause serious infection

# The Human Microbiome Project

- <sup>global</sup> 5-year multinational study to analyze the genetic composition (microbiome) of the microbial populations that live in and on healthy adults.

- It is estimated that bacterial cells outnumber human cells in the host by 10 : 1

by collecting the sample from different part of the body of healthy individuals they found that human cells " 30 trillions" are occupied by normal flora that each human cell in and out is occupied by ten normal flora normal flora number is ten times greater than human cells

50% of fecal material weight is bacteria  
لو اخذنا 1 كغ من ال  
fecal material  
منها بكتيريا .5

- A recent study estimated the ratio as 1.3:1 (science news: [Vol. 189, No. 3, February 6, 2016, p. 6](#))

- The Human Microbiome Project was launched in 2007 with the collection of samples from the nose, mouth, skin, gut, and vagina from healthy adult volunteers

- Bacteria colonizing the gut are different from those in the mouth, skin, and other body sites.
- The greatest taxonomic and genetic diversity was the intestine, and the vagina was the least complex.  
large intestine "colon " contain the largest genetic diversity while the vagina contain the least  
large intestine contain anaerobes and facultative anaerobes  
mixed species found in the oral cavity >>can afford different enviroments also it contains anaerobes and microaerophiles
- Microenvironments such as different regions of the mouth, gut, skin surface, and vagina also had their own unique microbiome

**Core Microbiome** like staphylococcus in the skin it was isolated from 95% of the sample which means its important to found it in healthy individuals and its absence indicates an abnormal situation "disease"  
"very important in health and disease"

- Most individuals share a core microbiome, arbitrarily defined as the species that are present at a specific site in 95% or more of individuals.
- The greatest numbers of shared species are present in the mouth, followed by the nose, intestine, and skin, and the fewest shared species are found in the vagina
- **Secondary microbiome** consists of small numbers of many species that may not be widely shared by individuals  
not very important in health and disease

