

# QMD:一种量化组间微生物绝对丰度差异的新方法

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# Microbiome

## IN NUMBERS

**100 Trillion**

symbiotic microbes live in and on every person and make up the human microbiota

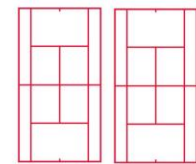
The human body has more microbes than there are stars in the milky way

**95%**

of our microbiota is located in the GI tract

**150:1**

The genes in your microbiome outnumber the genes in our genome by about 150 to one



The surface area of the **GI tract** is the same size as 2 tennis courts

You have **1.3X**

more microbes than human cells

**>10,000**

Number of different microbial species that researchers have identified living in and on the human body

**2kg**

The gut microbiota can weigh up to 2Kg



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The microbiome is more medically accessible and manipulable than the human genome

**90%**

It is thought that of disease can be linked in some way back to the gut and health of the microbiome

**5:1**

Viruses: Bacteria in the gut microbiota

**2.5**

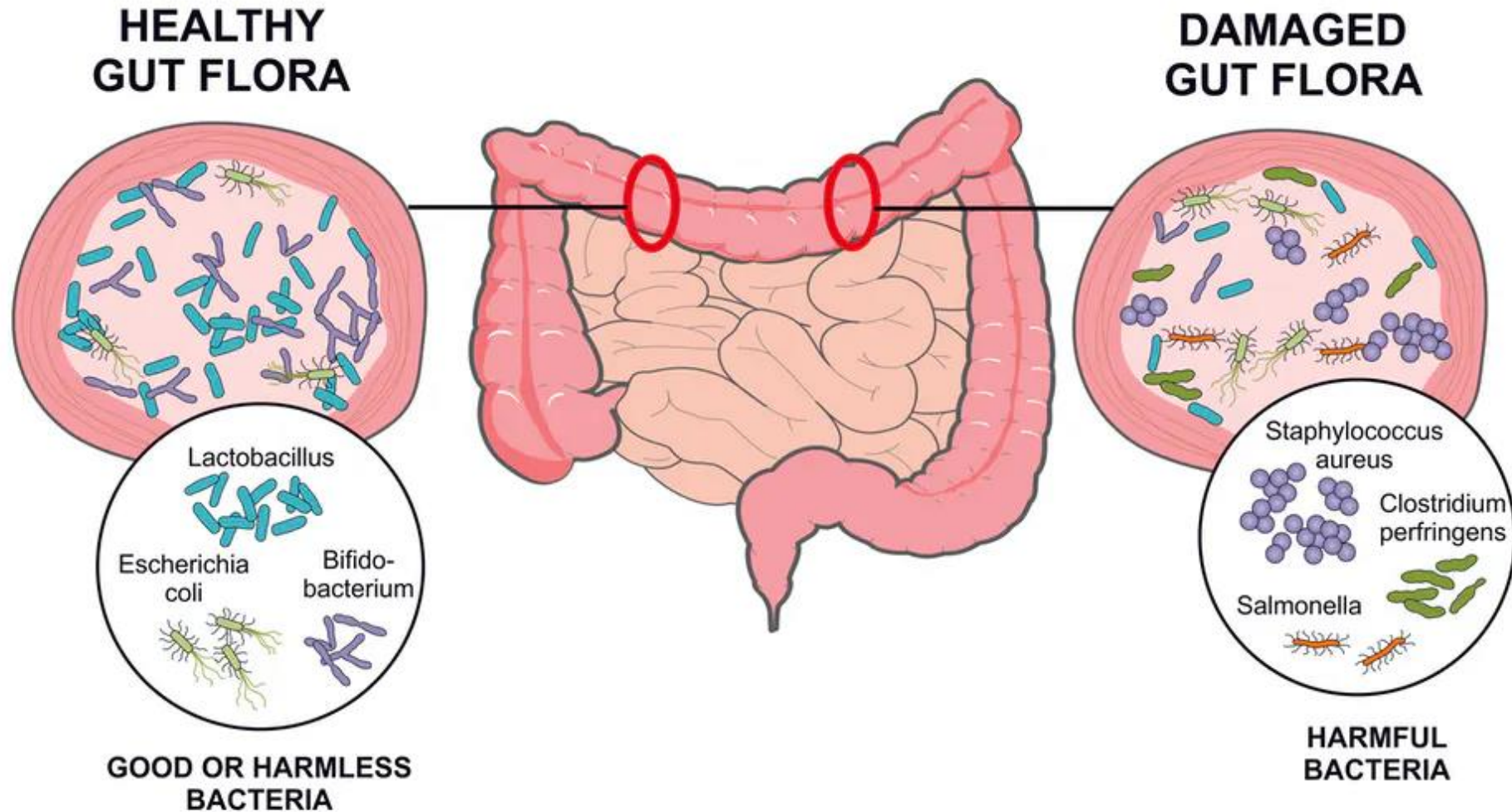
The number of times your body's microbes would circle the earth if positioned end to end



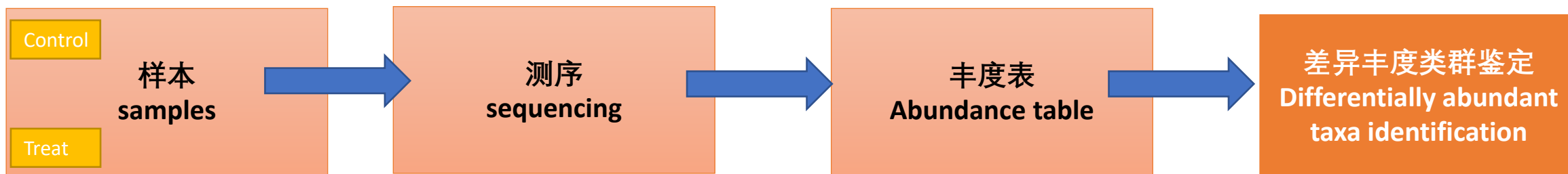
Each individual has a unique gut **microbiota**, as personal as a fingerprint



# 背景

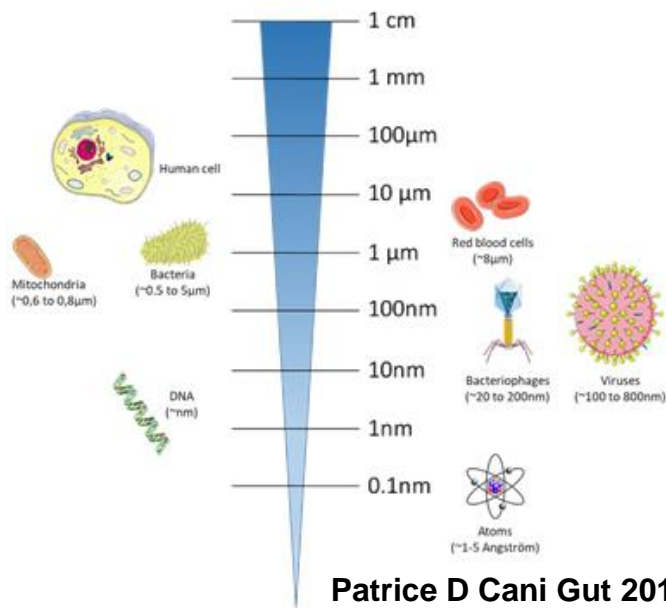


# 背景

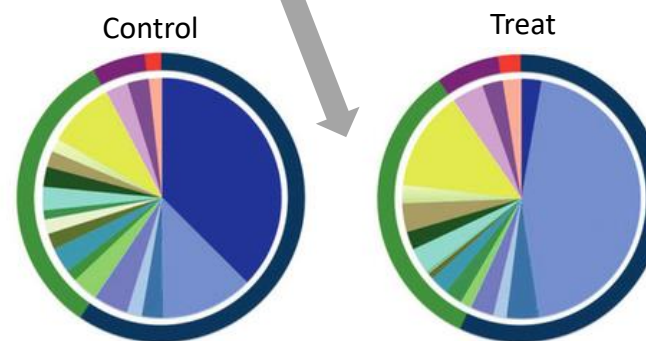


$10^{13}$  « human cells »  
 $10^{14}$  « microbial cells »  
 $10^{12}$  bacteriophages/g of fecal material  
 $10^{11}$  bacteria/g of fecal material

绝对丰度  
每单位样品质量的微生物载量

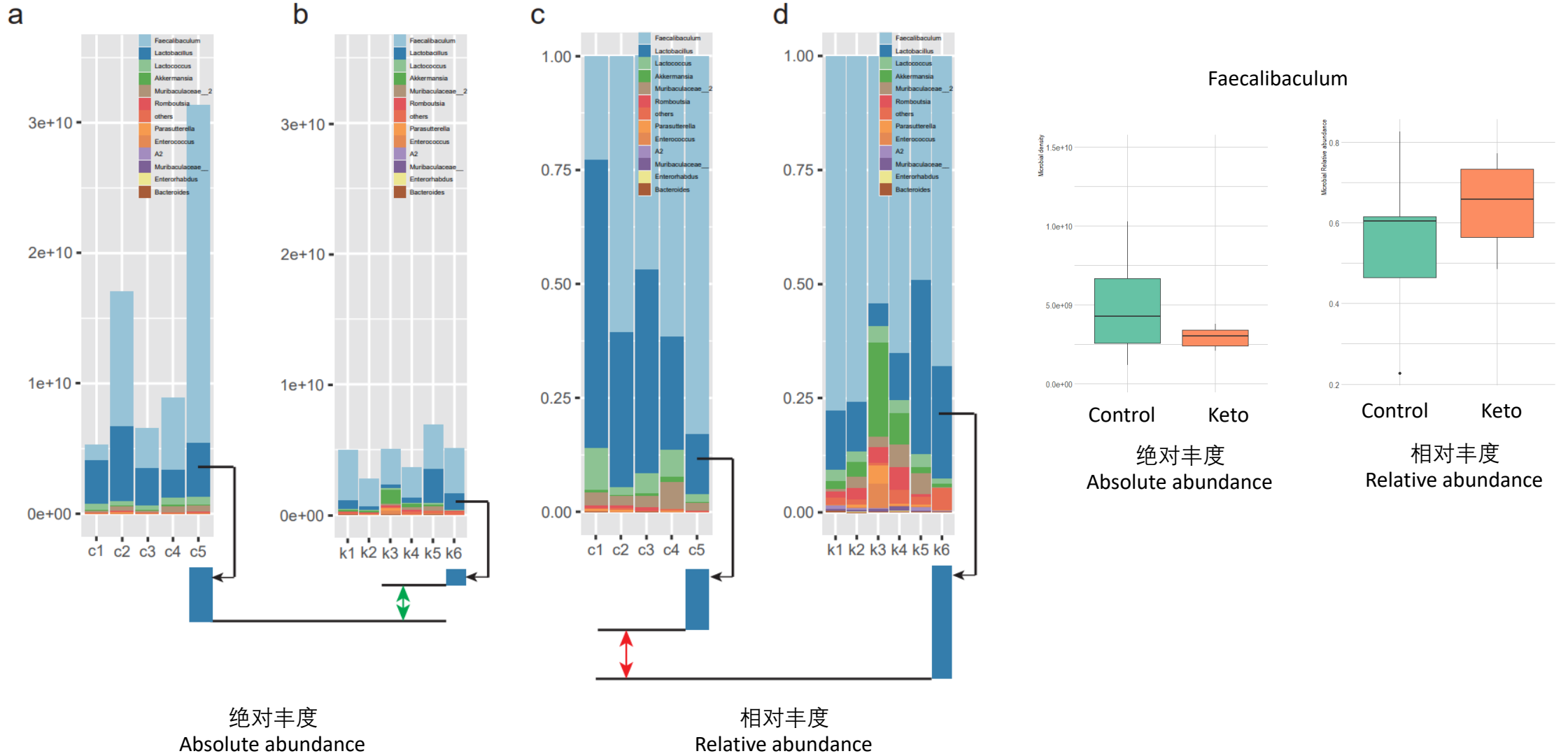


Patrice D Cani Gut 2018;67:1716-1725

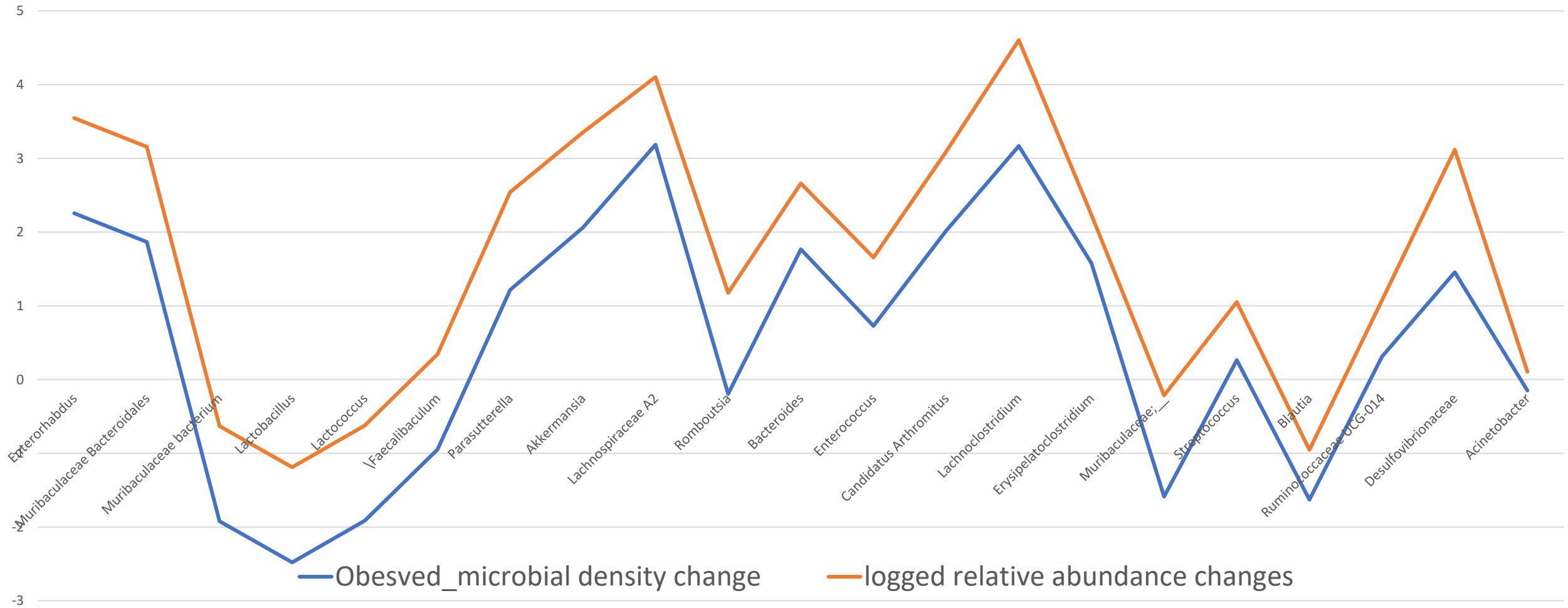


相对丰度  
绝对丰度的组成数据

# 结果

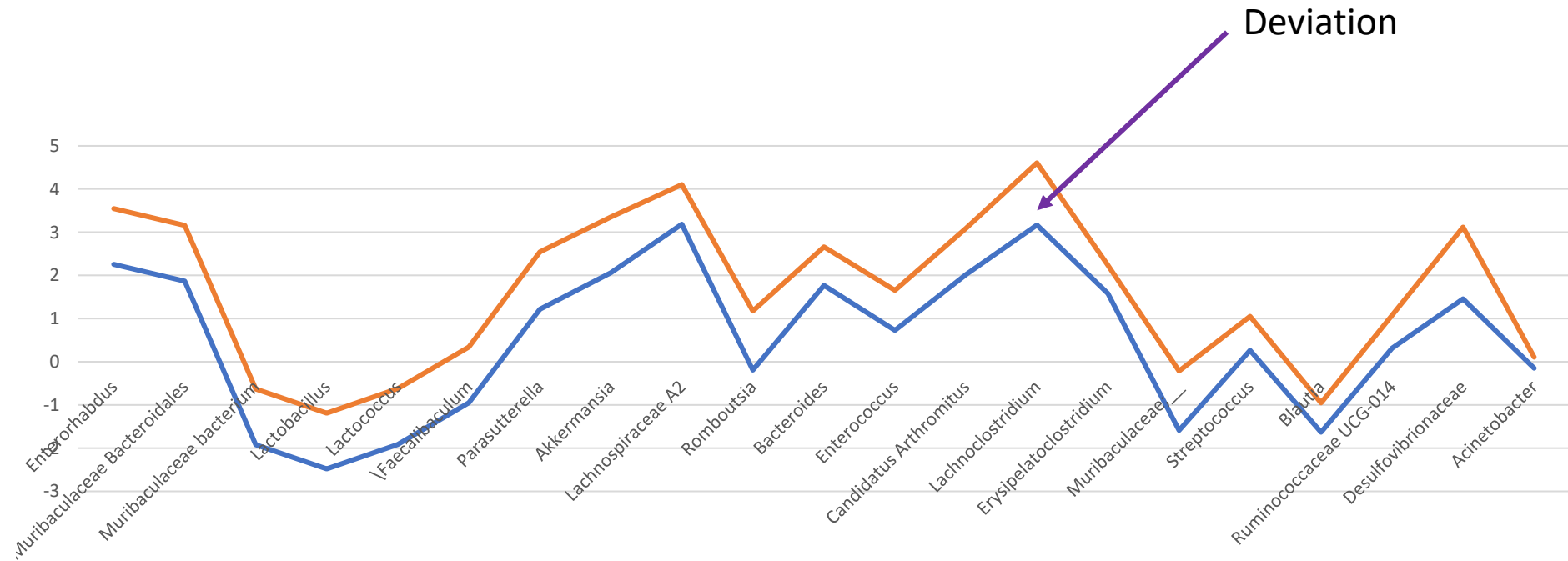


# 结果

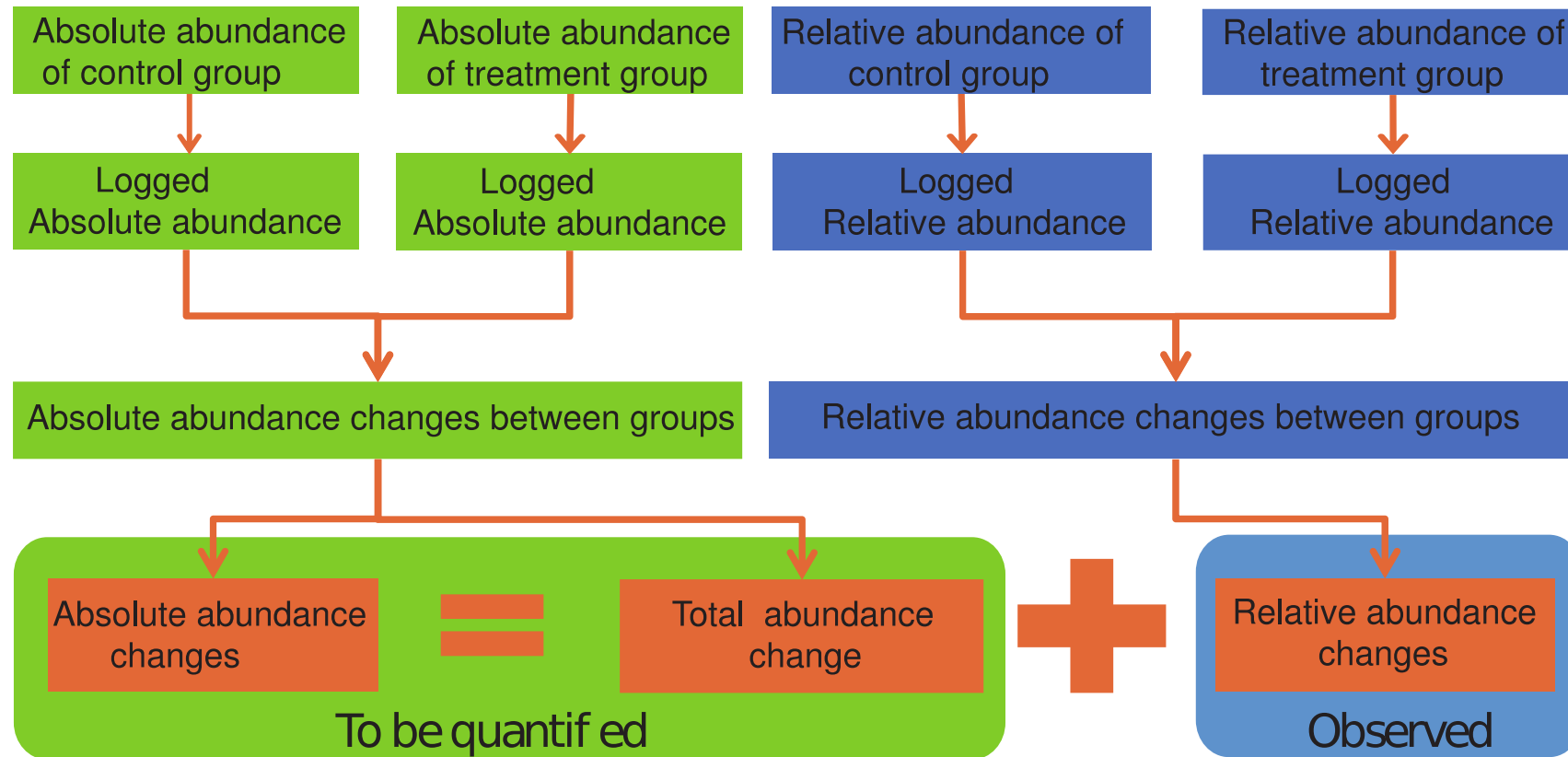


# 结果

## QMD的核心思想



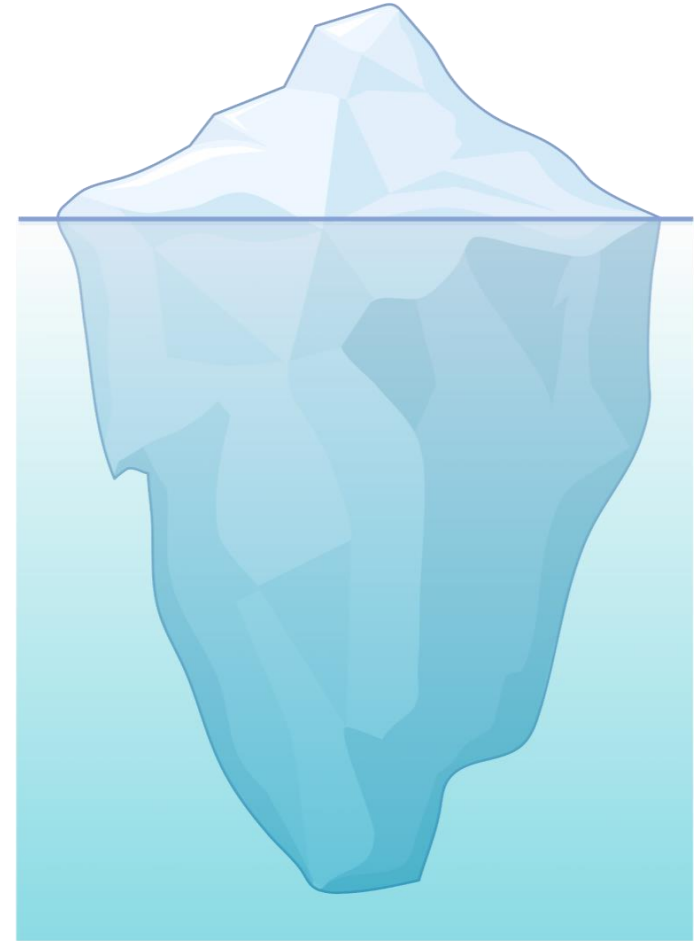
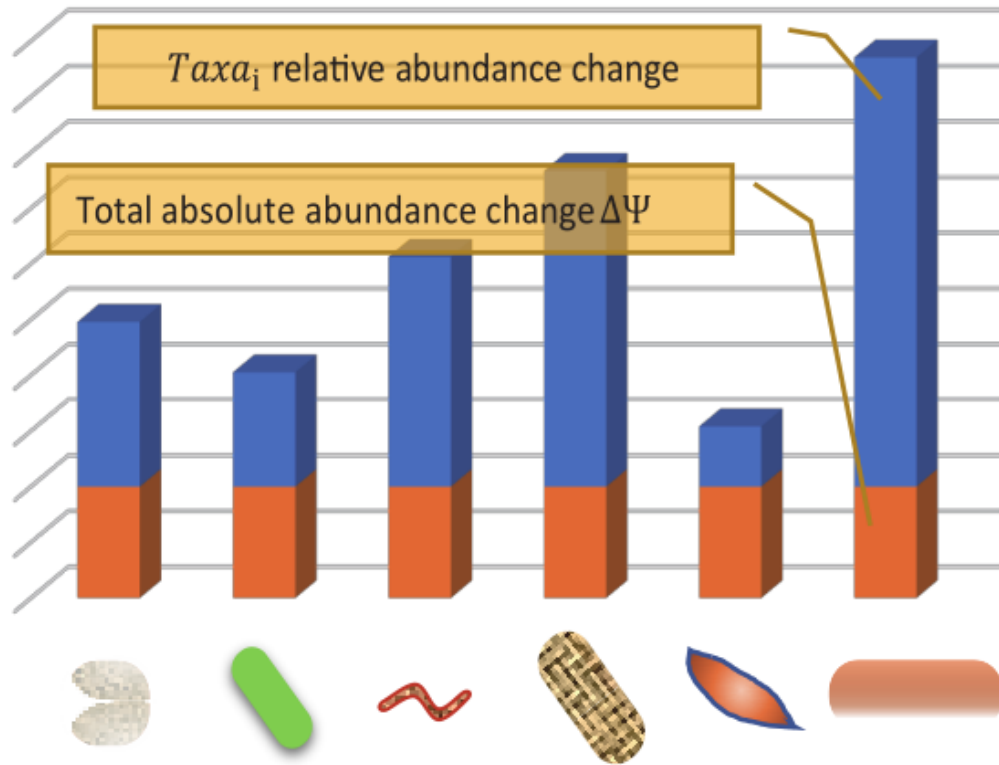
# 结果



$$E \left( \log(a_i^T) \right) - E \left( \log(a_i^C) \right) = \Delta\Psi + E \left( \log(o_i^T) \right) - E \left( \log(o_i^C) \right)$$

# 结果

Microbial abundance change  $\Delta M_i$  for  $Taxa_i$



# 结果

**QMD 软件获得**

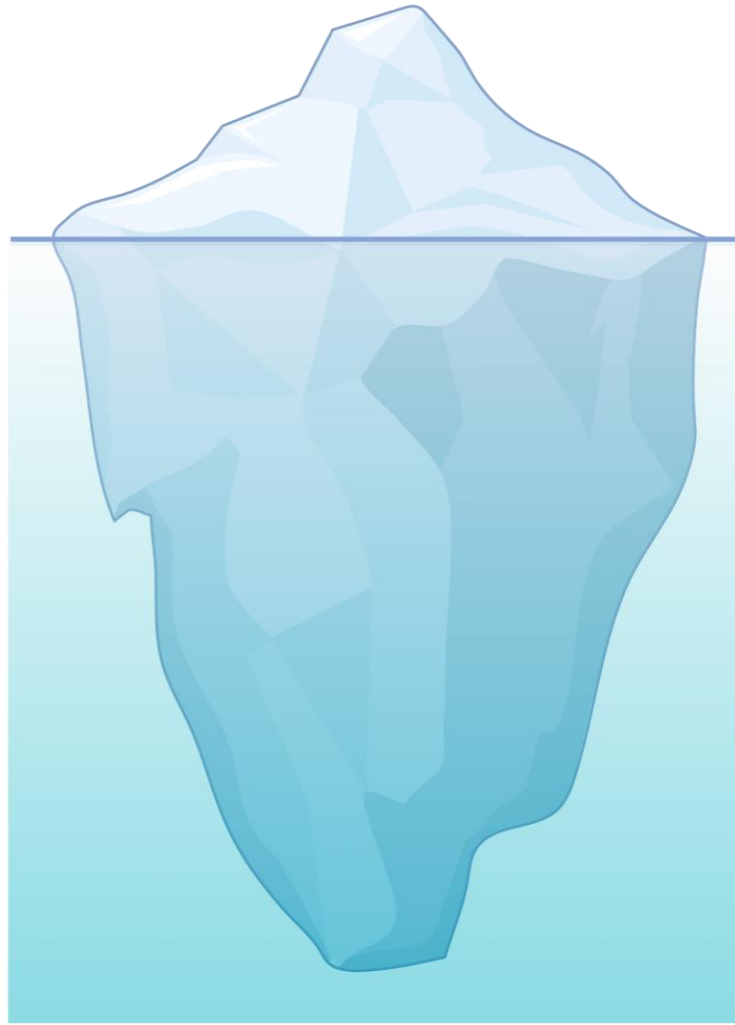
# QMD software acquisition

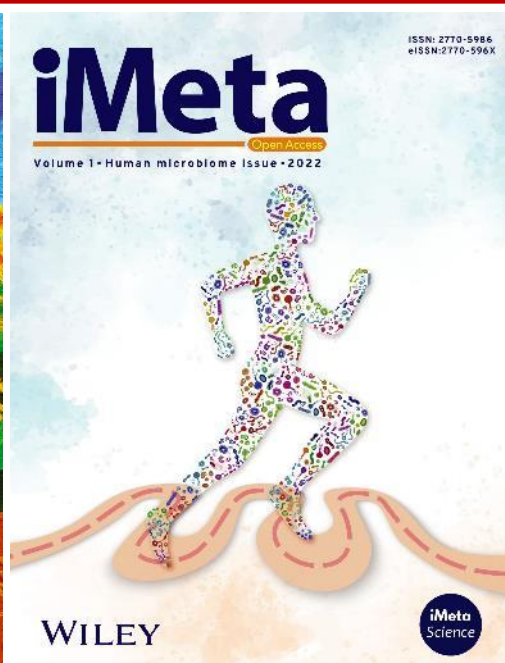
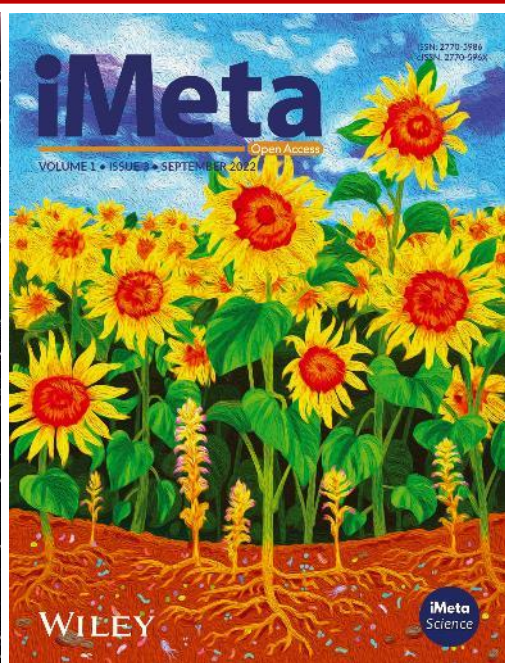
## QMD的软件使用

## **QMD software usage**

The input data in QMD is the relative abundance.

# 总结





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