# Investigation of the interaction between human gut microbiota and disease state: from dysbiosis to symbiosis

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To date, few international projects studied the intra- and inter-individual variability to underline the **possible role of microbiota in pathologies onset**. In this scenario, the **definition of recruiting protocols** and the **collection of biological samples** - from healthy subjects and patients – is necessary to provide significant data to highlight the microbiota-pathology correlations.

## 1. Defination of sampling method

**Sampling kit constitution**

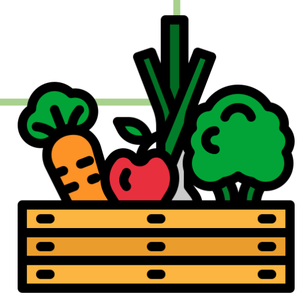

**Fecal sampling in Amies Transport Medium** to conserve microbial vitality and carry out metaomics analysis (metaproteomics, metabolomics)

- **Fecal sampling in RNA*later* in ratio 1:1** to store and stabilize the integrity of genetic material and carry out analyzes of 16S rDNA metagenetics
- One sterile and empty devices for **urinary samples** to store in the biobank
- One sterile and empty devices for **salivary samples** to store in the biobank

**Food diary filling**

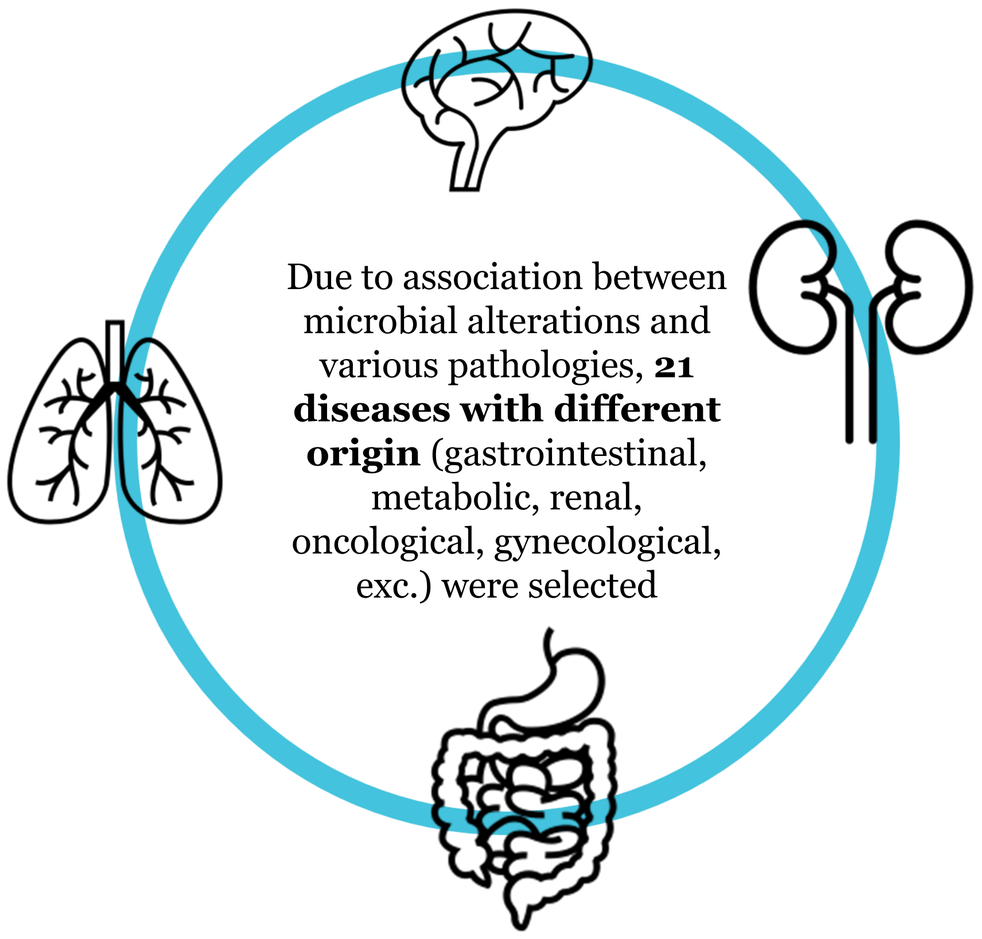
| | |
|---|---|
| **Giorno** | **DATA:** |
| **COLAZIONE** | |
| **Latte:** | intero ❒ scremato ❒ parzialmente scremato ❒ |
| Quantità: | n..... bicchieri oppure n.....tazze oppure altra quantità ..... |
| Aggiunta di zucchero o miele: | n..... cucchiaini oppure n..... cucchiai |
| **Succo di frutta:** | n.....bicchieri oppure n.....tetrapak |
| Altra bevanda (specificare tipo e quantità):..... | Zucchero o miele: n....cucchiaini |
| **Yogurt**: | n.....vasetti bianco ❒ alla frutta ❒ magro ❒ intero ❒ |
| **Fette biscottate o gallette di riso:** | n.2. **Miele o marmellata:** n 2 cucchiaini |
| **Biscotti:** | n.....biscotti .....(specificare il tipo) |
| **Cereali:** | n.....cucchiai oppure n.....grammi |
| **Brioche:** | confezionata ❒ oppure....artigianale ☒ n .....brioche |
| Altra colazione: (indicare tipo e quantità degli alimenti consumati) ..... | |

To patients and healthy volunteers is asked to fill a **food diary relating to the three days** prior to the collection of biological samples in order to evaluate the influence of food intake and specific dietary habits on the **composition of the microbiota** and on the **progression of considered pathologies**

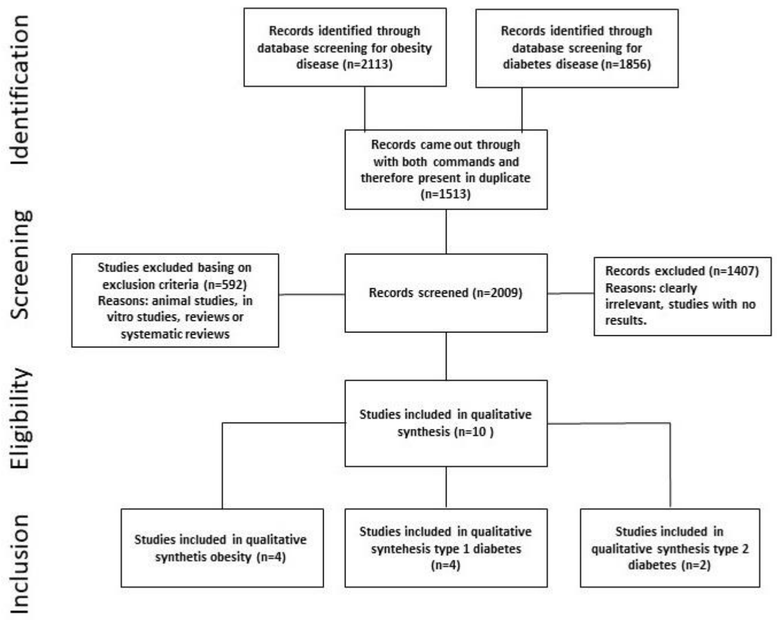


**Pathologies and subjects selection**

| Subject condition | Pathology Type | N° of subjects | RNA*later* (stool) | AMIES TM (stool) | Urine |
|---|---|---|---|---|---|
| Healthy | | 105 | 105 | 105 | 105 |
| IgAN | Nephropathic | 30 | 30 | 30 | 30 |
| ADPKD | Nephropathic | 30 | 30 | 30 | 30 |
| CKD advanced | Nephropathic | 25 | 25 | 25 | 25 |
| DKD | Nephropathic | 30 | 30 | 30 | 25 |
| Biting obesity | Metabolic | 25 | 25 | 25 | 25 |
| Obesity | Metabolic | 25 | 25 | 25 | 25 |
| Metabolic syndrome | Metabolic | 25 | 25 | 25 | 25 |
| DMT1 | Metabolic | 25 | 25 | 25 | 25 |
| DMT2 | Metabolic | 25 | 25 | 25 | 25 |
| Recurrent cervico-vaginitis | Gynecological | 25 | 25 | 25 | 25 |
| Endometriosis | Gynecological | 25 | 25 | 25 | 25 |
| Repeated implantation failures | Gynecological | 25 | 25 | 25 | 25 |
| Lung cancer NSCLC | Oncological | 25 | 25 | 25 | 25 |
| CDI | Antibiotic | 30 | 30 | 30 | 30 |
| MDRO | resistance | 25 | 25 | 25 | 25 |
| IBD | Antibiotic | 80 | 80 | 80 | 80 |
| IBS | resistance | 40 | 40 | 40 | 40 |
| Hepatic encephalopathy | Gastrointestinal Gastrointestinal Liver | 25 | 25 | 25 | 25 |
| **Total** | | **670** | **670** | **670** | **670** |




## 2. Review drafting




16S rRNA marker gene sequencing does not provide sufficient information about the microbioma plasticity. In this light, among omics technologies, **metabolomics and metaproteomics can allow a better understanding of microbiome adaptation to specific conditions as a disease progression.**

A review focused on highlighting the current shortage of studies which applied metaproteomics, alone or in combination with other omics, in a way to have a more complete framework of microbiota-pathology crosstalk, was near to be finalized.

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