

## FINDING HUMAN GENES THAT PREDISPOSE TO INFECTION

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Some environmental factors (such as the exposure to certain toxic compounds or microorganisms that can cause disease) might be generalized and relatively similar to everybody. However, some people have a higher risk to become ill than others. The protective shields of our bodies against infection consist of our anatomical barriers, the secretion of some substances and, of course, the immune system. The information of how all of these mechanisms work is stored in our genetic material. The heritable information is kept in our genes in the form of a code, the genetic code, consisting of the DNA nucleotides 4 letters alphabet. Small changes in this sequence may alter the structure, function or quantity of a protein. If the affected protein belongs to the “defensive shields” the person may be more vulnerable to infection. The goal of our research is to determine whether the individual differences in the genetic information leads to a higher susceptibility to get infections with *Candida albicans*. *Candida albicans* is a yeast (comparable to the one used to produce beer) that causes several types of infection. Skin, tongue (specially in patients with AIDS), the gastrointestinal tract and the female genitals are common sites of infection. More dramatically, a disseminated infection in the bloodstream may affect several organs being a possible cause of death. The research is made by comparing the genetic code with the clinical information and the functioning of the immune cells.

Multiple variations were not responsible to increase the probability to have an infection with *Candida albicans*, but some of them were. In our previous work, we have determined a variation in the gene coding for a receptor in the cells of the immune system. This receptor can detect a component of the *Candida albicans* surface,  $\beta$ -glucan, and it is called dectin-1. The patients having this nucleotide change have non functional receptors presenting *Candida albicans* recurrent vulvo-vaginal infections as well as infections in the nail bed. Conversely, in our current work we have determined that the same variation does not affect the predisposition of *Candida albicans* bloodstream infection as well as in the infection in the tongue (in HIV positive patients). In addition, a variation in the sequence of the CARD9 protein (the protein that transmits the dectin-1 signal to the rest of the cell), did not affect the predisposition of these infections. On the other hand, a variation on the NLRP12 gene had an effect on the apparition of the infection on the tongue on HIV positive patients when the level of CD4+ cells was low. The CD4+ are some kind of white blood cells affected by the HIV virus but essential to avoid the *Candida albicans* tongue infection. The NLRP12 protein is involved in inflammation, which is an important process of the immune response. Analysis of more genes related to other processes are still in progress.

The results of this research will help people to develop new detection tools and treatments.