

Finding of *Blastocystis* sp. in bivalves of the genus *Donax*

Hallazgo de *Blastocystis* sp. en bivalvos del género *Donax*

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Abstract

Although commonly detected in humans, microorganisms identified as *Blastocystis* have also been isolated from a wide range of animals, such as primates, pigs, cattle, birds, amphibians and, less frequently, rodents and insects. In the present paper, we describe the detection of *Blastocystis* sp. in bivalve mollusks of the genus *Donax* from the Peruvian northern coast. This finding extends the host range of this pathogen, opening the possibility of *Blastocystis* transmission to human beings by marine mollusks.

Keywords: *Blastocystis*, *Donax*, Peru, Trujillo.

Resumen

Aunque es detectado generalmente en seres humanos, los microorganismos identificados como *Blastocystis* han sido aislados de un amplio rango de hospedadores, tales como primates, cerdos, ganado, aves, anfibios y menos frecuentemente roedores e insectos. En el presente trabajo, se describe la detección de *Blastocystis* sp. en bivalvos del género *Donax* de la costa norteña peruana. Este hallazgo amplía el espectro de hospedadores para este enteropatógeno y abre la posibilidad de considerar la posible transmisión de *Blastocystis* en el hombre a partir de moluscos marinos.

Palabras clave: *Blastocystis*, *Donax*, Perú, Trujillo.

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Blastocystis hominis is one of the most common protozoan parasites of the human intestinal tract (Windsor et al.2002). Although many symptomatic cases, without any other detected causative agent, have been reported in many countries, *Blastocystis* infections are very common in many healthy people without any symptoms. Therefore, the pathogenic potential of this parasite remains controversial (Boreham and Stenzel, 1993; Tan, Singh and Yap, 2002).

Considered and classified for a long time as a yeast (Zierdt, 1978), classified *Blastocystis hominis* in the subphylum Sporozoa, suborder Blastocystina and more recently in the subphylum Sarcodina (Zierdt, 1988). In studies carried out by Johnson, Thanou, Boreham and Baverstock (1989), with the ribosomal RNA of this organism, they neither found similarity with *Saccharomyces* nor sporozoans, suggesting that *Blastocystis* is not related to those groups.

From molecular epidemiology studies and traditional epidemiology results from family members and small communities, the fecal-oral route is considered the main transmission route for *Blastocystis hominis* infections in humans. Circumstantial evidence of several zoonotic strains identified from a wide range of mammals and birds suggests that transmission can occur between animals and humans (Doyle et al., 1990). This route is also suggested because animal handlers show a high infection level by *B. hominis* (Salim et al., 1999), *Blastocystis* has previously been isolated from a wide range of animals, such as primates, pigs, cattle, birds, amphibians, and less frequently, rodents and insects (Boreham and Stenzel, 1993; Tan, Singh and Yap, 2002).

Several new species have been differentiated from *B. hominis*, but without a major confirmation by using molecular analysis, *B. hominis* defines the parasite isolated from humans and *Blastocystis* sp. the parasite isolated from animal hosts. In the present

paper, we describe the finding of *Blastocystis* sp. in bivalves of the genus *Donax*.

As a part of a study on human intestinal parasites in mollusks, 637 bivalves of the genus *Donax* were acquired from a popular market in the Trujillo city (North of Peru), and transported to the Institute of Microbiology and Tropical Parasitology in National University of Trujillo, Peru. All the bivalves were opened by valve separation and the feces of 100 specimens were removed by using a Pasteur pipette and stored in 2% $K_2Cr_2O_7$. The body of these specimens and all other specimens were stored in 70% alcohol for possible future studies by PCR. The valves were washed by using saline physiologic solution (0.85% NaCl). The resulting liquid from washing in the saline solution was centrifuged at 3000 rpm and the pellet was used to concentration by using Willis method (Willis, 1921), prior to optical microscope observation. Half the feces from the total volume in $K_2Cr_2O_7$ were observed with an optical microscope by direct examination and the rest was concentrated by using the Ritchie technique (Ritchie, 1948). The microscopic observation of feces and the suspension from the washed valves showed the presence of stages of *Blastocystis* sp. but the latter with less concentration of *Blastocystis* (Fig.1).

The stages seen were espherical cysts with a variable diameter (5-30 μ m), with a central vacuole surrounded by a cytoplasm ring that contained several nuclei. However, according to some researchers the vacuolar stage is also commonly observed (Requena-Certad et al; 1999). The finding of *Blastocystis* sp. in bivalves of the genus *Donax* increases the known host range of this parasite. It is the first report of *Blastocystis* in marine mollusks. The differentiation of new species of *Blastocystis* should be confirmed by using molecular studies, so we could not name this finding as a new species without the pertinent analysis. However, we can affirm that *Blastocystis* is present in bivalves frequently

consumed not only in Peru but also in many areas worldwide. This adds a possible link to the epidemiological chain of this pathogen. The fecal-oral route is considered to be the main mode of transmission, but food-borne and waterborne transmission of *Blastocystis* via untreated water of poor sanitary conditions have also been suggested (Kain et al; 1987).

These bivalves normally are prepared by using high temperature prior to being consumed, but the manipulation of the bivalves by handlers and other people may pose a risk of transmission, as the during the opening of the bivalves may result in direct contact with the mollusks' feces. Without clear diagnostic features that allow the differentiation of *Blastocystis* spp, we do not know the precise number of species that could infect humans from zoonotic transmission. This presents challenges to our understanding of the epidemiology of *Blastocystis* and its implications for public health.

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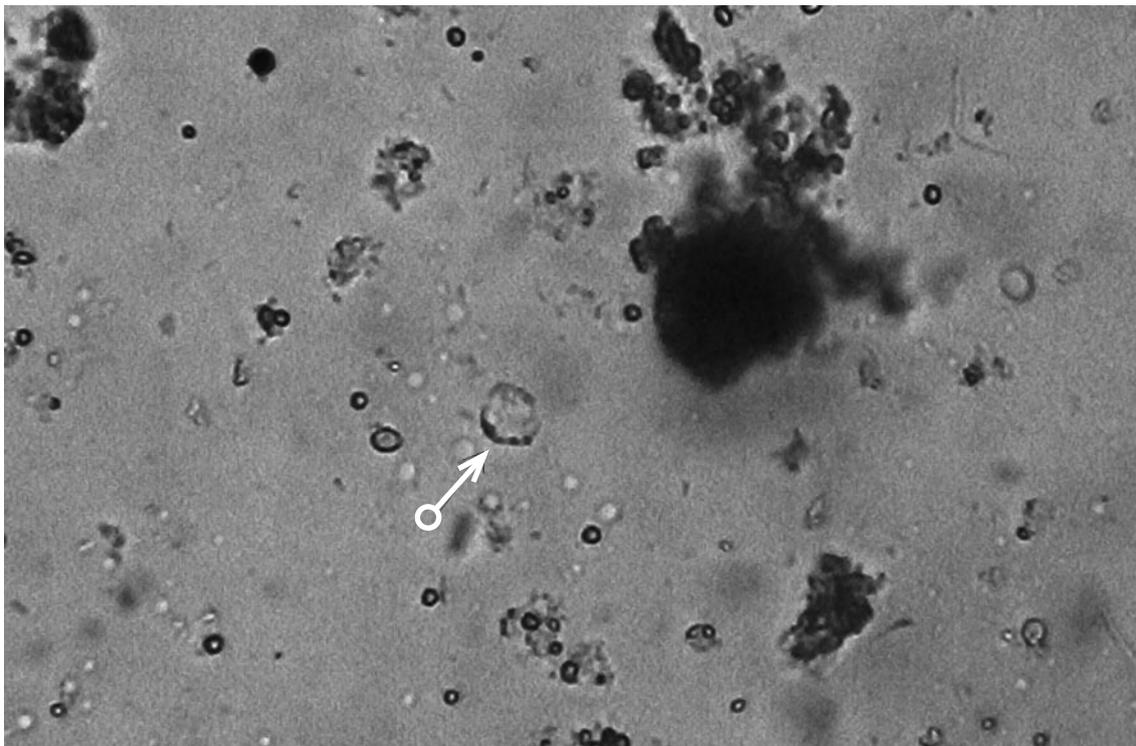


Figure 1. Image of a *Blastocystis* sp. stage from the feces of the bivalves *Donax* sp.(40x).