MINI-REVIEW

Mycoplasma genitalium and Cancer: A Brief Review

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Abstract

Approximately, 15-20% of all cancers worldwide are caused by infectious agents. Understanding the role of infectious agents on cancer development might be useful for developing new approaches to its prevention. Mycoplasma genitalium is a clinically important sexually transmitted pathogen that has been associated with several human diseases. There have been a few studies suggestive of probable roles of Mycoplasma genitalium in cancer development, including prostate and ovarian cancers and lymphomas, but the role of this microorganism like other Mycoplasma species in neoplasia is still conjectural. Considering the prevalence of Mycoplasma genitalium infections and also the emergence of resistant strains, Mycoplasma genitalium needs more attention in the infectious agent cancer-causing research area.

Keywords: Mycoplasma - cancer - infectious etiology - infection

Introduction

Approximately, 15-20% of all cancers worldwide are caused by infectious agents (Parkin, 2006; de Martel and Franceschi, 2009). Different bacterial (Vogelmann and Amieva, 2007), viral (Bergonzini et al., 2010) and parasitical (Khruran et al., 2005) agents have been shown might be involved in cancer development. Mycoplasmas are the smallest microorganisms which are capable to self replication. They found in animals and humans also are distinguishable from other bacteria by their small size and genome also total lack of cell wall (Razin et al., 1998).

Among them, Mycoplasma genitalium is a clinically important sexually transmitted pathogen that since its discovery by isolation from urethral specimens of two men with non-gonococcal urethritis in 1981 (Tully et al., 1981), has been associated with several human diseases such as non-gonococcal urethritis (Tully et al., 1983; Jensen et al., 1993; Totten et al., 2001) and chronic persistent prostatitis in men (Krieger and Riley, 2004, Mändar et al., 2005), also urethritis, cervicitis (Falk et al., 2005), endometritis (Cohen et al., 2002), salpingitis (Cohen et al., 2005), tubal factor infertility (Clausen et al., 2001) and Pelvic Inflammatory Disease (PID) (Simms et al., 2003) in women. Furthermore M genitalium has been isolated from synovial (Tully et al., 1995), respiratory system (Basesman et al., 1988) and rectal (Soni et al., 2010) specimens. After early indicative reports to presence of Mycoplasma species or antibody against them in leukemic patients in 1960s (Fallon et al., 1965; Grace et al., 1965; Haylick and Koprowski, 1965; Murphy et al., 1965; 1967; Barile, 1967; Murphy et al., 1967; 1970), many attempts have been performed to find linkage between these microorganisms and cancer.

Cancer Associations

Several in vitro evidences have demonstrated the potential of Mycoplasma species to malignant transformation and chromosomal instability of long term Mycoplasma-infected cell cultures (Paton et al., 1965; MacPherson and Russell, 1966; Tsai et al., 1995; Shaw-Huey et al., 1999; Zhang et al., 1999; 2004; 2006a; 2006b). Also some epidemiological studies, based on detection of Mycoplasma strains in cancer samples or evaluation of antibody status against these microorganisms in cancer patients, have been documented (Erturhan et al., 2013). M. hyorhinis (Ji et al., 2002), M. penetrans (Zhu et al., 2007; Yan et al., 2009), M. hominis (Barykova et al., 2011) and M. salivarium (Baracaldo et al., 2012) are the most detected species from cancer patients. In contrast, there are a few studies which are suggestive the absence of any association between Mycoplasma and cancer (Ebbesen and Lind, 1969; Zhang et al., 1998; Chanudet et al., 2007). To find association between M genitalium and cancer, there are some reports based on detection of Mycoplasma species DNA in cancer samples using PCR and universal primers which are capable to detect several Mycoplasma species genome, including M genitalium (Huang et al., 2001; Pehlivan et al., 2005; Jun et al., 2008), but in comparison to other species, the numbers of studies that have targeted just M genitalium-detection in cancer patients also studies for understanding this microorganism’s role in cancer development are few. Idahl

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M genitalium infections (Jones et al., 2009) also emerging 

resistance strains (Bradshaw et al., 2008; Jensen et al., 

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M genitalium needs more attention in infectious 

agent cancer-causing research area.

Conclusion

Understanding the role of infectious agents on 
cancer development might be useful for developing 
new approaches to cancer prevention. The role of 

M genitalium like other Mycoplasma species in cancer is 
still conjectural. To improve our understanding about the 
initial or co-factorial probable roles of this microorganism 
in cancer, more epidemiological studies based on 

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