

Estrogen Metabolites for the Diagnosis  
of Schistosomiasis Associated Urinary  
Bladder CancerMonica C Botelho<sup>1,2</sup>, Helena Alves<sup>1</sup> and Joachim Richter<sup>3</sup><sup>1</sup>INSA, National Institute of Health Dr. Ricardo Jorge, Portugal<sup>2</sup>IS, Instituto de Investigação e Inovação da Universidade do Porto, Portugal<sup>3</sup>Tropical Medicine Unit, Department for Gastroenterology, Hepatology and Infectious Diseases, Heinrich-Heine University, Germany

## Article Information

Received date: Feb 25, 2016

Accepted date: Feb 25, 2016

Published date: Feb 26, 2016

## \*Corresponding author

Mónica C Botelho, INSA - National Institute of Health Dr. Ricardo Jorge, Rua Alexandre Herculano, Porto, Portugal,  
Email(s): monicabotelho@hotmail.com;  
monica.botelho@insa.min-saude.pt

Distributed under Creative Commons  
CC-BY 4.0

In a recent issue of Cancer Letters Gouveia and colleagues [1] studied a series of 40 Angolan patients diagnosed with Urogenital Schistosomiasis (UGS). They reported that 45% of them presented UGS-associated Squamous Cell Carcinoma (SCC) and/or urothelial cell carcinoma [1]. In addition these authors performed Liquid Chromatography-Mass Spectrometry and this analysis revealed numerous estrogens like metabolites. These schistosoma infection-associated metabolites included Catechol Estrogen Quinones (CEQ) and CEQ-DNA-adducts, two of which had been identified previously in *S. haematobium* [1-3]. They conclude suggesting that these metabolites can be expected to provide deeper insights into the carcinogenesis UGS-induced bladder cancer, and as biomarkers for diagnosis and/or prognosis of this neglected tropical disease-linked cancer.

The results we have recently obtained partly confirm and partly diverge from the results reported by Gouveia and colleagues [1]. We have studied 300 individuals from the North of Angola [4]. Prevalence of *S. haematobium* infection was 71.7% (215/300). Ultrasound and cystoscopy examinations revealed pathological conditions at the urinary tract in all examined in a sub-sample of 29 (13.5%) of the patients diagnosed with UGS. One case (0.3%) presented with a vesical tumor. This tumor was classified as Squamous Cell Carcinoma (SCC) [4]. The low frequency of tumors found in our series in comparison to the high frequencies of tumors in the series of Gouveia, et al. [1] suggests that bladder cancer associated to UGS might have an increased burden than already described previously. In fact other authors reported that the incidence of SCC is 3-4/100000 cases [5] which are more in agreement with our study.

In keeping with the results of Gouveia and colleagues [1] we have previously described estrogen metabolites to be associated with schistosomiasis infected persons [6-8]. Our group has been working on the identification of parasite derived compounds that might be implicated in the carcinogenesis of *S. haematobium*. The majority of these compounds are catechol estrogens. The carcinogenic effect of this estrogen-DNA adduct mediated pathway could explain the link between chronic *schistosomiasis haematobia* and SCC of the bladder [6-8]. The association found by Gouveia and colleagues [1] and our selves between estrogen metabolites and schistosomiasis associated bladder cancer remains to be clarified.

## References

- Gouveia MJ, Santos J, Brindley PJ, Rinaldi G, Lopes C, Santos LL, et al. Estrogen-like metabolites and DNA-adducts in urogenital schistosomiasis-associated bladder cancer. *Cancer Lett.* 2015; 359: 226-232.
- Botelho MC, Vale N, Gouveia MJ, Rinaldi G, Santos J, Santos LL, et al. Tumour-like phenotypes in urothelial cells after exposure to antigens from eggs of *Schistosoma haematobium*: an oestrogen-DNA adducts mediated pathway? *Int J Parasitol.* 2013; 43: 17-26.
- Botelho MC, Soares R, Vale N, Ribeiro R, Camilo V, Almeida R, et al. *Schistosoma haematobium*: identification of new estrogenic molecules with estradiol antagonistic activity and ability to inactivate estrogen receptor in mammalian cells. *Exp Parasitol.* 2010; 126: 526-535.
- Botelho MC, Figueiredo J, Alves H. Bladder cancer and urinary Schistosomiasis in Angola. *J Nephrol Res.* 2015; 1: 22-24.
- Shiff C, Veltri R, Naples J, Quartey J, Otchere J, Anyan W, et al. Ultrasound verification of bladder damage is associated with known biomarkers of bladder cancer in adults chronically infected with *Schistosoma haematobium* in Ghana. *Trans R Soc Trop Med Hyg.* 2006; 100: 847-854.
- Santos J, Gouveia MJ, Vale N, Delgado Mde L, Gonçalves A, da Silva JM, et al. Urinary estrogen metabolites and self-reported infertility in women infected with *Schistosoma haematobium*. *PLoS One.* 2014; 9: e96774.
- Botelho MC, Sousa M. New biomarkers to fight urogenital schistosomiasis: a major neglected tropical disease. *Biomark Med.* 2014; 8: 1061-1063.
- Botelho MC, Alves H, Barros A, Rinaldi G, Brindley PJ, Sousa M. The role of estrogens and estrogen receptor signaling pathways in cancer and infertility: the case of schistosomes. *Trends Parasitol.* 2015; 31: 246-250.