

## Could Estradiol be used as a biomarker of infection in *Schistosoma haematobium* infected patients?

Botelho M.C.<sup>1,2</sup>, Cardoso R.<sup>1</sup>, Bordalo A.<sup>3</sup>, Alves H.<sup>1,4</sup>, Richter J.<sup>5</sup>

<sup>1</sup> INSA, National Institute of Health Dr. Ricardo Jorge, Department of Health Promotion and Chronic Diseases, Porto, Portugal, <sup>2</sup> i3S, Instituto de Investigação e Inovação da Universidade do Porto, Portugal, <sup>3</sup> ICBAS, Institute of Biomedical Sciences, Laboratory of Hydrobiology and Ecology, University of Porto, Portugal, <sup>4</sup> Fundação Professor Ernesto Morais, Porto Portugal, <sup>5</sup> Institute of Tropical Medicine and International Health, Charité - Universitätsmedizin Berlin, Germany

### AIM

To investigate the role of estradiol (E2) as a biomarker of infection in *S. haematobium* patients.

### BACKGROUND

- Schistosomiasis haematobia is a known risk factor for cancer leading to squamous cell carcinoma of the urinary bladder (SCC).
- Schistosome eggs produce catechol-estrogens (Fig. 1). These estrogenic molecules are metabolized to active quinones that cause alterations in DNA (leading in other contexts to breast or thyroid cancer).
- Our group has shown that schistosome egg associated catechol estrogens induce tumor-like phenotypes in urothelial cells, originated from parasite estrogen-host cell chromosomal DNA adducts and mutations.
- Also we have demonstrated that these molecules are detected as Estradiol (Fig. 2) in sera of infected patients.

### METHODOLOGICAL STRATEGY

1. Estradiol was tested by Electrochemoluminescence (ECLIA) in the urine of a cohort of infected patients from Guinea Bissau. We used not infected individuals from the same endemic area as controls.

### RESULTS

We found a significant decrease in the levels of Estradiol in the urines of infected females and a significant increase in the levels of Estradiol in the urines of infected males in comparison to not infected persons.

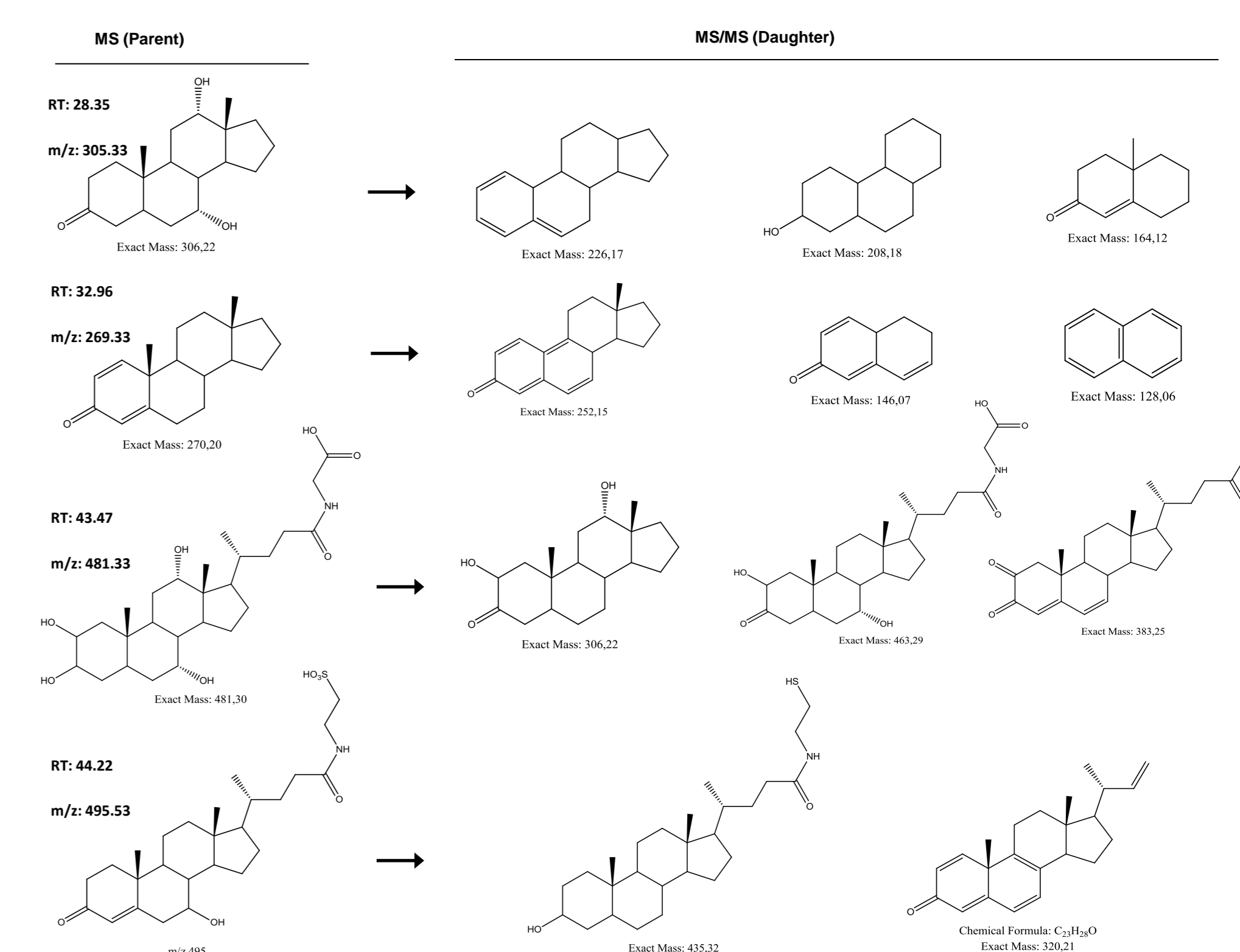


Fig. 1: Schistosome catechol-estrogens.

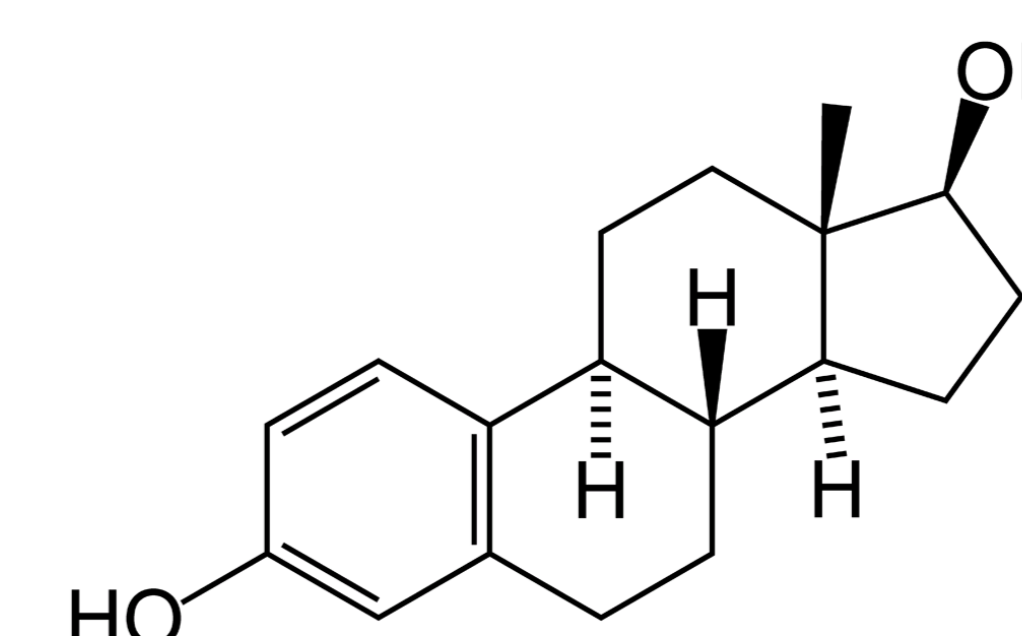
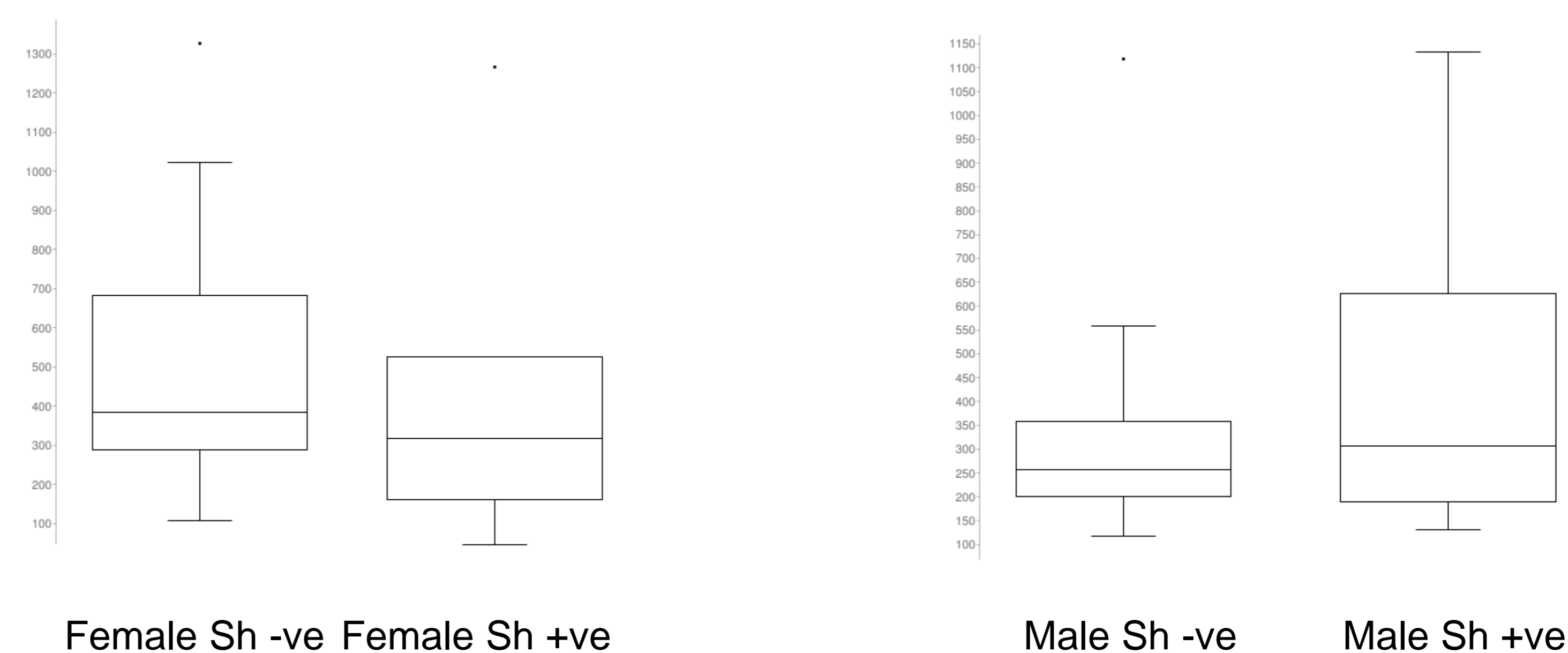


Fig. 2: Estradiol.

Estradiol urine levels among males and females negative (Sh -ve) and positive (Sh +ve) for *S. haematobium*.

Estradiol (pmol/L)	Sh -ve	Sm +ve	p
Females	972.28±302.36	390.48±110.68	0.000005
Males	282.81±119.69	427±155.84	0.003



### CONCLUSIONS

- E2 can be used as a biomarker of infection with *S. haematobium*.
- Schistosome eggs associated catechol estrogens are detected by Mass Spectrometry. This method is very expensive and very time consuming specially when considering schistosomiasis a disease affecting the poorest people living in the poorest countries of the world.
- We now propose the use of a test very feasible and very low cost used in every clinical pathology laboratories: Urine Estradiol