

Child growth impairment associated to Schistosomiasis

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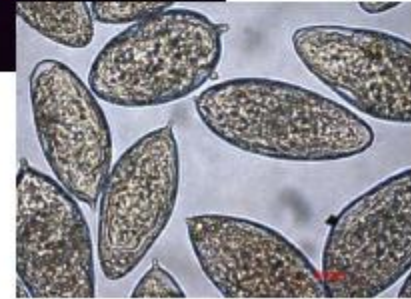
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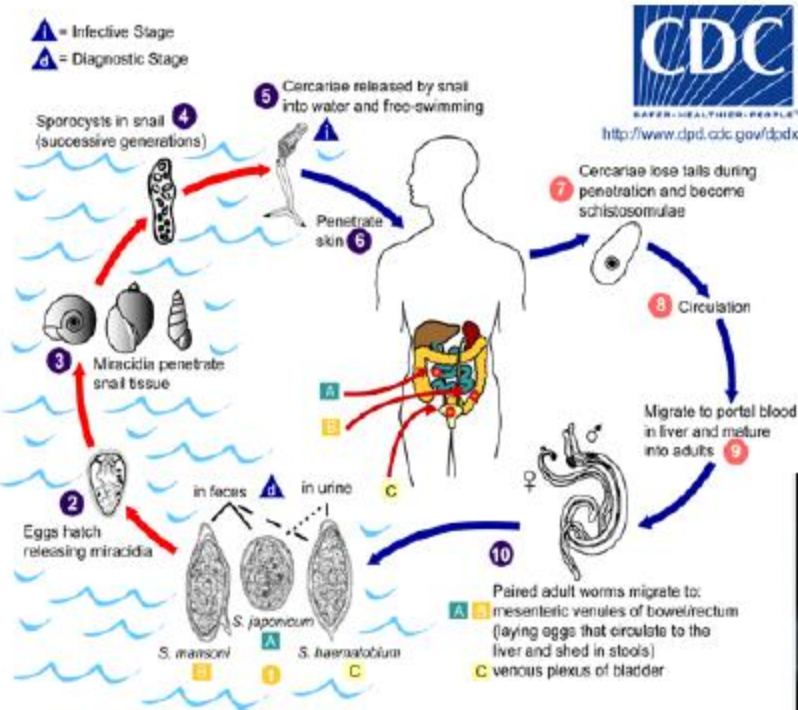
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OUTLINE

1. *Schistosoma haematobium*: facts and figures
2. The case of Guinea Bissau: school children
3. Nutritional Status and Growth Indicators
 - Stunting
 - Wasting
 - Underweight



Schistosomes: Life cycle

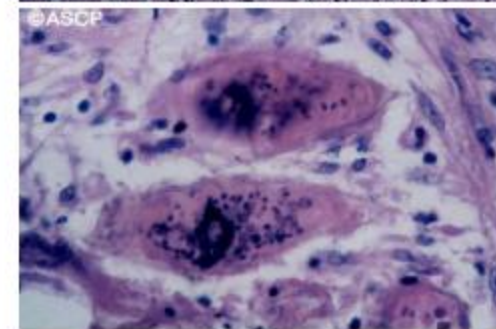
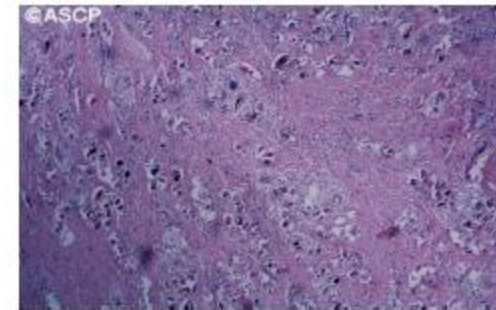


Urogenital Schistosomiasis

- Eggs provoke granulomatous inflammation that leads to small fibrotic nodules known as “sandy patches”, ulceration, and pseudopolyposis of the vesical and ureteral walls. Urinary granulomas.
- Dysuria, pollakisuria, proteinuria and HEMATURIA
- Bacterial superinfection
- Obstructive uropathy. Hydronephrosis



PJ Hotez et al., *Lancet* 2010



Gryseels et al 2006

Orihel and Ash

The most neglected schistosome among schistosomes

Table 1. Number of citations in PubMed over the last five years, 2008–2012.

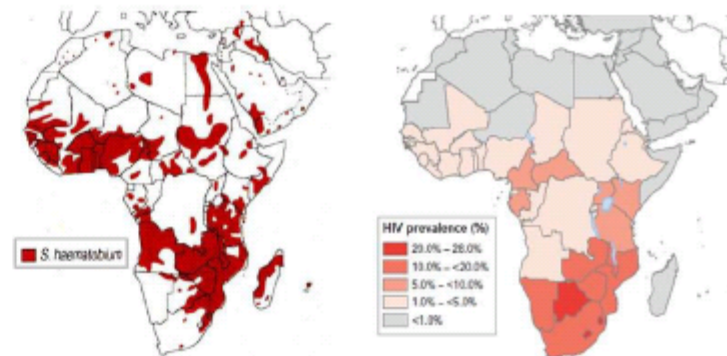
Parasite Species	Approximate Number of Human Cases	Number of PubMed Citations over the Last Five Years ^b	PubMed Citations per Millions of Human Cases	References
<i>Schistosoma japonicum</i>	1 million	644	644	Steinmann et al. 2006 [1]
<i>Schistosoma mansoni</i>	54 million ^a	1,371	25	Van der Werf et al. 2003 [3]
<i>Schistosoma haematobium</i>	112 million ^a	342	3	Van der Werf et al. 2003 [3]

a. Sub-Saharan Africa only

b. Search conducted on July 14, 2012

PJ Brindley and PJ Hotez, *PLoS NTDs* 2013

1. Group 1 carcinogen responsible for a unique squamous cell carcinoma of the bladder
2. Female Genital Schistosomiasis (FGS) – Infertility ?
3. FGS: 3 – 4 times increased risk in acquiring HIV infection



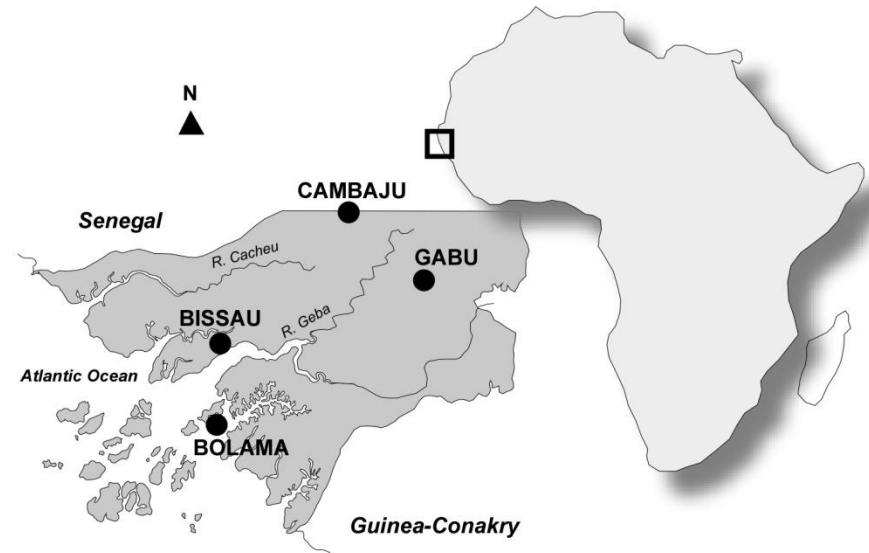
PJ Hotez et al., *PLoS NTDs* 2013

Guinea Bissau

Guinea-Bissau is one of the less developed countries in the world.

The 1.6 million inhabitants live under extreme poverty, and water supply and sanitation cover less than half of the population.

Although the WHO (2012) considers Guinea-Bissau to be a highly endemic country for schistosomiasis, to our knowledge this is the **first study addressing the prevalence of this neglected tropical disease in this part of sub-Saharan Africa.**



90 schoolchildren aged 6 – 15 were targeted in this study.

Growth Indicators

Body weight and height were measured using a standardized method of anthropometric techniques.

Height was measured to the nearest 0.1 centimeters and weight was measured to the nearest 0.1 kg using portable digital scales.

Body Mass Index (BMI) of each child was calculated as weight in kilograms divided by the square of height in meters (kg/m^2).

Nutritional Status

Z scores of height-for-age (HAZ) and weight-for-age (WAZ) were calculated using Nutritional Index Calculator (WHO, 1995).

HAZ and WAZ values less than -2 were considered as **stunting** and **wasting** respectively as described by WHO (1995).

BMI < 15 kg/m² was considered as **underweight** (WHO, 1995).



12-year-old boy suffering from stunting and wasting due to schistosomiasis

Stunting and wasting associated to Schistosomiasis

Urinary schistosomiasis in Guinea Bissau: the first epidemiologic report

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Table 2. Overall growth indicators among children positive (Sh +ve) and negative (Sh -ve) for *S. haematobium*.

Growth Indicators	Sh -ve; <i>n</i> =72	Sh +ve <i>n</i> =18	<i>p</i>
HAZ (mean±SD)	-0.58±1.11	-0.87±1.11	n.s.
WAZ (mean±SD)	-0.80 ± 1.04	-1.48±1.08	p=0.01
BMI (mean±SD)	14.6 2.16	13.9 2.67	n.s.

n - number of individuals; HAZ – height-for-age z-score; WAZ – weight-for-age z-score; BMI – Body mass index.

Conclusions

- 1. This survey provides for the first time data on the prevalence of *S. haematobium* infection and undernutrition among schoolchildren across Guinea-Bissau.**
- 2. All *Schistosoma* species cause non-specific but disabling systemic morbidities including malnutrition and impaired childhood development, as a result of the effect of continued inflammation on normal growth, iron metabolism, physical fitness, and cognitive function.**
- 3. Efforts to provide nutritional interventions, deworming and vaccination to children are indicated.**

Future Perspectives

- 1. Investigate schistosome catechol estrogen in urine of Schistosoma infected children from Guinea Bissau.**
- 2. Evaluate impact of these catechol estrogens on growth impairment in these informative human cases.**

Collaborations



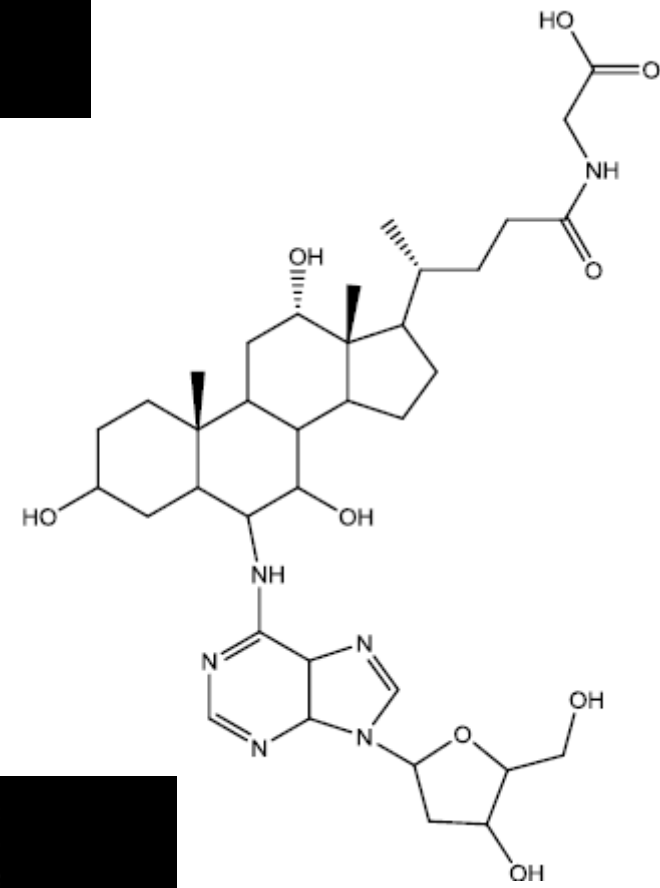
Prof. Dr. Joachim Richter



Prof. Dr. Adriano Bordalo



Dr. André Carvalho



Thank you for your attention