How proteomics shed light in understanding host-parasite interplay and clinical consequences during trypanosome infectious process

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Background and aims:
Animal trypanosomiasis is a major constraint to livestock productivity in the tropics and has a significant impact on the life of millions of people. In Africa, South America and south east Asia, the disease is caused mainly by Trypanosoma congolense (A), T. evansi (B), T. vivax and T. brucei brucei.

The extracellular position of trypanosomes in the bloodstream of their host (C) requires consideration of both the parasite and its naturally secreted-secreted factors (secretome) in the course of pathophysiological processes (anemia, cachexia, neurological disorders). We therefore developed and standardised a method to produce purified secretomes of African trypanosomes[2]

Workflow and results:
We used 2D-DIGE and statistical differential analysis (Progenesis SameSpot) coupled to Nano HPLC ESI-Q-TOF to propose for the first time a comparative approach of the secretomes of T. congolense and T. evansi clones exhibiting marked differences in their virulence and pathogenicity profiles. Surprisingly, the 2D-DIGE-MS/MS analytical filter highlighted few differentially expressed molecules, some of which were moreover identified as Putative Uncharacterised Protein[2]. Nevertheless and interestingly, bioinformatics allowed us to directly link several proteins to the clinical disorders observed in trypanosome-infected animals in the field.

Conclusions and perspectives:
This first comprehensive analysis shows how proteomics is powerful in the molecular identification of differentially expressed trypanosomes molecules correlated with either the virulence process or exhibiting potential properties to induce pathogenic dysregulation of physiological functions. Moreover, deciphering of the molecular dialogues and conflicts that govern host-parasite interplay is promising to define new molecular targets for improved field diagnosis and new strategies of interference with the infectious process to fight against animal trypanosomiasis.

References: