This report is structured according to the questionnaire contained in the UWC-UM exchange application document.

1. **The objectives of the visit:**

The objectives of my visit were threefold: Firstly, to explore the effects of varying concentrations of extracts from two plants known for their effects on the male reproductive system, *typha capensis* and *carica papaya*, on cultured Sertoli cells, using microspectrofluorescence techniques to evaluate the trans-membrane fluxes of calcium in real time in response to the extract. Secondly, to investigate the effect of these extracts on the ionic fluxes across the Sertoli cell membrane, using the patch-clamp electrophysiological technique. Thirdly, to explore the feasibility of an academic and HOD being able carry out research at the University of Missouri and yet to functionally be able to respond to urgent academic, post-graduate and under-graduate student and administrative requirements.

2. **Objective successes:**

**Microspectrofluorescence:** This technique involves culturing the Sertoli cells on glass coverslips that have been specially coated with fibronectin. The fibronectin coating mimics the basement membrane these cells require to morphologically and functionally resemble their *in vivo* state. The culturing of each set of cells takes 3 to 4 days before they are ready for experiments. We struggled to achieve acceptable intracellular fluorescence, but after using varying concentrations of the fluorescene probe we were able to achieve varying degrees of success. In spite of these setbacks, we were able to record a significant amount of new and publishable data. Prof Doug Bowles was exceptional in explaining the technique and patient in coaching me to proficiency of this technique. It would be a wonderful instrument for UWC to acquire.

**Electrophysiology:** The technique involved the ‘patching’ of membrane cells, using customed made glass pipettes to attach to a cell membrane and then to measure the current fluxes across various channels in the ‘patched’ membrane. It is one of the most
difficult techniques in biological research in which to become proficient. However, since I have been exposed to this technique during my previous visits to the Bowles lab, it was fairly easy to become reacquainted with the technique and by the second day I was able to routinely patch cells and record data. We made a significant breakthrough with the cultured Sertoli cells: at previous visits we trypsinated the cells growing on the fibronectin coated coverslips, and patching was extremely difficult, resulting on an average in only retrieving data from one cell per week. During this visit, the trypsination step was skipped and the Sertoli cells were exceptionally easy to patch. In fact, every coverslip with Sertoli cells provided publishable data. I was so successful at this technique that at 18:00 hours, on the day before departing for Cape Town, I was still busy patching Sertoli cells. The significance of this success is enormous, as experience “patchers” often only obtain 1 or 2 good ‘patches’ per week. Fortunately, as time prevented the analysis of the data, Doug Bowles generously offered to analyze the data on my behalf and send it through to me later.

I was, and still am, so enthused by this success that I am actively pursuing setting up a patch clamp system at the Department of Medical Biosciences, UWC. I hope that once the patch clamp equipment is operational that Doug Bowles would be able to visit UWC for the first time to lend a hand at calibrating the equipment.

**Trans-Atlantic Academic Functionality:** When I last visited MU (2005) the only modes of communication were using the prohibitively expensive telephone and/or email. As there is a 7 hour difference in time between MU and UWC emails responses normally had a 24 hour lag time. Nothing urgent could be addressed or immediately be resolved. Any student interaction had to wait on the return of the academic.

This scenario had dramatically changed during my last visit (2009) with the advent of real time video conference (VC) facilities at both UM and UWC. Of the number of such facilities at UM I was lucky to have a dedicated video conference room which was situated within the Vets School, just meters from the lab where I worked. Because of the time difference most of my sessions were scheduled early in the morning (6am which is equivalent to 1pm South African time). This made the use of the VC facility available throughout the duration of my stay and, furthermore, I was given a key to access the facility whenever the need arose. In this regard, I would like to thank the kind administrative (Karol Dinwiddie) and the IT staff at the Vets School for always assisting me.

The VC-facility allowed me to consult with my research team, my post graduate students, as well as with a group of undergraduate students who completed a research project with me. It was especially convenient for the undergraduate students who at the time that I left for UM had just completed collecting the data for their project and were particularly concerned regarding my proposed research visit to UM. However, I arranged several video-conferencing sessions with them during which we were able to discuss different issues regarding their draft research projects and their presentation thereof, both of which were crucial to their completion of the research module. The students found this mode of communication both exciting and novel, and were genuinely
in awe of the cutting edge technology which was able to connect two sets of individuals across approximately 9000km and separated by the vast Atlantic Ocean, and that in real time.

The draft documents, for which I was responsible to provide editing and comment, were emailed to me. I would print these in Doug’s lab and edited them using my usual method (comments in pen). The edited version was then scanned and emailed to my students as a PDF document using the automated photocopy system at the Vets School.

The third year students and my honours student all presented their final oral presentations on their research projects via the video conference facility at UWC. I would also like to thank Graham Julies for always assisting and sorting out connection problems regarding the VC link, from UWC’s side.

The VC facility enormously facilitates exchange visits between UWC and UM, especially, for busy academics who have student commitments during the time the plan to go on a scheduled research visit. In other words, all the facilities exist to fully carry out the academic duties of any exchange staff member while visiting UM or vice versa.

I would like to thank Prof Rod Uphoff for his insistence on using the video conference system to meet with my collaborator, Doug Bowles, before I embarked on this trip. Before this, I was not aware of the ease at which the video-conference equipment works and also the feasibility of using it for consultations with my students.

As my hotel offered free broadband internet access for the duration of my visit, I utilized Skype for all my face to face consultations with the Dean of our faculty, with my PA and administrative staff on a daily basis and with my wife and family at home in Cape Town. Thus, any emergency issues relating to the faculty and to the running of the department could be dealt with promptly.

3. Aspects that could be improved:

Arrangements for my visit were flawless, both from UWC and from UM. In this regard, my host also played an enormous role in making feel at home away from home. However, with regards to the hiring of the car: It would be more convenient if the hiring of the car could have been paid directly by the exchange programme rather than via my credit card, as costs regarding this transaction amounted to close to R500.

4. Planning by UWC:

In this regard, support from the International office at UWC was outstanding. Congratulations to Prof Jan Persens and his excellent team.
5. **Assessment of the programme:**

The UM/UWC Exchange Program is invaluable to the development of young and upcoming scientists at UWC. Both the intellectual stimulation and the exposure to a superb scientific culture will have a positive long term impact on the scientific community at UWC. Another clear benefit of the programme is the opportunity to engage intellectually, culturally and scientifically with scientists of the highest caliber.

6. **Impact:**

We have subsequently identified a project which is of interest to both institutions. The exchange program facilitates these academic interactions which are ultimately to the benefit of both universities, but especially for UWC.

Discussions between Prof Bill Lamberson (UM) and myself has led to the successful submission of a proposal to the UM/UWC Exchange Program which will involve his visit to UWC in January 2010 and the entrenching of a successful research collaboration.

Furthermore, Prof Bowles has identified areas of research involving the testing of indigenous plant extracts on vascular tissue. It is our hope that these research endeavors would further strengthen our ongoing collaboration.

7. **Next Exchange Visit:**

I have enjoyed my experience so much at the University of Missouri, that as I’m writing this report I am looking forward to my next visit. In the future, UM/UWC Exchange Program could perhaps investigate the possibility of sending supervisor and a postgraduate/research assistant on short visits to UM. This would be extremely valuable for exposure to new/difficult techniques.

8. **Exchange Highlights:**

As always, one of the highlights of my visit was the wonderful hospitality I received from my host, Doug Bowles and his wonderful wife, Yvette, together with their son Hunter. All of them went out of their way to make me feel enormously welcome. Yvette, at her own cost, always secured free visits to their gym, where I always felt welcome and part of the gym family.

I have to mention having a delightful dinner at Rod’s home, where surprisingly I had the pleasure of meeting with Manie Regal, UWC’s director of finance, along with Bill Lamberson and his wife.
During my visit I also had the opportunity to meet with one of the leading scientists in the field of the blood-testis and blood-brain barriers, Prof Bill Banks, who delivered a lecture at the UM, Columbia. Afterwards, he invited me to his lab in St Louis, where he was kind enough to show me various techniques used to explore the properties of the blood-brain barrier.

I also spent time discussing future collaborative visits by Prof Bill Lamberson who planned to visit Cape Town in January 2010 as well as future joint funding proposals between Prof Crissy Cammack (University of Wyoming), Prof Bill Lamberson, Prof Ralf Henkel (UWC) and myself.

In addition, it was rewarding to renew old established relationships with Bill Folk and especially Prof Rich Oliver (School of Health Professions) who was responsible for initially introducing me to a wonderful institution, the University of Missouri.

9. **Continuation of the UWC-UM exchange programme?**:

I wish to reiterate my previous sentiments: The exchange of ideas, both culturally and academically, are central to the ethos of individuals and institutions who want to be on the cutting edge of research, discovery and vision. The exchange program between the two institutions facilitates this process and attempts to prevent a detrimental introverted vision from developing. Each of my visits to UM has made life richer and scientifically more endowed. Once again I would like to echo my previous sentiments: visiting the world class research infrastructure at UM Biomedical Science department could be likened to a research oasis. Here the researcher can obtain a focus that is not currently possible at UWC, where research funding is scarce and continuity of time required for focused research is interrupted by large lecture loads.

**END**