LKCMedicine PhD Research Project Submission Form

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<th>Research Theme (Please indicate as appropriate)</th>
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<tr>
<td>☐ Dermatology &amp; Skin Biology</td>
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<td>☐ Others (Please specify):</td>
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Research Project Title:
Cell biology and mechanistic study of elevated NETosis in diabetes

Project Description:
Neutrophils can release their chromatin in response to acute stimulations such as infection and hypoxia, forming extracellular DNA-based structures called neutrophil extracellular traps (NETs). In addition, they can also be primed and even activated to produce NETs under chronic inflammation. These cytotoxic NETs cause damages to the body, and propagate further unfavourable immune response. We and others discovered that both type 1 and type 2 diabetes mellitus exacerbate NET formation (NETosis) in humans and mice, and the excessive NET burden contributes to diabetic complications such as delayed wound healing and retinopathy. However, how diabetes predisposes neutrophils to NETosis remains under-defined. The current project aims to dissect the mechanisms and pathways that upregulate NETosis under diabetic / hyperglycaemic conditions.

Significance
By unveiling the molecular pathways that mediate pathological NETosis, we aim to propose new targets to more effectively inhibit / modulate NETosis, so as to prevent / curtail diabetic complications. Our ultimate goal is to promote healthy aging by alleviating chronic inflammation.

Brief summary of main Methodologies and/or Techniques to be learned during the proposed PhD (experimental or analytical):
The current project will harness a wide range of cell biology methodologies (culture of human cell lines, isolation of blood neutrophils from both humans and mice, transfection of cells to express fluorescent cellular proteins, etc.), molecular techniques (Western blotting, immunoprecipitation, etc.), and more importantly, advanced microscopy (confocal...
immunofluorescence microscopy, real-time imaging and super-resolution microscopy). Animal disease models will also serve as an important tool in the study.

**Keywords:**
Neutrophil extracellular traps, NETosis, diabetes, cell biology, microscopy
**Supervisor(s)**

**Primary Supervisor**

Name of Supervisor: Christine Siu Ling WONG  
Designation: Nanyang Assistant Professor  
Email: christine.wongsl@ntu.edu.sg  

**Co-Supervisor (need not be determined at this time)**

Name of Supervisor:  
Designation:  
Email:  

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**Main Location of Research Work** (Please indicate as appropriate)

- ☐ LKCMedicine Experimental Medicine Building @ Yunnan Campus
- ☒ LKCMedicine Clinical Sciences Building @ Novena Campus
- Others (Please specify):

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**Other Information**

1. Does the proposal need IRB’s approval?  
   - ☒ Yes  
   - ☐ No
   
   If “Yes”, is the IRB’s approval in place?  
   - ☐ Yes  
   - ☒ No

2. Does the project involve contact with patients?  
   - ☐ Yes  
   - ☒ No

3. Is there a potential for overseas academic exchange as part of this research project?  
   - ☐ Yes  
   - ☒ No
   
   If “Yes”, please specify: