



**Canadian Arthritis Network
International Partnership Initiative**

**International Research & Training Program
LABORATORY/CLINIC PROFILE**

Contact information of the principal investigator

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**Please indicate if you are member or affiliate of one or more of the following
International Partnership Initiative organizations:**

- AO Foundation – Biotechnology Advisory Board, Switzerland
- Arthritis Foundation, USA
- Arthritis Research Campaign, UK
- Canadian Arthritis Network, Canada
- Japan Society for the Promotion of Science, Japan
- Nuffield Foundation Oliver Bird Rheumatism Program, UK

International Research & Training Program Opportunity

**Please indicate which of the following international opportunities would be
available at your laboratory/clinic.**

- Training Elective Rotation
- Research Mini-sabbatical
- Industry Training Rotation



The International Research & Training Program will be available for trainee elective rotations and investigator mini-sabbaticals that commence on or before March 31, 2009. If you have any preferences regarding the dates when you can host an international trainee or investigator, please indicate this below.

Visit Length (please indicate start and end dates if known):	We are flexible. Suitable dates will be arranged with interested individuals.
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Please provide ten key words and a brief description of the research currently being conducted in your laboratory/clinic, including descriptions of any specialized equipment, methods or technologies employed at your facility.

10 key words

<ol style="list-style-type: none">1. Calcium imaging2. Patch clamp electrophysiology3. Osteoclast isolation4. Chemotaxis5. Ion channels6. Bone resorption7. arthritis8. cell signaling9.10.
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Brief description (up to ½ page)

<p>Studies in the Sims Laboratory focus on ion channels and calcium signalling in bone and muscle cells, including osteoclasts, the cells responsible for resorption of bone. We use several approaches, including patch-clamp recording methods to monitor channel activity, Ca^{2+} indicator dyes to image regional changes of Ca^{2+}, time-lapse video recording and functional assays to investigate the control of osteoclast function. We were the first to characterize K^+ and Cl^- channels in mammalian osteoclasts and are presently studying their regulation by receptors and substrate in controlling expression of channels. In other studies, we are investigating the regulation of osteoclast activity and motility by various mediators. A collaborative study with Dr. Josef Penninger explored chemotaxis of osteoclasts in relation to tumor metastases to bone. Knowledge of the cellular basis for control of osteoclast motility and resorptive activity is essential for understanding the role of osteoclasts in normal bone turnover and in diseases involving excessive bone loss, such as osteoporosis and some forms of arthritis.</p>

Key publications (maximum 5 publications)



Komarova SV, Pereverzev A, Shum JW, **Sims SM**, Dixon SJ. Convergent signaling by acidosis and receptor activator of NF- κ B ligand (RANKL) on the calcium/calcineurin/NFAT pathway in osteoclasts. *Proceedings of the National Academy of Sciences U S A*, 102: 2643-2648, 2005.

Korcok J, Raimundo LN, Du X, **Sims SM**, Dixon SJ. P2Y6 nucleotide receptors activate NF- κ B and increase survival of osteoclasts. *Journal of Biological Chemistry*. 280: 16909-16915, 2005.

Jones DH, Nakashima T, Sanchez OH, Kozieradzki I, Komarova SV, Sarosi I, Morony S, Rubin E, Sarao R, Hojilla CV, Komnenovic V, Kong YY, Schreiber M, Dixon SJ, **Sims SM**, Khokha R, Wada T, Penninger JM. Regulation of cancer cell migration and bone metastasis by RANKL. *Nature* 440: 692-696, 2006.

Armstrong S, Korcok J, **Sims SM**, Dixon SJ. Activation of transcription factors by extracellular nucleotides in immune and related cell types. *Purinergic Signalling* 3: 59-69, 2007.

Williams BA, **Sims SM**. Calcium sparks activate calcium-dependent Cl⁻ current in rat corpus cavernosum smooth muscle cells. *American Journal of Physiology (Cell and Molecular Physiology)* In press, C-00553-2006, 2007.

