Full title of PhD thesis: Role of JARID2 in the Regulation of Keratinocyte Differentiation (http://etheses.bham.ac.uk/8427)

Name: Diaa Ali Naji Al-Raawi

Email: d.alraawi@gmail.com

Home institution: Faculty of Science, Sana'a University, Sana'a Yemen

Host College/Department: College of Life and Environmental Sciences/ School of Biosciences, Birmingham, UK

Abstract.

JARID2 is a member of the Jumonji family of histone demethylases. It plays an important role in the regulation of gene expression and is indispensable for normal vertebrate development. JARID2 interacts with the chromatin modifying polycomb repressive complex-2 (PRC2) for modulating its activity and its binding to chromatin. It is central to the gene regulatory network of embryonic stem (ES) cells but its role in lineage-committed cells, such as Keratinocytes, is not well studied. In this study, we studied the role of JARID2 in several lineage-committed cells including keratinocytes. Using an *in vitro* keratinocyte differentiation model, we show that a novel form of JARID2 is up-regulated during differentiation. To investigate the functional mechanism of this form, genome-wide gene expression profiling using RNA-sequencing was performed. JARID2 knockout cells showed down-regulation of many epidermal differentiation genes and up-regulation of cell cycle genes. Interestingly, the effect of JARID2 knockout on epidermal differentiation genes could be rescued by exogenously expressing the novel form. This indicates that this form of JARID2 promotes activation of differentiation genes in contrast to PRC2 which is needed for repression of differentiation.