anomalies. Analysis of \textit{ALX1} function and identification of its target genes will help to better understand and innovate future treatments, through pharmacologic or CRISPR editing approaches.

\textbf{J. Pini:} None. \textbf{E.C. Liao:} None.

\section*{Maintenance of Mammalian Stem Cell States and Enhanced Wound Healing by Honey Bee Royal Jelly}

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\textbf{PURPOSE:} Royal jelly is the well-known queen-maker for the honey bee \textit{Apis mellifera}, and has documented cross-species effects on longevity, fertility, and regeneration in mammals. Given larger body size and shorter developmental times in honey bee queens despite genetic similarity to workers, we reasoned that royal jelly may impact stem cell function. Here we show, for the first time, stemness maintenance activities in mouse embryonic stem cells and enhanced wound healing in dorsal mouse wounds.

\textbf{METHODS:} J1 mESCs were grown in medium containing KnockOut D-MEM and 1,000U/ml mouse LIF. For 2i conditions, mESCs were cultured in serum-free 2i media containing 1,000U/ml mouse LIF, 1uM PD0325901, and 3uM CHIR99021. To assess teratoma formation capacity, -LIF+Royal Jelly mESCs were injected subcutaneously into flanks of 8-week-old SCID/Beige mice. RNA-seq libraries were generated and deep sequencing was performed. Royal jelly mass spectrometry was performed, and data-dependent collision induced fragmentation was evaluated on the top 10 most intense +2 and +3 ions. Individual royal jelly components were also injected into full-thickness dorsal wounds in mice and wound healing rates were determined.

\textbf{RESULTS:} mESCs readily differentiated upon LIF withdrawal, however addition of royal jelly, in the absence of LIF, resulted in formation of undifferentiated colonies and upregulation of pluripotent genes. Royal jelly maintained a high pStat3 state, suggesting activation of a Stat3-driven pathway for mESC self-renewal. mESCs grown in -LIF+Royal Jelly were also capable of teratoma formation in mice. RNA-seq analysis revealed 1445 upregulated and 1885 downregulated genes in response to royal jelly. GO term analysis revealed enrichment of genes involved with proliferation and stemness among upregulated gene sets. Furthermore, GO term analysis of 'royal jelly-responsive' genes demonstrated enrichment for metabolic and biosynthetic processes, similar to ground state conditions. To obtain an unbiased view of royal jelly and what components may be responsible for its stemness effects, we performed liquid chromatography-mass spectrometry. Six of 10 predominant proteins belonged to a highly homologous group known as major royal jelly proteins, one of which was capable of maintaining mESCs in a pluripotent ground state and enhancing wound healing in mice.

\textbf{CONCLUSION:} Royal jelly can functionally replace LIF and maintain self-renewal and pluripotency in mESCs, effecting a phenotype similar to ground state pluripotent stem cells. Our findings indicate that royal jelly can regulate the dynamic state of stem cells in non-insect species, uncovering an important heretofore unappreciated innate program for stem cell self-renewal with broad implications in understanding the molecular regulation of stem cell fate and wound healing.

\textbf{D.C. Wan:} None. \textbf{K.C. Wang:} None.
Effect of Obesity and Its Associated Cost in Autologous Breast Reconstruction

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PURPOSE: Obesity has been identified as independent risk factor for complications in surgical outcomes. This study aims to quantify the effects of obesity and its associated costs in autologous breast reconstruction outcomes.

METHODS: A retrospective review was performed on patients undergoing abdominal based microsurgical breast reconstruction at an academic institution (2004–2015). Patient were divided into 5 different groups based on their body mass index (BMI), normal (<25), pre-obese (25–29.99), obese I (30–34.99), obese II (35–39.99), obese III (>40) based on World Health Organization Body Mass Index Classification. Complication data was extracted and complication-associated costs were calculated. Total cost, which was a sum of baseline cost and complication costs, was compared among the five groups.

RESULTS: There were 283 (33%) patients with normal BMI, 306 (36%) pre-obese, 184 (21.5%) obese I, 60 (7%) obese II, and 22 (2.5%) obese III. Statically significant findings include higher rates of donor wound dehiscence, infection, seroma, breast infection, umbilical necrosis, and readmission in all four obese groups. Compared to the group with normal BMI, the pre-obese group incurred an additional $399.76 and similarly the obese I $359.54, obese II $1,574.37, obese III $440.64.

CONCLUSION: This study quantified the disadvantageous effect of obesity in autologous breast reconstruction and its corresponding incremental costs. Most complications were related to wound healing and infection. Risk reduction strategies are needed to optimize patient outcomes.

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