Annotated Bibliography:

Investigation of microRNA products -mir-675-3p and mir-675-5p - from H19, against the Bone Morphogenetic Family (BMP) proteins BMP 7, BMP 4, and BMP 11 for kidney formation during development

---

Bates, C., Charlton, J., Ferris, M., Hildebrandt, F., Hoshizaki, D., Warady, B., Moxey-Mims, M.M. (2014). Pediatric kidney disease: Tracking onset and improving clinical outcomes. *Clinical Journal of the American Society of Nephrology, 9*(6), 1141-1143. doi:10.2215/CJN.00860114

Exactly as the title of the paper says, this paper focuses on pediatric kidney disease. It explores the etiology and pathogenesis of chronic kidney disease (CKD) in children by reviewing clinical data and identifying potential causes of CKD. This is a paper that summarizes what is currently known in the literature and puts forward research questions that should be prioritized by the research community to address pediatric renal disease. One research question proposed is target medication. This paper helped by generating inspiration on what I would hope my research question would help to elucidate.

Cain, J. E., Hartwig, S., Bertram, J. F., & Rosenblum, N. D. (2008). Bone morphogenetic protein signaling in the developing kidney: Present and future. *Differentiation, 76*(8), 831-842. doi:10.1111/j.1432-0436.2008.00265.x

A review paper that focuses on the bone morphogenetic protein (BMP) family in relation to kidney development. This paper provides a review of what is currently known about BMP signaling during development of the kidney by reviewing other studies that have performed both *in vitro* and *in vivo* animal models. In addition to drawing attention to gaps of understanding between BMP and kidneys during development, they provide suggestions on how our understanding can be improved. This paper helped to generate where I want to focus my research question on to better improve gaps in understanding.

Callis, T., Chen, J., & Wan, D. (2007). MicroRNAs in skeletal and cardiac muscle development. *DNA and Cell Biology, 26*(4), 219-225. doi:10.1089/dna.2006.0556

A paper that describes that expands our understanding on the function of miRNA by examining its role in muscle-related diseases e.g cardiac and skeletal muscles. They suggest that miRNAs could become novel therapeutic targets for human diseases as they had linked a mutation in the miRNA target site to a muscle disease. This source was used more to gain a deeper understanding of how miRNA can function across different organs to generate an idea of how miR-675-3p and miR-675-5p could function during kidney development.

Clemson, C. M., Hutchinson, J. N., Sara, S. A., Ensminger, A. W., Fox, A. H., Chess, A., & Lawrence, J. B. (2009). An architectural role for a nuclear noncoding RNA: NEAT1 RNA is essential for the structure of paraspeckles. *Molecular Cell, 33*(6), 717-726. doi:10.1016/j.molcel.2009.01.026

This paper focused on NEAT1 RNA, and whether it was an essential structure of paraspeckles. They found results that demonstrate that NEAT1 does function as an essential structure of paraspeckles. An interesting (perhaps, out of the scope of this course), paper, but aside from the experiment, it wasn't relevant to my own project. I was more interested in that they were able to target nuclear RNA successfully via siRNA as it provided confidence that I can use siRNA technology to knock down H19.

Dey, B. K., Gagan, J., & Dutta, A. (2011). miR-206 and -486 induce myoblast differentiation by downregulating Pax7. *Molecular and Cellular Biology, 31*(1), 203-214. doi:10.1128/MCB.01009-10

This paper investigated the function of miR-206 and -486 during myoblast differentiation in relation to the transcription factor, Pax7. They reported that the microRNAs are induced during differentiation and will downregulate Pax7. This source is relevant for my interested project because it provided an idea on ways microRNAs can be studied in relation to different proteins in the organ system. In particular, their experiment was sound in logic. Given that they worked to generate results for a manuscript, they were more-indepths with techniques used e.g microarray profiling. Overall, a good read!

Dey, B., Pfeifer, K., & Dutta, A. (2014). The H19 long noncoding RNA gives rise to microRNAs miR-675-3p and miR-675-5p to promote skeletal muscle differentiation and regeneration. *Genes & Development, 28*(5), 491-501. doi:10.1101/gad.234419.113

I ended up citing two of Bijan, K. Dey's papers, which is why I did some investigate work on the man. At the time he published this paper, and the paper above, he was a senior research scientist at the University of Virgina School of Medicine. Currently, he is a principal investigator at State University of New York. I'm not surprised as both of the papers that I read by him were sound in logic, and original! This paper was a good read for what I was interested in as it gave me a better idea of how my interested microRNAs function in other organ systems. It also served me to better understand how to design a sound experiment for my own project.

Dharmacon: RNAi, Gene Expression, and Gene Editing. (2014). Effective controls for RNA interference (RNAi) experiments using siRNA. Retrieved from http://dharmacon.gelifesciences.com/uploadedFiles/Resources/effective-sirna-controls-technote.pdf

Not a paper, but a resource provided by a biotechnology company in the US. A relatively young company, but their focus is on providing RNAi related products to better serve researchers. As my experiment used siRNA technology, and any good experiment would have a positive and a negative control, I turned to this company to see if they could offer anything effective.

Kallen, A., Zhou, X., Xu, J., Qiao, C., Ma, J., Yan, L., Lu, L., Liu, C., Yi, J., Zhang, H., Min, W., Bennett, A., Gregory, R., Ding, Y., & Huang, Y. (2013). The imprinted H19 LncRNA antagonizes let-7 MicroRNAs. *Molecular Cell, 52*(1), 101-112. doi:10.1016/j.molcel.2013.08.027

This paper focused on H19 lncRNA and its implication in human genetics and cancer. It was a stepping stone for me to understand the gaps in our knowledge when it comes to the function of H19. They identified that H19 is able to modulate the microRNA let-7 and were able to do so because of the lncRNA generated. This wasn't entirely pertinent to my paper because it focused more on the lncRNA than miR-675-3p and miR-675-5p, but it is still important because it emphasizes the versatility of H19 for development, regulation, and cancer.

Kaur, G., & Dufour, J. M. (2012). Cell lines: Valuable tools or useless artifacts. *Spermatogenesis, 2*(1), 1-5. doi:10.4161/spmg.19885

A review article that looked at cell lines as a technique to study biological processes. It provides advantages and disadvantages of this technique Overall, a really good paper for anybody to read if they are using cell-lines as part of their experiment. Not only did it address potential pitfalls, but it also provided suggestions on how to avoid or remedy the disadvantages. I read this paper carefully for when it came to designing my experiment.

Liu, Y., Li, G., & Zhang, J. (2017). The role of long non-coding RNA H19 in musculoskeletal system: A new player in an old game. *Experimental Cell Research*, 360(2), 61-65. doi:/10.1016/j.yexcr.2017.09.007

Another paper that looked at the lncRNA. The authors also expressed interest in H19 because of its strong expression during embryogenesis. This paper provided a summary on the current understanding of H19 and H19 during multi-differentiation of mesenchymal stem cells because of the cells multi-differentiation ability. This source was important during the preliminary stages of designing a question and a hypothesis. While did it not focus on miR-675-3p and miR-675-5p, it gave me an idea of H19's versatility across different systems.

Lonza. (2017). Human renals cells (normal & diseased). Retrieved from https://www.lonza.com/products-services/bio-research/primary-cells/human-cells-and-media/renal-cells-and-media/human-renal-cells.aspx

Not a paper, but a link to my chosen human primary cell for my experiment. As mentioned earlier in this bibliography, I carefully read a paper that highlighted disadvantages of cell lines and what could be done to remedy it. One suggestion to a disadvantage of cell lines was the repeat of the experiment in primary human cells. As my project focused on kidney development, I chose primary renal cells to repeat my experiment.

Lorenzen, J. M., & Thum, T. (2016). Long noncoding RNAs in kidney and cardiovascular diseases. *Nature Reviews.Nephrology, 12*(6), 360. doi:10.1038/nrneph.2016.51

This is definitely a review article and not a paper. There wasn't an abundance of information for my own project as there was only a small section on H19 and its relevance towards kidney disease. That being said, this review was very well written. It outlines for the reader the current understanding of a variety of lncRNAs' role and function in kidney and cardiovascular disease. For anybody interested in lncRNA and wants a better understanding of what has been done and what remains to be explored, it is well-worth a read

Matoba, S., Inoue, K., Kohda, T., Sugimoto, M., Mizutani, E., Ogonuki, N., Nakamura, T., Abe, K., Nakano, T., Ishino, F., & Ogura, A. (2011). RNAi-mediated knockdown of Xist can rescue the impaired postimplantation development of cloned mouse embryos. *Proceedings of the National Academy of Sciences of the United States of America, 108*(51), 20621-20626. doi:10.1073/pnas.1112664108

This group of researchers identified that most upstream level of dysfunction leading to impaired development of cloned mouse embryos by using RNAi against Xist. Another interesting read, but it isn't entirely relevant to my own project. What interested me and helped me the most was their investigation of Xist, another lncRNA. Like me, they used RNAi technology to knock down a nuclear RNA. It gave me confidence in using siRNA technology in my own experiment to knock down H19!

Nishinakamura, R., & Sakaguchi, M. (2014). BMP signaling and its modifiers in kidney development. *Pediatric Nephrology, 29*(4), 681-686. doi:10.1007/s00467-013-2671-9

A review paper that looks at BMP signaling and the roles it plays during kidney differentiation with different protein players. It highlights which proteins when disrupted can contribute to kidney disease or maldevelopment of the kidneys. This paper helped me to narrow which BMP proteins I wanted to focus my attention on for this project. It also helped me to understand later on the intricacies of BMP signaling which I went to further explore in my discussion section.

The Kidney Foundation of Canada. (2016). 1 in 10 Canadians has kidney disease, and millions more are at risk. Are you at risk? Retrieved from https://www.kidney.ca/page.aspx?pid=2617

Vasudevan, S., Tong, Y., & Steitz, J. A. (2007). Switching from repression to activation: MicroRNAs can up-regulate translation. *Science, 318*(5858), 1931-1934. doi:10.1126/science.1149460

Wang, R. N., Green, J., Wang, Z., Deng, Y., Qiao, M., Peabody, M., Zhang, Q., Ye, J., Yan, Z., Denduluri, S., Idowu, O., Li, M., Shen, C., Hu, A., Haydon, R., Kang, R., Mok, J., Lee, M., Luu, H., & Shi, L. (2014). Bone morphogenetic protein (BMP) signaling in development and human diseases. *Genes and Diseases, 1(1),*87-105. doi:https://doi.org/10.1016/j.gendis.2014.07.005

Wetzel, P., Haag, J., Câmpean, V., Goldschmeding, R., Atalla, A., Amann, K., & Aigner, T. (2006). Bone morphogenetic protein-7 expression and activity in the human adult normal kidney is predominantly localized to the distal nephron. *Kidney International, 70*(4), 717.