

The Role of Obesity in Multiple Myeloma Drug Resistance

Faculty Member: Professor Katie DeCicco-Skinner

Multiple myeloma (MM) is a hematological cancer where a monoclonal tumor plasma cell grows in the bone marrow, leading to complications such as renal failure and lytic bone disease¹. Genetic heterogeneity makes MM difficult to treat because of the emergence of drug resistant tumor cells, the involvement of different pathways, such as cyclin D/retinoblastoma pathway, and interactions with the microenvironment, such as of the bone marrow¹. MM is the second most common blood cancer in the United States, with 20,000 new cases per year and a median survival of 6 years¹. The cause of MM is poorly understood, but an overweight or obese person is 12% and 27% more likely to get MM, respectively⁴. The correlation between obesity and MM seems promising since obesity is known to increase cancer growth, inflammation, and drug resistance in many cancers^{2,3}. The focus of this proposed research is to see how fat contributes to MM drug resistance. Methodologically, MM cells will be co-cultured with fat cells from a person with normal body mass index (BMI) of 20-25 kg/m², overweight BMI of 25-30 kg/m², or obese BMI of more than 30 kg/m². Then, proteins will be extracted and Western blots will be used to look for the presence of drug resistant proteins such as MDR1 and proteins in the cell adhesion molecule drug resistance (CAM-DR) pathway. The goal of this study is to identify factors that show the contribution of obesity to MM drug resistance, which could lead to improved therapeutics to prevent cancer progression.

References

1. Kuehl, W.M., and Bergsagel, P. L. Molecular Pathogenesis of Multiple Myeloma and its Premalignant Precursor. *The Journal of Clinical Investigation*. 2014; 122: 10
2. Pelicano, H., Carney, D., and Huang, P. ROS Stress in Cancer Cells and Therapeutic Implications. *Drug Resistance Updates*. 2004; 7: 97-100
3. Perez-Hernandez, A., Catalan, V., Gomez-Ambrosi, J., Rodriguez, A., and Gruhbeck, G. Mechanisms Linking Excess Adiposity and Carcinogenesis Promotion. *Frontiers in Endocrinology*. 2014; 5: 65
4. Wallin, A., and Larsson, S. C. Body Mass Index and Risk of Multiple Myeloma: A Meta-Analysis of Prospective Studies. *European Journal of Cancer*. 2011; 47: 1606-1615