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**Abstract** - Master Thesis Project, the Pharmacy Programme

## **Lenalidomide activity in Chronic Lymphocytic Leukemia (CLL) by analysis of F- actin polymerization with Flow Cytometry**

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Chronic Lymphocytic Leukemia (CLL) is characterized by accumulation of B-lymphocytes in the blood, marrow and lymphoid tissue. CLL is the most common lymphoid leukemia cancer in Western countries, corresponding to 25% of all leukemias. Defective F-actin polymerization has been identified in CLL patients, leading to an impaired immunological synapse which can be recovered with the novel anticancer drug, Lenalidomide. This study aimed to standardize a Flow Cytometry analysis for detection of F-actin polymerization and use it to evaluate the activity of Lenalidomide. CLL cells and peripheral blood mononuclear cells (PBMC) were incubated *in vitro* with Lenalidomide [10 $\mu$ M] at different time-points and evaluated for F-actin polymerization using Phalloidin intracellular staining and fluorochrome labeled antibodies detected by Flow Cytometry. CLL cells showed a significant increase in F-actin polymerization after treatment with Lenalidomide. F-actin polymerization was observed within one hour after incubation with Lenalidomide with a plateau happening around 8 hours. Within the three cell-populations analyzed, (monocytes, B- and T-lymphocytes) the largest increase in F-actin polymerization was observed in monocytes with a tenfold increase compared to non-treated CLL cells. Using this technique we observed that CLL cells treated with Lenalidomide respond with higher levels of F-actin polymerization compared to normal PBMC. This flow Cytometry technique potentially can be used to evaluate the activity of Lenalidomide in different cell types and serve as a tool for screening of related compounds.