Plasma cell dyscrasias are hematopoietic neoplasms that are produced as a result of malignant transformation of plasma cells, which are essential for the immune system. FISH (fluorescence in situ hybridization) studies with the same RB1, CTB +21,+21,+21,+mar1,+mar2,+mar3,+mar4[cp3]/,+15,+19, del(13)(q14q22), +add(6)(q15), +7, -13q, +15, +19, del(13)(q14q22) are found in both WBM and RCC samples. The supernatant comprising the RCC was poured off leaving bound plasma cells inside the tube (StemCell Technologies, 2008).

### Materials and Methods

#### Hypothesis and Study

We hypothesized that FISH is superior to UPC by FISH analysis in detecting benign abnormalities and that the remaining cellular components (RCC) subsequent cell isolation can be used for chromosome analysis to detect non-PC related abnormalities.

#### Testing the Hypothesis

**Study I (FISH)**

- **FISH results using UPC vs. CD138 EPC:**
  - UPC: 27 Samples (January-September 2010)
  - CD138 EPC: 58 Samples (April-December 2011)

**Study II (Karyotyping)**

- EasySep Human CD138 Selection Kit
- **Data from Study I confirms that EPC FISH increases the detection rate of genomic abnormalities and that the remaining cellular components (RCC) subsequent cell isolation can be used for chromosome analysis to detect non-PC related abnormalities.**

**Study II (Karyotyping)**

- GSILO CytoVision Scanning System – Leica Microsystems
- Results from Study II support the superior diagnostic potential of selecting PCs and reviewing the supernatant comprising the RCC as a diagnostic strategy.

#### Flow Cytometry

- After isolation, purity of 90.0% CD138+ plasma cells was detected by flow cytometry.

#### Results

**Study I (FISH)**

- The top panel shows FISH scores from 2 tubes apparently showing hyperdiploidy; 3 signals for ATM and p53 in 10 out of 200 cells. The bottom panel shows from the same patient after isolation of plasma cells demonstrates a significant increase. The frequency of abnormal cells rose by 82.5% (Figure 5).

**Study II (Karyotyping)**

- **Table 1** illustrates the increase in abnormal karyotype found in the RCC CA. 84% of cases with abnormality found in the RCC CA. 84% of cases with abnormality diagnosed in the RCC. 21% of cases with abnormality found in the RCC CA.

**Conclusions**

- **Data from Study I confirms that FISH increases the detection rate of genomic abnormalities.**
- **Diagnostic sample size is limiting and the inability to perform CA may compromise patient care since it is equally important for detecting non-PC related abnormalities in diagnostic and post treatment samples.**
- **Results from Study II support the superior diagnostic potential of selecting PCs and reviewing the supernatant comprising the RCC as a diagnostic strategy.**
- **Retracing the RCC from the negative fraction proves to be an innovative strategy for improving the diagnostic potential.**
- **An algorithm was developed to assist in the initiation process when CA and FISH are requested.**

**Algorithm for Initiation**

- **Figures 3 and 4** illustrate the sample volume as detailed in Figure 3. Any volume less than 1 mL is reduced to CA only to avoid compromising testing.

**References**