末梢血からのリンパ球の分画および計測

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血液1滴から行う白血球の全数検査！

Cell Sorter & Cell Imaging
Rare Cell Sorter
Single Rare Cell Isolation and Collection System [1]

✓ Rapid
✓ High Throughput
✓ Damage Less
✓ Cell Imaging

Immune System

Leukocytes
- Lymphocytes: 20-25%
- Monocytes: 3-8%
- Basophils: 0.5-1%
- Neutrophils: 60-70%
- Eosinophils: 2-4%
- Cell-mediated immunity: T-cell
- Humoral immunity: B-cell

Characterization:
Immunodeficiency and Autoimmune diseases, Cancer, HIV, leukemia and so on...

Whole Blood Cell Separation & Detection

Gradual size-based filtration

Immune System

Cell identification
- Training
  - Input images, compute HOG*1 and color features
  - Train SVM classifier
- Test
  - Scan images
  - Compute HOG and color features for each window
  - Classify windows and merge detection
  - Count target cells

Microfluidic Device vs. Flow Cytometry*2

Sample: 1 µL of Whole blood diluted 10 times
T-cells: CD3+—FITC
B-cells: CD19+—PE
Separation speed: 3 µL/min

Passing-Bablok regression

\[ y = 0.254 + 0.899x \]

Bland-Altman plot

Average: -0.6
95% limits=3.4

Cell capture rate: 99.8%
Coefficient of variation: 2.77%
Pearson correlation coefficient (vs FACS): 0.987

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References:
[2] K Masuda, AM Noor, W Lei, 堀尾, 齋藤, 宮田, 新井, 1 µL末梢血からのリンパ球の分画および計測. 西部化学とマイクロ・ナノシステム学会, 3007

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