Distribution of Neuraminidase Activity In Fibroblasts From Post Mortem Samples

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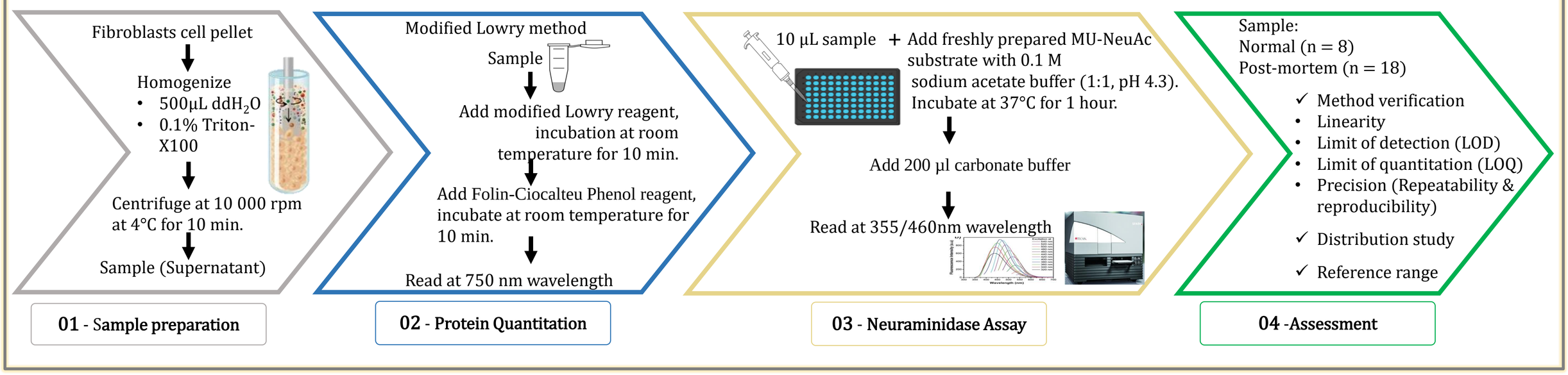
Introduction

Sialidosis is a rare autosomal recessive lysosomal storage disease caused by a deficiency of neuraminidase (EC 3.2.1.18) due to mutations in the *NEU1* gene located on chromosome 6p21.33. Approximately, the prevalence of sialidosis is between 1/5,000,000 to 1/1,500,000 live births worldwide. To date, the diagnosis of sialidosis in Malaysia still relies on metabolite measurement of total and free sialic acid using thin layer chromatography method for screening . As for confirmation using biochemical assay, neuraminidase assay testing in Malaysia is still unavailable, therefore physicians need to send the sample to be analysed overseas.

Objective

To assess and establish the performance of neuraminidase assay using fibroblasts sample for laboratory diagnosis.

Material & Method



Results & Discussion

- Through a 5-point standard curve, linearity was determined and 4-methylumbelliferone (4MuF) as standard was linear up to 40,000 nmol. The linearity satisfactorily covered the working range of 0 to 2.5 nmol (Figure 1).
- Limit of detection and limit of quantitation were 7.998 nmol/hr/mg and 26.66 nmol/hr/mg protein, respectively.
- Repeatability and reproducibility test results expressed as coefficient of variation (%CV) were 11.38% and 12.52%, respectively.
- Demographic characteristic in this study presented the median age for normal fibroblasts sample was 2 months ranged from 0 to 33 months old. Whereas, the median age for post-mortem fibroblasts sample was 26 years ranged from 24 to 32 years old (Figure 2a).
- Gender for normal fibroblasts sample was divided evenly with each male and female equal to nine persons. Meanwhile, post-mortem fibroblasts sample consist of six males and two females (Figure 2b).
- The median (range) neuraminidase activities in normal and postmortem patients' samples were 38.41 (82.13) and 24.28 (36.29) nmol/h/mg protein, respectively demonstrating a significant difference between both ($p<0.05$).

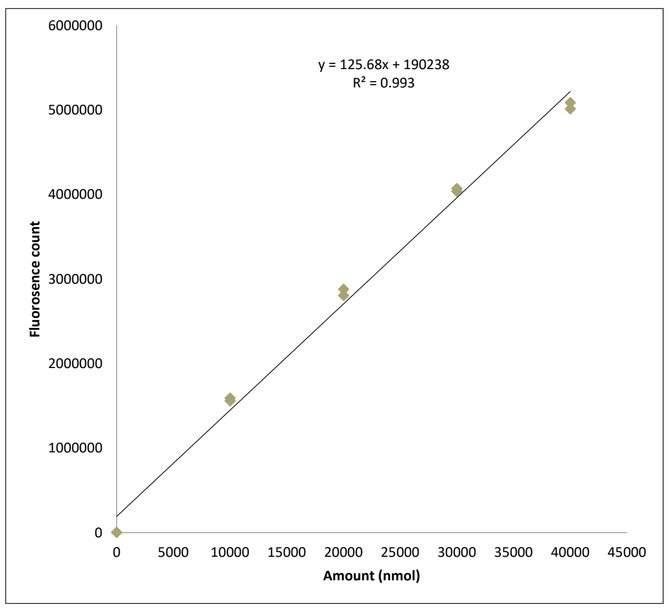


Figure 1:
4MuF linearity standard

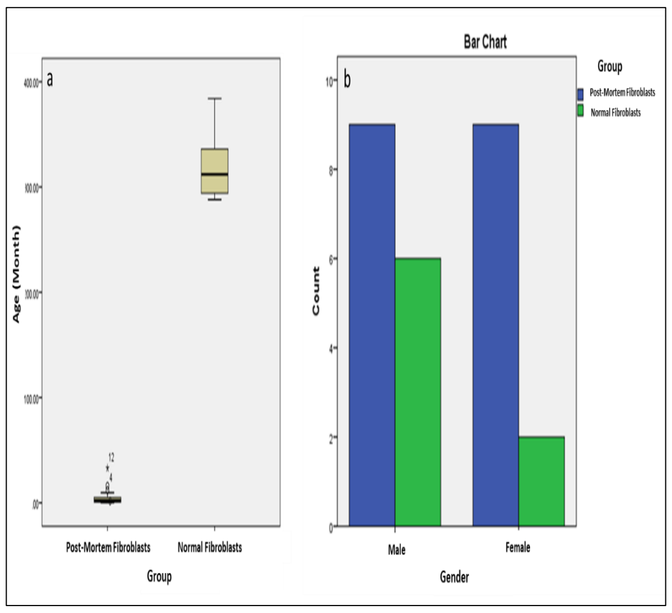


Figure 2:
(a) Distribution of age variable between groups (Post-mortem fibroblasts vs Normal fibroblasts)
(b) Bar chart between post-mortem fibroblasts and normal fibroblasts for gender variables.

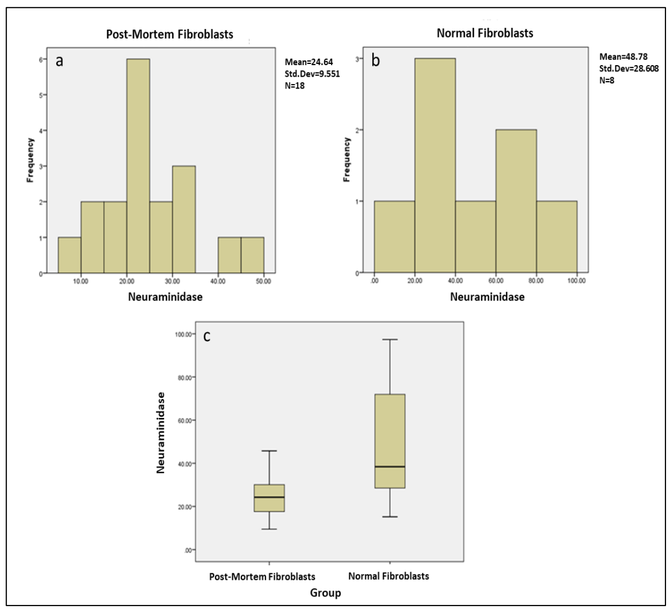


Figure 3: Histogram of neuraminidase activity
(a) Post-mortem fibroblasts group
(b) Normal fibroblasts group
(c) Comparisons between two groups.

Conclusion

In conclusion, our study showed neuraminidase assay accomplished an appropriate method verification requirement. New laboratory test for the diagnosis of sialidosis has been effectively established in Malaysia. Nevertheless, bigger sample size as well as separating the range between post-mortem and living individuals are needed in bringing new insights into this current understanding.

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ACKNOWLEDGEMENT

We thank the Director General of Health Malaysia for his approval to present this poster.

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