Basic biostatistics and basic R for the biologist

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PREREQUISITE: Basic statistic course

COURSE SCHEDULE: 16 October – 27 November 2023, Monday 13.00 – 15.00 (Thai time)

COURSE LENGTH: 12 lecture/lab hours

Objective:

- Participants can explain basic biostatistical concepts and tests commonly used in biology.
- Participants can install, update, and use basic R commands.
- Participants can import and manipulate data, perform basic data analysis, and data visualization.
- Participants can perform simple biological data analysis with packages from a Bioconductor repository

Date	Topic	Detail	Hour
16 October 2023	Basic R	- R and RStudio installation - Basic operation - Types of data - Indexing - Loop	2
30 October 2023	Data manipulation with R	- Data import, skimming, and Export - Filter, select, summarize - Joining data - Long-form and wide-form data transformation	2
6 November 2023	Data visualization with R	ggplot2 - Histogram, scatterplot, barplot, lineplot, boxplot - Faceting, customization for publication and export	2
13 November 2023	Statistical distribution	Statistical distribution - Normal distribution - Uniform distribution - Binomial distribution - Poisson distribution	0.5
	Hypothesis testing	- Null and alternative hypothesis - Type I and II errors - P-value, confidence interval - Multiple tests adjustment	1.5

Date	Topic	Detail	Hour
		Parametric - T-test - ANOVA Non-parametric - Kruskal-Wallis, Wilcoxon test - Fisher's exact, chi-square test Post-hoc test	
20 November 2023	Regression and dimensionality reduction	- Linear regression - Logistic regression - Poisson regression - Multivariate regression - Principal component analysis	1.5
	Survival analysis	- Censoring - Kaplan-Meier - Log-rank test - Cox's proportional hazard model	0.5
27 November 2023	Bioconductor	- Introduction to Bioconductor - Limma, edgeR - Pathway analysis: ORA, GSEA	2