Seminar

Lichuang Huang

Wie-Biotech

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Repetition of Technology

Article

Serum and urine metabolomics study reveals a distinct diagnostic model for cancer cachexia

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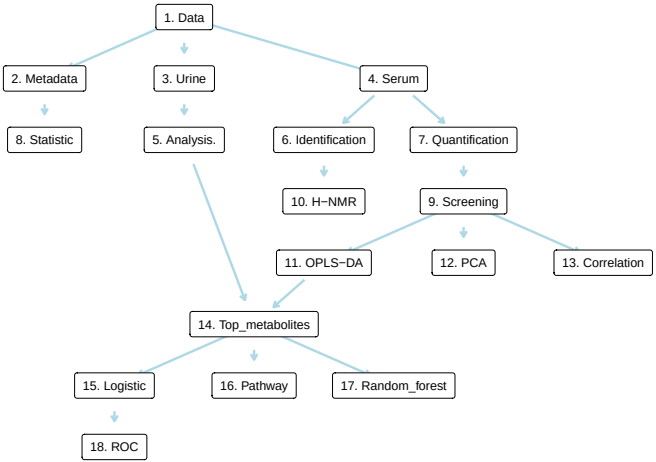
Yang Q, et al. (2017). *Journal of Cachexia, Sarcopenia and Muscle.*

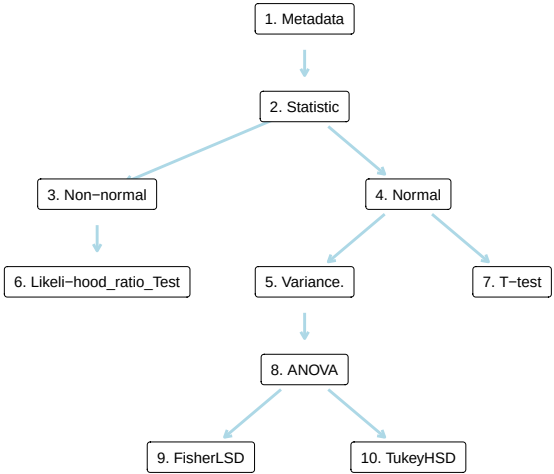
Research idea

- Main
  - Identification
  - Quantification
  - Feature selection
  - Establish model
  - Validation



Statistic of metadata

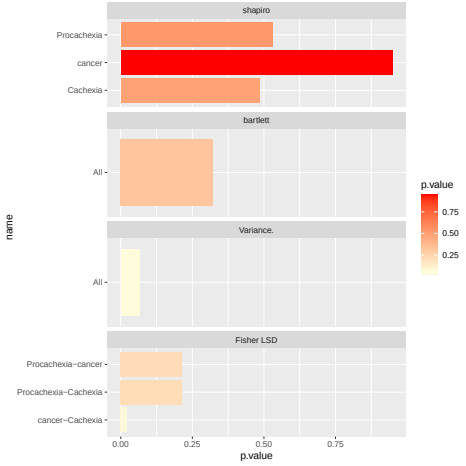
- The pre-test
  1. Normal distribution
     - `shapiro.test()`
  2. Variance test
     - `bartlett.test()`
- ANOVA
  - `aov()`
- Multiple comparison
  - `TurkeyHSD()`



Demo statistic

Table 1: Demo data

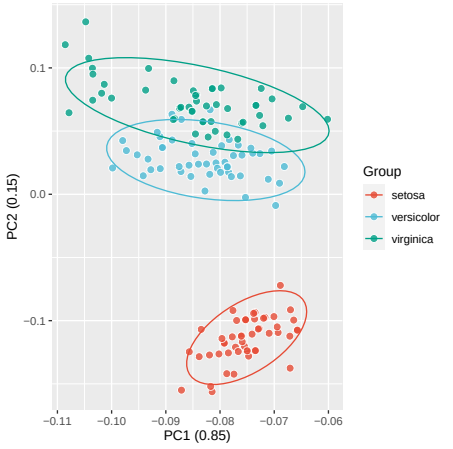
sample	group	Total.cholesterol
Ca1	Cachexia	4.24
Ca2	Cachexia	6.00
Ca3	Cachexia	NA
Ca4	Cachexia	NA
Ca5	Cachexia	4.96
T1	cancer	3.88
T2	cancer	1.79
T3	cancer	3.36
T4	cancer	2.97
T5	cancer	5.41
Pro1	Procachexia	3.30
Pro2	Procachexia	5.44
Pro3	Procachexia	NA



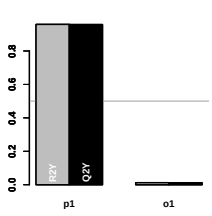
Multivariate statistics: PCA

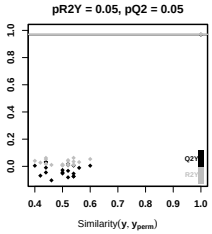
Table 2: Demo data

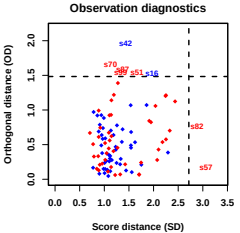
Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
7.0	3.2	4.7	1.4	versicolor
6.4	3.2	4.5	1.5	versicolor
6.9	3.1	4.9	1.5	versicolor
5.5	2.3	4.0	1.3	versicolor
6.3	3.3	6.0	2.5	virginica
5.8	2.7	5.1	1.9	virginica
7.1	3.0	5.9	2.1	virginica
6.3	2.9	5.6	1.8	virginica

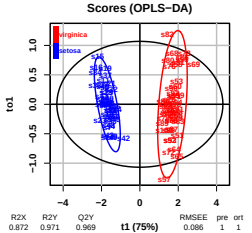


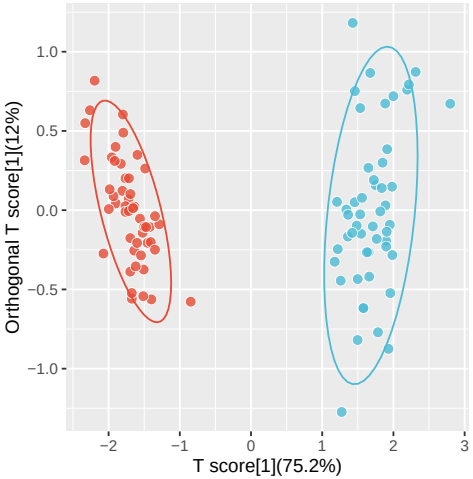
Multivariate statistics: OPLS-DA











Random Forest

Table 3: Traning data

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
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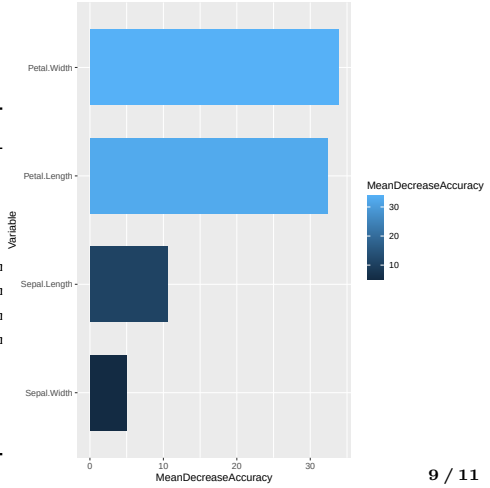


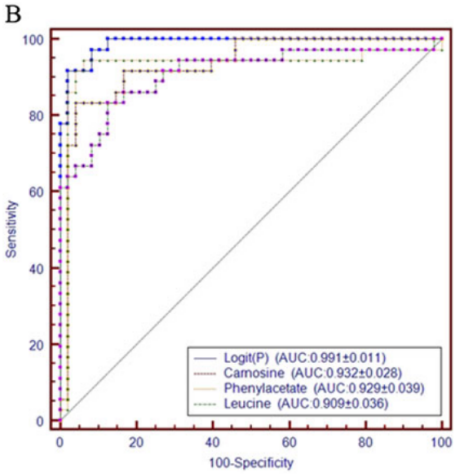
Logistic regression

Table 4: Traning data

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
5.1	3.5	1.4	0.2
4.9	3.0	1.4	0.2
4.7	3.2	1.3	0.2
4.6	3.1	1.5	0.2

Table 5: Validate data

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
5.85	2.94	4.32	1.34
5.74	2.98	3.98	1.02
5.04	3.41	3.52	0.90
5.49	2.79	4.06	1.11



Thank you