

Package ‘caffsim’

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Title Simulation of Plasma Caffeine Concentrations by Using Population Pharmacokinetic Model

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Description Simulate plasma caffeine concentrations using population pharmacokinetic model described in Lee, Kim, Perera, McLachlan and Bae (2015) <doi:10.1007/s00431-015-2581-x> and the package was published <doi:10.12793/tcp.2017.25.3.141>.

Depends R (>= 3.3.2)

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LazyData true

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Imports mgcv, dplyr, tidyr, tibble, ggplot2, shiny, markdown

NeedsCompilation no

URL <https://github.com/asancpt/caffsim>

BugReports <https://github.com/asancpt/caffsim/issues>

RoxygenNote 6.0.1

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| | |
|--------------|--|
| caffConcTime | <i>Create a concentration-time dataset of single oral dosing of caffeine</i> |
|--------------|--|

Description

caffConcTime will create a dataset of the concentration-time curve.

Usage

```
caffConcTime(Weight, Dose, N = 20)
```

Arguments

| | |
|--------|----------------------------------|
| Weight | Body weight (kg) |
| Dose | Dose of single caffeine (mg) |
| N | The number of simulated subjects |

Value

The dataset of concentration and time of simulated subjects

See Also

<https://asancpt.github.io/caffsim>

Examples

```
caffConcTime(Weight = 20, Dose = 200, N = 20)
caffConcTime(20, 200)
```

| | |
|-------------------|--|
| caffConcTimeMulti | <i>Create a concentration-time dataset of multiple oral dosing of caffeine</i> |
|-------------------|--|

Description

caffConcTimeMulti will create a dataset of the concentration-time curve of multiple oral administration of caffeine.

Usage

```
caffConcTimeMulti(Weight, Dose, N = 20, Tau = 8, Repeat = 4)
```

Arguments

| | |
|--------|--|
| Weight | Body weight (kg) |
| Dose | Dose of single caffeine (mg) |
| N | The number of simulated subjects |
| Tau | The interval of multiple dosing (hour) |
| Repeat | The number of dosing |

Value

The dataset of concentration and time of simulated subjects of multiple dosing

See Also

<https://asancpt.github.io/caffsim>

Examples

```
caffConcTimeMulti(Weight = 20, Dose = 200, N = 20, Tau = 8, Repeat = 4)
caffConcTimeMulti(20, 200)
```

| | |
|--------------|---|
| caffDescstat | <i>Calculate descriptive statistics of simulated pharmacokinetic parameters</i> |
|--------------|---|

Description

caffDescstat will calculate descriptive statistics of simulated PK parameters

Usage

```
caffDescstat(caffPkparamData)
```

Arguments

caffPkparamData
data frame generated by caffPkparam function

Value

The descriptive statistics of pharmacokinetic parameters

See Also

<https://asancpt.github.io/caffsim>

Examples

```
caffDescstat(caffPkparam(20,500))
caffDescstat(caffPkparamMulti(20,500))
caffDescExample <- cbind(caffDescstat(caffPkparam(20,500)),
                        caffDescstat(caffPkparam(50,500))[2,])
colnames(caffDescExample)[2:3] <- c('20 kg', '50 kg')
caffDescExample
```

| | |
|--------------|---|
| caffOverdose | <i>Calculate a duration of toxic concentration over specified levels (40 mg/L or 80 mg/L)</i> |
|--------------|---|

Description

caffOverdose calculates a time duration of plasma caffeine concentration over specified toxic limits (40 mg/L or 80 mg/L)

Usage

```
caffOverdose(caffConcTimeData)
```

Arguments

caffConcTimeData
data frame containing concentration-time data

Value

descriptive statistics of duration of toxic concentrations

See Also

<https://asan.shinyapps.io/caff/>

Examples

```
caffOverdose(caffConcTime(Weight = 20, Dose = 200, N = 20))
caffOverdose(caffConcTimeMulti(Weight = 20, Dose = 200, N = 20, Tau = 8, Repeat = 4))
```

| | |
|-------------|---|
| caffPkparam | <i>Create a dataset of pharmacokinetic parameters of single oral dosing of caffeine</i> |
|-------------|---|

Description

caffPkparam will create a dataset for simulation of single dose of caffeine

Usage

```
caffPkparam(Weight, Dose, N = 20)
```

Arguments

| | |
|--------|----------------------------------|
| Weight | Body weight (kg) |
| Dose | Dose of single caffeine (mg) |
| N | The number of simulated subjects |

Value

The dataset of pharmacokinetic parameters of subjects after single caffeine dose following multivariate normal

See Also

<https://asancpt.github.io/caffsim>

Examples

```
caffPkparam(Weight = 20, Dose = 200, N = 20)
caffPkparam(20, 500)
```

| | |
|------------------|---|
| caffPkparamMulti | <i>Create a dataset of pharmacokinetic parameters of multiple oral dosing of caffeine</i> |
|------------------|---|

Description

caffPkparamMulti will create a dataset for simulation of multiple dose of caffeine.

Usage

```
caffPkparamMulti(Weight, Dose, N = 20, Tau = 8)
```

Arguments

| | |
|--------|--|
| Weight | Body weight (kg) |
| Dose | Dose of multiple caffeine (mg) |
| N | The number of simulated subjects |
| Tau | The interval of multiple dosing (hour) |

Value

The dataset of pharmacokinetic parameters of subjects after multiple caffeine dose following multivariate normal

See Also

<https://asancpt.github.io/caffsim>

Examples

```
caffPkparamMulti(Weight = 20, Dose = 200, N = 20, Tau = 8)
caffPkparamMulti(20, 500)
```

| | |
|----------|--|
| caffPlot | <i>Plot plasma concentration-time curves of single oral dosing of caffeine</i> |
|----------|--|

Description

caffPlot will create concentration-time curve after single dose of caffeine

Usage

```
caffPlot(caffConcTimeData, log = FALSE)
```

Arguments

| | |
|------------------|---|
| caffConcTimeData | data frame of concentration-time dataset having column names Subject, Time, and Conc (case-sensitive) |
| log | y axis log |

Value

The concentration-time curve

See Also

<https://asancpt.github.io/caffsim>

Examples

```
caffPlot(caffConcTime(Weight = 20, Dose = 200, N = 20))
```

| | |
|---------------|--|
| caffPlotMulti | <i>Plot plasma concentration-time curves of multiple oral dosing of caffeine</i> |
|---------------|--|

Description

caffPlotMulti will create concentration-time curve after multiple doses of caffeine

Usage

```
caffPlotMulti(caffConcTimeMultiData, log = FALSE)
```

Arguments

| | |
|-----------------------|---|
| caffConcTimeMultiData | data frame of concentration-time dataset having column names Subject, Time, and Conc (case-sensitive) |
| log | y axis log |

Value

The concentration-time curve

See Also

<https://asancpt.github.io/caffsim>

Examples

```
caffPlotMulti(caffConcTimeMulti(Weight = 20, Dose = 200, N = 20, Tau = 8, Repeat = 4))
```

caffShiny

Run Shiny app to interactively simulate single and multiple dosing for plasma caffeine concentration

Description

caffShiny runs an internal shiny app Caffeine Concentration Predictor in order to interactively simulate plasma caffeine concentration.

Usage

```
caffShiny()
```

See Also

<https://asan.shinyapps.io/caff/>

UnitTable

Unit data of PK parameters

Description

A dataset containing information regarding unit data of pharmacokinetic parameters

Usage

```
UnitTable
```

Format

A data frame with 16 rows and 2 variables:

Parameters Abbreviated pharmacokinetic parameters

Parameter Pharmacokinetic parameters in full name

See Also

<https://asancpt.github.io/caffsim>

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