Package 'caffsim'

May 8, 2026

Title Simulation of Plasma Caffeine Concentrations by Using Population Pharmacokinetic Model

Version 0.2.2

Date 2017-08-22

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>.

Depends R (>= 3.3.2)

Encoding UTF-8

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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

Maintainer Sungpil Han <shan@acp.kr>

Author Sungpil Han [aut, cre]

Repository CRAN

Date/Publication 2017-08-28 03:36:21 UTC

Contents

`caffConcTime` *Create a dataset of the concentration-time curve of single oral administration of caffeine*

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 *Create a dataset of the concentration-time curve of multiple dosing of caffeine*

Description

caffConcTimeMulti will create a dataset of the concentration-time curve of multiple oral administrations 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 *Calculate descriptive statistics of simulated PK parameters*

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
```

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caffOverdose *Calculate a duration of plasma caffeine concentration over specified toxic limits*

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` *Create a dataset for simulation of single dose of caffeine*

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 *Create a dataset for simulation of multiple dose of caffeine*

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 *Create concentration-time curve after single dose of caffeine*

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 *Create concentration-time curve after multiple doses of caffeine*

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 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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