Package 'caffsim'

July 17, 2018

Title Simulation of Plasma Caffeine Concentrations by Using Population Pharmacokinetic Model

Version 0.2.4

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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)

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

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R topics documented:

caffConcTime *Create a concentration-time dataset of single oral dosing 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 concentration-time dataset of multiple oral dosing of caffeine*

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)
```

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caffDescstat *Calculate descriptive statistics of simulated pharmacokinetic 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
```

caffOverdose *Calculate a duration of toxic concentration over specified levels (40 mg/L or 80 mg/L)*

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 of pharmacokinetic parameters of single oral dosing 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 of pharmacokinetic parameters of multiple oral dosing 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 — *Plot plasma concentration-time curves of single oral dosing 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 — *Plot plasma concentration-time curves of multiple oral dosing 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 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

Index