

# Package ‘caffsim’

August 28, 2017

**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

**License** GPL-3 | file LICENSE

**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>

## R topics documented:

caffConcTime . . . . .	2
caffConcTimeMulti . . . . .	2
caffDescstat . . . . .	3
caffOverdose . . . . .	4
caffPkparam . . . . .	4
caffPkparamMulti . . . . .	5
caffPlot . . . . .	6
caffPlotMulti . . . . .	6
caffShiny . . . . .	7
UnitTable . . . . .	7
<b>Index</b>	<b>8</b>

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caffConcTime	<i>Create a dataset of the concentration-time curve of single oral administration of caffeine</i>
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### 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)
```

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caffConcTimeMulti	<i>Create a dataset of the concentration-time curve of multiple dosing of caffeine</i>
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### 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)
```

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caffDescstat	<i>Calculate descriptive statistics of simulated PK parameters</i>
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**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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caff0verdose	<i>Calculate a duration of plasma caffeine concentration over specified toxic limits</i>
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### Description

caff0verdose calculates a time duration of plasma caffeine concentration over specified toxic limits (40 mg/L or 80 mg/L)

### Usage

```
caff0verdose(caffConcTimeData)
```

### Arguments

caffConcTimeData	data frame containing concentration-time data
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### Value

descriptive statistics of duration of toxic concentrations

### See Also

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

### Examples

```
caff0verdose(caffConcTime(Weight = 20, Dose = 200, N = 20))
caff0verdose(caffConcTimeMulti(Weight = 20, Dose = 200, N = 20, Tau = 8, Repeat = 4))
```

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caffPkparam	<i>Create a dataset for simulation of single dose of caffeine</i>
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### 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)
```

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caffPlot	Create concentration-time curve after single dose of caffeine
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**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
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**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))
```

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caffShiny	<i>Run shiny app to interactively simulate plasma caffeine concentration.</i>
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**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/>

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UnitTable	<i>Unit data of PK parameters</i>
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**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

## \*Topic **datasets**

UnitTable, [7](#)

caffConcTime, [2](#)

caffConcTimeMulti, [2](#)

caffDescstat, [3](#)

caffOverdose, [4](#)

caffPkparam, [4](#)

caffPkparamMulti, [5](#)

caffPlot, [6](#)

caffPlotMulti, [6](#)

caffShiny, [7](#)

UnitTable, [7](#)