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A MATHEMATICAL MODEL FOR PULSATILE GONADOTROPIN-RELEASING HORMONE RELEASE FROM HYPOTHALAMIC EXPLANTS OF MALE MARMOSET MONKEYS COMPARED WITH MALE RATS

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ABSTRACT. The present research was conducted to quantify tissues in vitro for gonadotropin-releasing identified primary culture of marmoset hypothalamic muscles for 2days to evaluate in vitro GnRH release profiles from testis- intact and gonadectomised males in hypothalamic explants. The Pulsalite GnRH release profile was readily demonstrated from isolated in vitro hypothalamic explants of adult male marmost monkeys. On day 1 of cultivation 0 male marmostgonadectomy results from hypothalamic explants to high mean gnrh and pulse largeness. The largeness of Gnrh pulses increased by day 2 in 67 per cent of intact testis marmosets hypothalamic explants, indicating release from an endogenous GnRH regulator. Finally, we conclude that the application part coincides with a mathematical model and the result is linked to the medical report. In the future, this paper will be very beneficial in the medicinal field.

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1. Introduction

Any combined distribution functions by Gompertz (1825) and Verhults (1838, 1845, 1847) during the first half of the 19th century compared traditional human impermanence tables and reflected impermanence growth [3]:

$$F(s) = (1 - qe^{-s\mu})^{\gamma} \text{ for } s > 1/\mu\, In\, p, \tag{1.1}$$

where all the positive real numbers are p, $\mu$and γ. Only in the twentieth century Ahuja and Nash (1967) took this definition into account and rendered some more generalization [1]. The generalized distribution or exponential distribution is known as a special case of the distribution Gompertz-Verhust (1.1). So, since $q = 1$. X is a generic random exponential variable with two parameters, if it has the distribution function

$$E(z; \gamma, \mu) = (1 - p^{-\mu z})^{\gamma}, \qquad z > 0. \tag{1.2}$$

For γ, μ >0. Here γ and μ parameters.

The three-parameter exponentiated Weibull distribution, suggested by Mudholkar and Srivastava (1993) as G(s) = [F(s)]^β, where G(t) is the base line distribution function [6]. The Authergupta and Kundu (2001) observe that the generalized exponential distribution of two parameters can be used quit effectively to evaluate positive lifetime results, especially in place of the two-parameter Weibull distribution. Therefore all three distributions, namely generalized exponential, Weibull and gamma, are in various forms all extensions / generalizations of the exponential one-parameter distribution. All three distributions, namely generalized exponential, Weibull and gamma, are therefore all extensions / generalizations of the exponential one-parameter distribution in different ways.

$$E(z; m, \mu) = (1 - p^{-\mu z})^{m}, \qquad z > 0. \tag{1.3}$$

For μ >0, obviously (1.3) the generalized exponential distribution function with $\mu = m$. Therefore, contrary to the Weibull distribution function,

The generalized exponential distribution function, which describes a sequence system, is a parallel system for simulation purposes is very significant. Thanks to the simplicity of the distribution function the generalized exponential random variable can be generated easily.For example, if U is a uniform random variable from $[0,1]$, then $Z = -(1/\mu)$ in $(1 - V^{\frac{1}{\gamma}})$ has generalized exponential distributions with the distribution function given by (1.2). Both science calculators or computers already have a standard uniform random number generator, such that generalized random exponential variance can be conveniently generated from a uniform random number generator.

This paper's main purpose is to provide a general introduction to the common exponential distribution and discuss some of its recent developments.This unique method has many benefits and presents the professional with another chance to analyze skewed evidence regarding lifespan. This article will help practitioners get the appropriate context and connections to this dissemination.

2. Mathematical model and Assumption

If random variable Z has the function of distribution (1.2),

$$E(z;\gamma,\mu) = \gamma\mu\left(1 - p^{-\mu z}\right)^{\gamma-1} p^{-\mu z}, \qquad z > 0.$$

For $\mu, \mu > 0$ see [4]. Compactness functions may take different forms of widespread exponential distribution. For $\gamma \leq 1$, it's a decreasing function and for $\gamma > 1$, it's a Weibull unimodal, distorted, right tail. It is observed that it is not β For $\mu = 1$, the mode for > 1 is $\log\alpha$ and the mode for $\alpha \leq 1$ is 0. The median is at $-\operatorname{In}\left(1 - (0.5)^{1/\gamma}\right)$. The mean median and mode are non-linear vector functions of the form and, when the vector of the type goes to infinity, they both seem infinite. The standard, median, and mode for α-large values are roughly equal to $\log\alpha$ but converge at different speeds. It is possible to obtain the different moments of a generalized exponential distribution by using its momentary generating function. If Z follows $FG(\gamma,\mu)$, then the moment generating function $N(s)$ of Z for $s < \mu$, is

$$N(s) = Fp^{sz} = \frac{\Gamma(\gamma+1)\Gamma(1 - s/\mu)}{\Gamma\left(\mu - \frac{s}{\mu} + 1\right)}.$$

Therefore, it immediately follows that

$$F(z) = 1/\mu[\psi(\gamma+1) - \psi(1)], \quad u(x) = 1/\mu^2\left[\psi(1) - \psi'(\gamma+1)\right],$$

where $\psi(z)$ and its derivatives are the diagram and polygamma functions. The mean of a generalized exponential distribution is increasing to ∞ as γ increase, for fixed μ. The Weibull distribution. In the case of gamma distribution, the variance goes to infinity as the shape parameter increases, whereas in the case of the distribution, the variance is about $\pi^2/6\mu\gamma^2$ for high shape parameter values γ.

Now we provide a stochastic representation of $\mathrm{EG}(\gamma, 1)$ for details see Gupta and Kundu [4], which can also be used to calculate yarious moments of a generalized exponential distribution. If α is a positive integer. say n, then the X distribution is the same as that of $\sum_{i=1}^{m} Zi/i$, wherever Zj's i.i.d. Random exponential vector with mean 1.

When a isn't an integer, then Z is the same as

$$\sum_{i=1}^{[y]} \frac{Xi}{i+(\mu)} + Z.$$

Here (γ) is the fractional component then the random variable Z follows $\mathrm{EG}(\gamma, 1)$, irrespective of the X is: Next we think about the generalized exponential distribution's skewness and kurtosis. The skewhood and kurtosis can be measured as

$$\sqrt{\omega}_1 = \lambda_3/\lambda_3^{3/2}, \quad \omega_2 = \lambda_4/\lambda_2^2.$$

Here $\lambda_2, \lambda_3,$ and λ_4 are respectively the second third and fourth moments and the digamma and polygamms feature can be described:

$$\begin{aligned}
&\lambda_2 = 1/\mu^2[\psi'(1) - \psi'(z+1) + [\psi(z+1) - \psi(1)]^2] \\
&\lambda_3 = 1/\mu^3[\mu'' \quad (\gamma+1) - \mu''(1) + \quad 3(\psi(\gamma+1) - \psi(1)(\psi'(1) - \psi'(\gamma+1)) \\
&\qquad + (\psi(\gamma+1) - \psi(1))^3] \\
&\lambda_4 = 1/\mu^4[\psi'''(1) - \psi'''(\gamma+1) + 3(\psi'(1) - \psi'(\gamma+1))^2 + 4(\psi(\gamma+1) - \psi(1)) \\
&\quad (\psi''(\gamma+1) - \psi''(1)) + 6\psi(\gamma+1) - \psi(1))^2(\psi'(1) - \psi'(\gamma+1) + \psi'''(1) \\
&\qquad - \psi'''(\gamma+1))^4].
\end{aligned}$$

Both the skewness and kurtosis are independent of scale parameter. It is observed numerically that the function of α is diminished by both skewness and kurtosis, and that the maximum value of skewness is around 1.139547.

$$\alpha Z^{(u;\gamma)} = \frac{\mathrm{In}\left(1 - v^{\frac{1}{\gamma}}\right) + \mathrm{In}\left(1 - \left(1 - v^{\frac{1}{Z}}\right)\right) - 2\,\mathrm{In}\left(1 - \left(\frac{1}{2}\right)^{1/\gamma}\right)}{\mathrm{In}\left(1 - v^{\frac{1}{\gamma}}\right) - \mathrm{In}\left(1 - v^{\frac{1}{\gamma}}\right)} \tag{2.1}$$

The plots of the skewness functions (2.1) of the generalized exponential distribution for different values of are presented.

2.1. **Hazard function and its properties.**

$$h(z;\gamma,\mu)=\frac{f(z;\gamma,\mu)}{1-E(z;\gamma,\mu)}=\frac{\gamma\mu p^{-\mu z}\left(1-p^{-\mu z}\right)^{\gamma-1}}{1-(1-p^{(-\mu z)\gamma})}$$

As π is the parameter of the scale, the shape of the function does not depend on $\hat{y}$, it depends only on γ. For any set, the generalized exponential distribution hes an increasing hazard function for $y>1$ and has a decreasing danger function for γ >1 and has a decreasing danger function for $\gamma<1$. It has constant function of danger to $\gamma=1$. These results are not very hard to prove since the generalized exponential distribution has $\gamma>1$ log-concave density and α log-convex [4]. The hazard function of the generalized exponential distribution is exactly the same as that of the gamma distribution hazard function, which is distinct from the Weibull distribution hazard function [4].

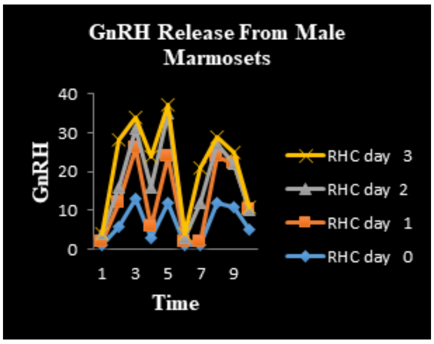
The inverse danger function has recently become popular. extensive exponential distribution is

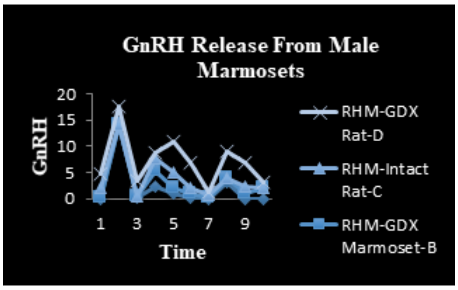
$$P(Z;\gamma,\mu)=\frac{f(z;\gamma,\mu)}{E(z;\gamma,\mu)}=\frac{\gamma\mu p^{-\mu z}}{1-p^{-\mu z}}.$$

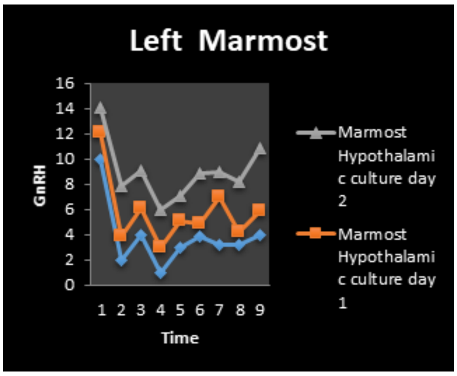
The inverse hazard function is found to be a decreasing function of z over all γ-values. By Nanda and Gupta (2001) [7] some other reversed hazard function properties of a generalized exponential distribution were obtained. Remember that $\lambda\mu p^{-z}/1-p^{-z}$ [7]. The hazard function and the reversed hazard function can be used to measure the fishing knowledge matrix of the unknown parameter, [2]. See [5] for the generalized exponential distribution $r(x;\alpha,\lambda)$ in a convenient way and it can easily be used to calculate the Fisher information matrix.

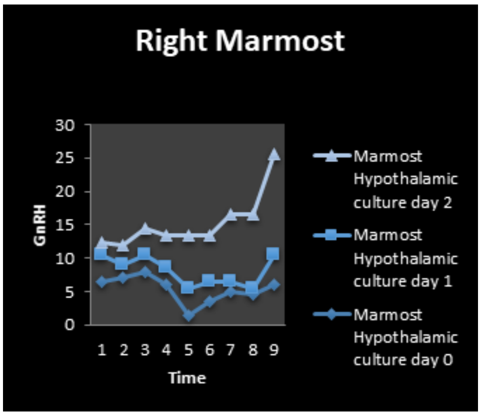
3. Application

The hypothalamic decapeptidegonatrotrabine - (GnRH) for regulating the production of pulsalitegonadotropine through binding in all vertebrates and in most mammals to pituitary gonadotrabine (1.1). In this regard, the primary testicular-mediated negative feed back regulation for the anterior pituitary release of gonadotropin is provided by testosterone (T). The dynamics of GnRH release improved from day 0 to day 2, in terms of the pulse amplitude and mean concentration, in the following four cases (of the following 2 males). GnRH publishes profiles of two descriptive hypothalamic explants collected from male rats with intact testis that display invarientsGnRHpulsatility in the 78-h population. GnRH release dynamics remained constant during the processing, with no signs of in- or inter-male variation in rats, pulse duration, pulse nadir, incidence values remaining unbothered during the trial thalamic explants since no evidence of in-or inter-male variability in rats.

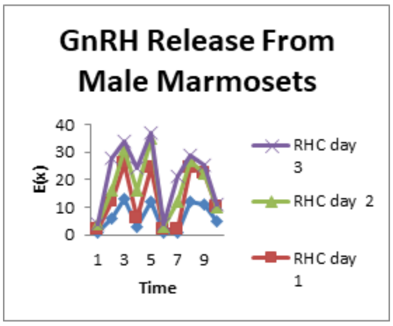


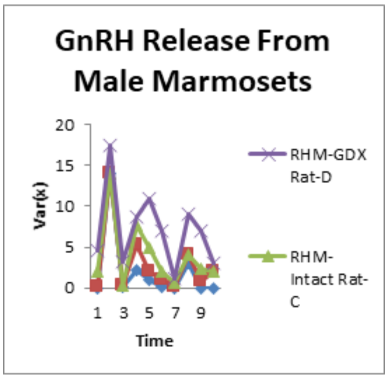


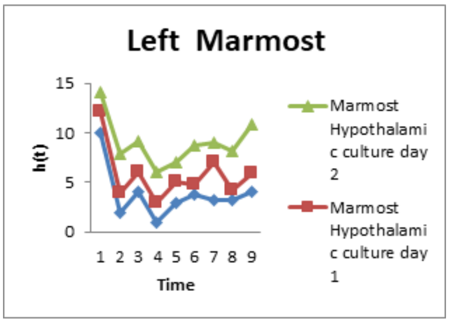


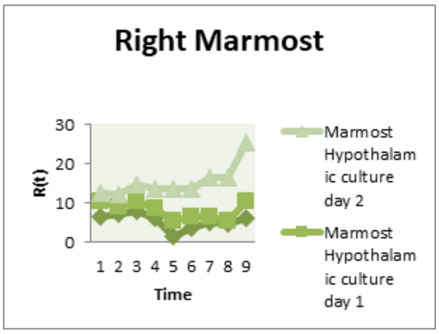


4. Mathematical Results









5. Conclusion

In this research reveals a robust in vitro model for the observation over 3 days of continuous release of GnRH from marmosthypothamic explants. This approach would significantly improve the experimental manipulation of each organism as opposed to the techniques. We are also absorbed by the possible effects of higher stages of despicable GnRH and GnRH pulse largeness linked with both gonadectomised marmosets as opposed to testis-intact marmosets and observations from intact marmosets. Our finding differences with a nonexistence of gonadectomise outcome on the release of GnRH from hypothalamic explants on or after male rats. Ultimately, we conclude that the application part coincides with a mathematical model and the result is linked to the medical report. In the future, this paper will be very beneficial in the medicinal field.

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