A Mathematical Model For Maximum Likelihood Estimation To Atrazine Inhibits Pulsatile Gonadotropin-Releasing Hormone In Animals

R.Kalaiselvi1[a], A.Manickam[b] and Mamta Agrawal [c]

[a] Research Scholar (Full Time),Department of Mathematics, MaruduPandiyar College,(Arts &Science),
(Affiliated to Bharathidasan University, Tiruchirappalli-Vallam Post, Thanjavur–613 403, Tamilnadu, India.
[b,c]School of Advanced Sciences & Languages,Department of Mathematics,
VIT Bhopal University, Kottri Kalan Sehore (District),Madhya Pradesh , India
E-mail: [a] kalairaja1607@gmail.com, [b] manickammaths2011@gmail.com,[c]mamta.agrwal@vitbhopal.ac.in
Corresponding Author: [b] manickammaths2011@gmail.com

Article History: Received: 10 November 2020; Revised 12 January 2021 Accepted: 27 January 2021; Published online: 5 April 2021

Abstract: In this study, we present a Extreme possibility estimation to analyze examine the strong ATR doses can work hypothalamic GnRH inhabiting life unlocks patterns in a style that is exactly the same as seen in the LH secretion. In presentation, inflammatory hormone levels are likely to work in response to GnRH. Finally, we decide that a computational model is based on the submission portion and we result with the medical refort . This paper will be very useful in the future for medical field.
Keywords: GnRH, LH, ATR

---

1. Introduction

In psychosomatic research , reveal general laws and principles that govern the investigated baviour. This principles can not be observed directly, they are hypothetically formulated. Modeling in mathematics, These theories about the structure and internal functioning of the interactive system of importance are defind as model in terms of calculated. Once a model with its parameter is defined, data was collected using specific standards. Two methods are widely accepted estimation of parameters methods. First method least-squares,Second method maximum likelihood .We consider the former as many of the common principles like linear regression, summary of error square, The difference in proportions accounted[2] , and the root mean square variance is correlated with the process. On the other side of course, MLE is not widely recognized psychology modelers[3], though it is, by far, the most frequently used to summarize the experimental data[9], nonetheless, for statistical inference such as template,MLE is more fitting.

2. Maximum Likelihood Method

Let $Y_1,\ldots\ldots Y_n$ be an identically independent test with the density function of the probability x(yi;ϕ), where ϕ is a (m×1) vector of limitations that characterize $x(y_i;\phi)$[8]. if $Y_i \sim M(\Omega,\sigma^2)$ then $f(y_i,\geq\phi) = (2\pi\sigma^2)^{-1/2}\exp(-\frac{1}{2\sigma^2}(x_i-\Omega)^2)$ and $\phi = (\Omega,\sigma^2)'$. Then the joint sample density is equivalent to the sum of the marginal densities by independence.

$x(y_1,\ldots\ldots y_n;\phi) = x(y_1;\phi)\ldots\ldots x(y_n;\phi) = \prod_{i=1}^{n} x(y_i,)$.

Joint density is an m dimensional function of the data $y_1\ldots\ldots,y_n$ given the parameter vector ϕ. The function JDF condition satisfied

$x(y_{1,}\ldots\ldots y_n;\phi) \geq 0$

$\int\ldots\ldots\int x(y_1\ldots\ldots y_n;\phi) = 1.$

likelihood function is defined as follows

$M(\phi/y_1,\ldots\ldots,y_n) = x(y_{1,}\ldots\ldots y_n;\phi) = \prod_{i=1}^{n} x(y_i,\phi)$.

remember that the function of probability is a k dim(ϕ), given the data $y_1,\ldots.y_n$. This is important to remember that the probability works, functioning ϕ and not the data,is not a correct proability density functions.It is must be positive but

$\int$……..$\int$ M(ϕ/y_1……..y_n)dϕ_1………d$\phi_k \neq 1$.

To shorten the notation, we take the vector Y = (y_1,……..y_n) denote the experimental sample. Then combinedp.d.f and likelihood function can then be expressed as x(Y;ϕ) and m(θ/Y).

*E*xample 2.1 Bernoulli Sampling

defined as follows

Let Y_i~Bernoulli(ϕ). That is, Y_i = 1 with probability ϕ and y_i = 0 with probability 1 – ϕ where 0 ≤ϕ≤ 1. The p.d.f for Y_i is y_i

x(y_i;ϕ) = $\theta^{y_i}(1-\phi)^{1-y_i}$, y_i= 0,1

Let Y_1,…..$Y_n$be an identically independent test sample with Y_i~Bernoulli(ϕ).The probability of joint density likelihood function is given by

x(y;θ) = L(ϕ/y) = $\prod_{i=1}^{n}\phi^{y_i}(1-\phi)^{1-y_i} = \phi^{\sum_{i=1}^{n}y_i}(1-\phi)^{n-\sum_{i=1}^{n}y_i}$

For a given value of ϕ and observed sample y, x(y,ϕ) gives the probability of observing the sample. suppose here n=5 and y = (0,…..,0). Now some values of ϕ are more likely to have generated this sample than others. In particular, it is more likely that ϕ is close to zero than one.we note that the likelihood function for this sample is

m(ϕ/(0,…….,0)) = $(1-\phi)^5$

likelihood function has a clear maximum at ϕ = 0. That is, ϕ = 0 is the value of ϕ that makes the practical sample x = (0,……,0) most likely

Correspondingly, suppose y = (1,……..,1). Then the likelihood function is

M(ϕ/(1,……,1)) = ϕ^5

Now the likelihood function has a maximum at ϕ = 1.

Example 2.2 Normal Sampling

Let Y_1,……….,Y_n be an iid sample with Y_i~N(Ω,σ^2). The pdf for Y_i is

x(y_i;ϕ) = $(2\pi\sigma^2)^{-1/2}\exp(-\frac{1}{2\sigma^2}(y_i-\Omega)^2)$, $-\infty<\Omega<\infty, \sigma^2>0, -\infty<x<\infty$

so that ϕ = $(\Omega,\sigma^2)'$.

M(ϕ/y) = $\sum_{i=1}^{n}(2\pi\sigma^2)^{-1/2}\exp(-\frac{1}{2\sigma^2}(y_i-)^2)$, = $(2\pi\sigma^2)^{-n/2}\exp(-\frac{1}{2\sigma^2}\sum_{i=1}^{n}(y_i-\Omega)^2$, suppose σ^2 = 1. Then M(ϕ/y) = L(Ω/y) = $(2\pi)^{-n/2}\exp(-\frac{1}{2}\sum_{i=1}^{n}(y_i-\Omega)^2)$

Now$\sum_{i=1}^{n}(y_i-\Omega)^2 = \sum_{i=1}^{n}(y_i-\bar{y}+\bar{y}-\phi)^2$

$= \sum_{i=1}^{n}[(y_i-\bar{y})^2 + 2(y_i-\bar{y})(y-\bar{\Omega}) + (\bar{x}-\Omega)^2] = \sum_{i=1}^{n}(y_i-\bar{y})^2 + n(\bar{y}-\Omega)^2$, so as to

m(Ω/y) = $(2\pi)^{-n/2}\exp(-\frac{1}{2}[\sum_{i=1}^{n}(y_i-\bar{y})^2 + n(\bar{y}-\Omega)^2])$

Since both $(y_i-\bar{y})^2$ and $(\bar{y}-\Omega)^2$ are confident it is strong that m(Ω/y) is exploited at $\Omega=\bar{y}$.

3. Applications

Atrazine (ATR) is a reference /early postemergence weed hunders in the usually found in the pitches of maize , sorghum and sugarcane , when rats were successful, The luteinzing hormone surge and the release of pulsates have been shown to be ATR[6-8]. ATR draws the LH increase without increasing stimulus resistance of the GnRH neuron[7-8]. We have shown that ATR treatment reduces pulses regularity and increases pulses.

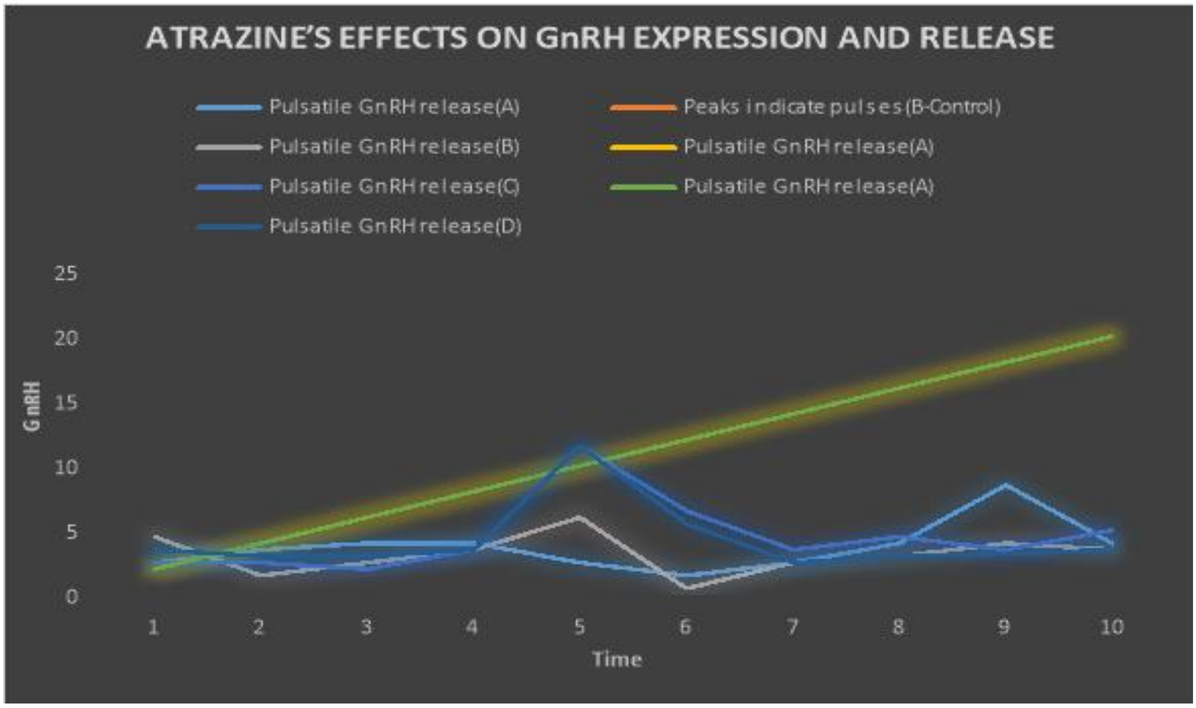
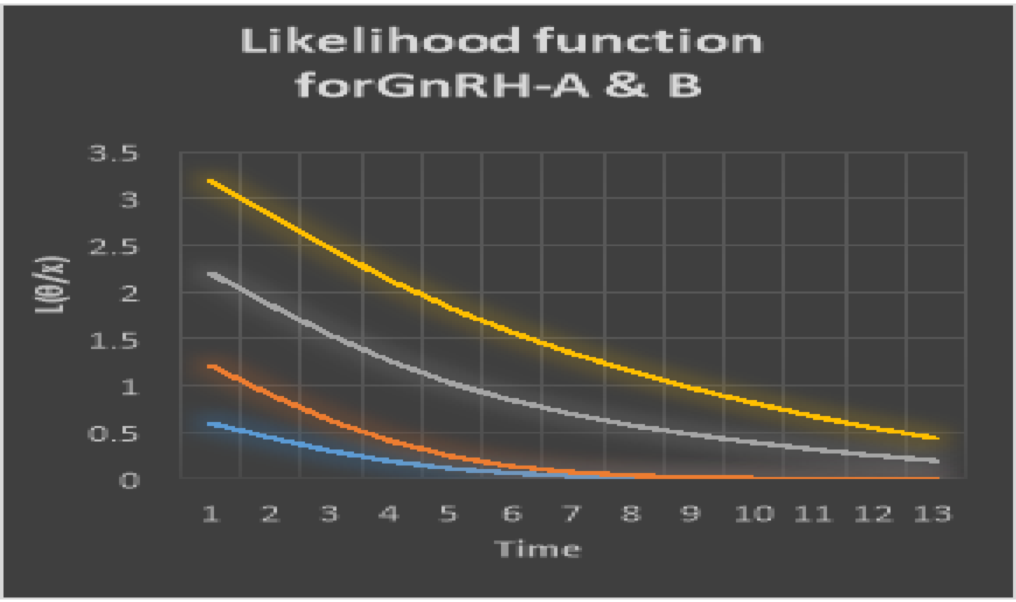


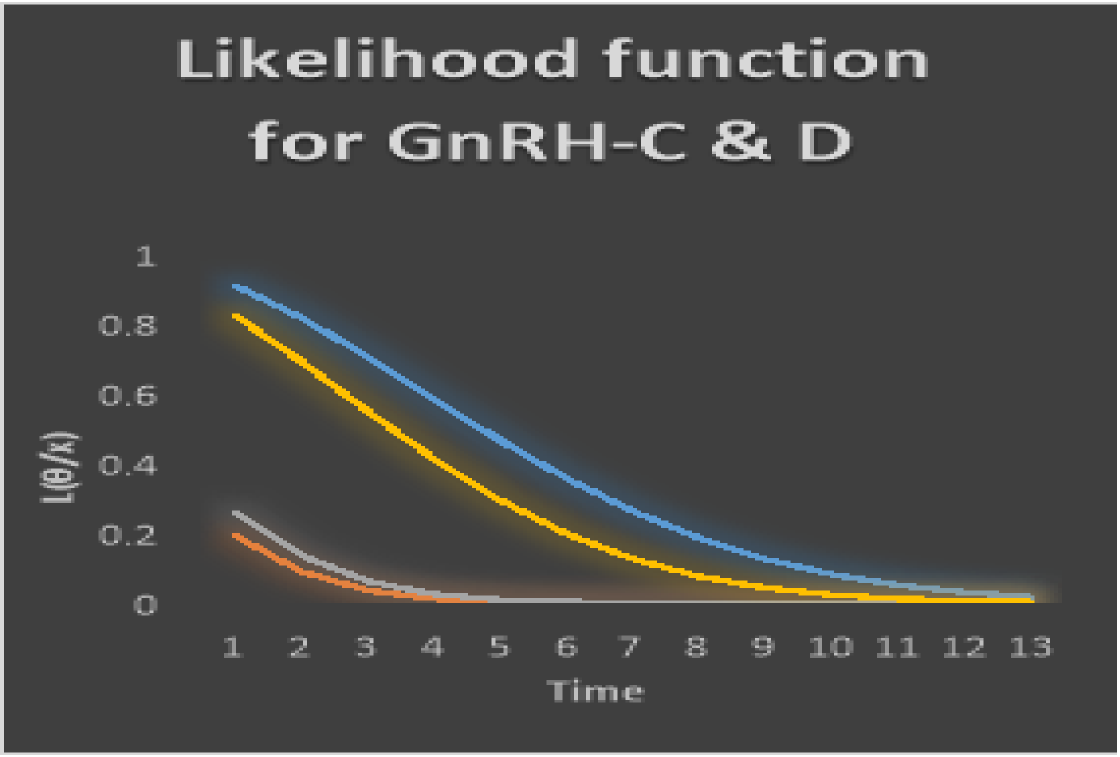
Figure.3.1. Descriptive pulsatile GnRH release from individual hypothalamic explants of four animals with regulated profiles .

Oophorectomized rats were controlled ATR (200mg/kg) or vehicle (1%carboxymethy / sodiumcellose salt through distriputed (500mg) the minute everyday at about 900 h for 4 days. Oophorectomized rats were given daily in the vehicle for 4 days(1% CBC) or previously one of the three doses was found to occupy LH pulse and surge vivo. Representative of line graphs showing pulsate GnRH release from explants of four animals from individual neural structure pattern incontro conserved .

Rats concluded reach its highest point indicate pulses. the total number of recognized cells and GnRH cells are released for each individual . In a sequence of every fourth chapter, the position of gur-immunoreal cells was examined through the poa and hypothalamus of each species. The mechanism ATR uses to activate and relief GNRH. A number of epinephrine and ATR has reportedly altered neuropeptides elaborate in GNRH release . ATR has been testified to be epinephrine content and density in masculine and feminine rats. Hypothalamic ATR has been shown to decrease the amount and density of norepinephrine. Then to growthmonomine or take no outcome on the hypothalamus neurotransmitter stages. If ATR works to release pulsalitethrough one these upriver GnRH activity temperatures remains unclear or , works on GnRH neuron directly.

4. Mathematical Results:





5. Conclusion:

Maximumparameter Estimation method is by far the most comman and is an essential device for many numerical showing methods,Especially when modelling non-linear through non-normal statistics[4]. The perseverance of this research article is to afford a good illustrative examples to good throretical explanations of the method. In application, the probability function of inflammatory hormone levels in response to GnRH is part of normal distribution. Finally, we conclude that a mathematical model is coinciding with application part and conclusion is compared with medical report. This paper will be very useful for medical field in future.

6.Acknowledgements

The authors would like to thank the National Institute of Medical Science, IISC Bangalore for the use of ANSYS software

Conflict of Interests

The authors declare that there is no conflict of interests.

References

Bain L.J., Statistical Analysis of Reliability and life testing models, Marcel Dekker, NewYork, 1978
Belchetz PE, Plant TM, Nakai Y Keogh EJ, Knobil E,Hypophysialresponse to continuous and intermittent delivery of hypothalamic gonadrotropin-releasing hormone. Science 1978;202:631-633.
Cohen, A.C., Jr., Tables for Maximum likelihood estimatessingly truncated and single censored Samples, Technimetrics, 3:535-541(1961).
Consul PC, Shenton LR, Some interesting properties of Lagrangiandistributions. Comm. Stat.Theory. Meth: 2, 3, 263 – 272, 1973.
CooperTE, Tyrey L, Goldman JM, McElroy WK. Atrazine disrupts the hypothalamic control of pituitary-ovarian function.Toxicolsci2000;53:297-307
Foradori CD, Hinds LR, Hannda RJ. Efforts of atrazine and its withdrawl ongonadotropin-releasing hormoneneuroendocrine function in the adult female Wister rat, BiolRepord 2009;81:1009-1105.
Hinds LR, Hanneman WH, Clay CM, Handa RJ. Atrazine inhabits pulsatileluteinizing hormone releasing without altering pituitary sensitivity to a GnRH receptor agonist in female WISTER rats.BiolRepord 2009; 81:40-45.
Lopez FJ, Merchenthaler IJ, Moretto M, Negro-vilarA. Modulating mechanisms of neuroendocrine cell activity: the LHRH pulse generator. Cell MolNeurobiol 1998; 18:125-[7]. Foradori 146.
Levine JE, Chappell P, Bauer-Dantion AC, Wolfe AM, Porkka-Heiskanan T, Urban JH. Amplitude and frequency modulation of pulsalite luteinizing hormone-releasing hormone release. Cell MolNeurobiol 1995;

15:117-139.
Le Cam, Lucien; Lo Yang, Grace (2000). Asymptotic in Statistics: Some Basic Concepts (Second.). Springer. ISBN 0-387-95036-2.
Pfanzagl, Johann (1994). Parametric statistical theory. With the assistance of R.   Ham booker. Berlin, DE: Walter de Gruyter. RL, Stokerpp. 207–208 ISBN 3-11-013863-8.