บรรณานุกรม

Abraham, G.E., "Ovarian and Adrenal Contribution to Peripheral Androgens during the Menstrual Cycle," J. Clin Endocrinol Metab, 39 340-346, 1974.

Aedo, A.R., M Nunez, B.M. Landren, S.Z. Cekan, and E. Diczfalusy, " Studies on the Pattern of Circulating Steroids in the Normal Menstrual Cycle," Acta Endocrinol, 84, 320-332, 1977.

Anderson, D.C., "A Simple and Clinically Useful Method for Plasma Testosterone like Substances by Competitive Protein Binding," Clin Chim Acta, 29, 513-522, 1970.

Anderson, D.C., "Sex Hormone Binding Globulin," Clin Endocrinol, 3, 69-96, 1974.

Anderson, D.C., B.L. Lasley, R.A. Fisher, J.H. Shepherd, L. Newman, and A.G. Hendrickx, "Transplacental Gradients of Sex Hormone Binding Globulin in Human and Simian Pregnancy," Clin Endocrinol, 5, 657-669, 1976.

August, G.P., M. Tkaehuk, and M.M. Grumbach, "Plasma Testosterone Binding Affinity and Testosterone in Umbilical Cord Plasma, Late Pregnancy, Prepubertal Children and Adults," J. Clin Endocrinol Metab, 29, 891-899, 1969.

Bardin, C.W., and M.B. Lipsett, "Testosteone and Androstenedione Blood Production Rates in Normal Women and Women with Idiopathic Hirsutism or Polycystic Ovaries," J. Clin Invest, 46, 891-902, 1967.

Baulieu, E.E., J.P. Raynaud, and E. Milgrom, "Measurement of Steroid Binding Proteins," Acta Endocrinol Suppl. 64, 143-148, 1970.

Bolufer, P., P. Antonio, R. Garcia, J. Munoz, A. Rodringuez, and A. Romeu, "Role of the Ovary in the Regulation of Sex Hormone Binding Globulin and Its Contribution to Peripheral Levels of Androstenedione," Exp. Clin. Endocrinol, 82(1), 29-34, 1983.

Burry, K.A., T. Tabei, J. Resko, P.H. Petra, and W.L. Heinrichs, "Differentiation of sex Steroid Binding Protein in Adult Rhesus Monkeys," Am. J. Obstet Gynecol, 136, 446-450, 1980.

Caputo, M.J., and T.A. Hosty, "The Presence of Sex Binding Globulin in Ammiotic Fluid," Am. J. Obstet Gynecol, 113, 804-811, 1972.

Cekan, S.Z., U. Segersteen, and M. Jia, "A Simple, But Reliable Assay of Sex Hormone Binding Globulin," Analytical Letters, 18(B3), 287-298, 1985.

Cerutti, R., P. Gibin, T. Fede, B. Mozzanega, and D. Marchesoni, "SHBG Pattern during the Menstrual Cycle," Clin. Exp. Obst. Gyn. XI (1-2), 60-63, 1984.

Corvol, P., and C.W. Bardin, "Species Distribution of Testosterone Binding Globulin," Biology of Reproduction 8, 277-282, 1973.

Corvol, P.L., A. Chrambach, D. Rodbard, and C.W. Bardin, "Physical Properties and Binding Capacity of Testosterone Estradiol Binding Globulin in Human Plasma, Determined by Polyacrylamide Gel Electrophoresis," J. Biol. Chem, 246(11), 3435-3443, 1971.

Cunningham, S.K., T. Loughlin, M. Culliton, and T.J. Mc. Kenna, "The Relationship between Sex Steroids and Sex Hormone Binding Globulin in Plasma in Physiological and Pathological Conditions," Ann. Clin. Biochem, 22, 489-497, 1985.

Dalton, M.E., "The Effect of Progesterone Administration on Sex Hormone Binding Globulin Binding Capacity in Women with Severe Premenstrual Syndrome," J. steroid Biochem, 20(1), 437-439, 1984.

De Moor, P., O. Steeno, W. Heyns, and H. Van Baelen, "The Steroid Binding β-Globulin in Plasma Pathophysiological Data," Ann. Endocrinol, 30, 233-239, 1969.

Dowsett, M., S.L. Attree, S.S. Virdee, and S.L. Jeffcoate, "Oestrogen Related Changes in Sex Hormone Binding Globulin Levels during Normal and Gonadotrophin Stimulated Menstrual cycle," Clin. Endocrinol, 23, 303-312, 1985.

Dukelow, W.R., and S. Bruggemann, "Charateristics of the Menstrual Cycle in Nonhuman PrimatesII Ovulation and Optimal Mating Times in Macaques," J. Med. Primatol, 8, 79-87, 1979

Eik-Nes, K., J.A. Schellman, R.Lumry, and L.T.Samuels, "Binding of Steroids to Protein. I. Solubility Determinations," J.Biol. Chem, 206, 411-419,1954.

Ekins, R.P., "Theoretical Aspects of Saturation Analysis," In Vitro Procedures with Radioisotopes in Medicine, pp 325, International Atomic Energy Agency, Vienna, 1970.

Ekins, R.P., and J.A. Albano, "The Attainment of High Sensitivity and Precision in Radioimmunoassay Techniques as Exemplified in a Simple Assay of Serum Insulin," In Vitro Procedures with Radioisotopes in Medicine, pp 491, International Atomic Energy Agency, Vienna, 1970.

Fahraeus, L., and U. Larsson-cohn, "Oestrogens, Gonadotrophins and SHBG during Oral and Cutaneous Administration of Oestradiol-17β to Menopausal Women," Acta Endocrinol, 101, 592-596, 1982.

Forest, M.C., and J. Bertrand, "Studies of the Protein Binding of Dihydrotestosterone (17β -hydroxy-5α-androstan-3-one) in Human Plasma (in Different Physiological Condition and Effect of Medroxyproges terone)," Steroids, 19, 197-214, 1972.

Forest, M.G., M.A. Rivarola, and C.J. Migeon, "Percentage Binding of Testosterone, Androstenedione and Dihydrotestosterone in Human Plasma," Steroids, 12, 323-343, 1968.

Gauthier-Wright, F., N. Baudot, and P. Manvais-Jarvis, "Testosterone Binding Globulin in Stump Tailed Macaque Monkeys (Macaca speciosa), "Endocrinology, 93, 1277-1286, 1973.

Gueriguian, J.L., and W.H. Pearlman, "Some Properties of a Testosterone Binding Component of Human Pregnancy Serum, "J.Biol Chem, 243, 5226-5233, 1968.

Hansson, V., J. Larsen, and E. Reusch, "Physiochemical Properties of the 5α-Dihydrotestosterone Binding Protein in Human Male Serum," Steroids, 20(5), 555-574, 1972.

Heyns, W., and P. De Moor, "The Binding of 17β Hydroxy-5α Androstan-3-one to the Steroid Binding β-Globulin in Human Plasma, as Studied by Means of Ammonium Sulphate Precipitation," Steroids, 18, 709-730, 1971.

Hodges, J.K., S.A.K. Eastman, and N., Jenkins, "Sex Steroids and their Relationship to Binding Proteins in the Serum of the Marmoset Monkey (Callithrix jacchus)," J. Endocrinol, 96, 443-450, 1983.

Hotchkiss, J., "Changes in Sex Hormone Binding Globulin Binding Capacity and Percent Free Estradiol during Development in the Female Rhesus Monkey (Macaca mulatta) : Relation to the Metabolic Clearance Rate of Estradiol," J. Clin Endocrinol Metab, 60, 786-792, 1985.

Kato, T, and R. Horton, "Studies of Testosterone Binding Globulin," J. Clin Endocrinol Metab, 28, 1160-1168, 1968.

Khan, M.S., B.B. Knowles, D.P. Aden, and W. Rosner, "Secretion of Testosterone Estradiol Binding by a Human Hepatoma-Derived Cell Line," J. Clin Endocrinol Metab, 53,448-449, 1981.

Kim, M.H., R.L. Rosenfield, and C. Dupon, "The Effects of Dexamethasone on Plasma Free Androgens during the Normal Menstrual Cycle," Am. J. Obstet. Gynecol, 126, 982-986, 1976.

Koritnik, D.R., and K.B. Marschke, "Sex Steroid Hormone Binding Globulin Levels and Free 17 β-Estradiol and Testosterone in Cynomolgus Monkeys during Different Reproductive Status," J.Steroid Biochem, 25(1), 135-141, 1986.

Lee, I.R., L.E. Lawder, D.C. Townend, J.D. Wetherall, and R. Hahnel, "Plasma Sex Hormone Binding Globulin Concentration and Binding Capacity in Children before and during Puberty," Acta Endocrinol, 109, 276-280, 1985.

Lutz, R.A., L. Lutz-Ewan, and H.G. Weder, "Further Studies on the Temperature Dependence of the Binding of Testosterone to Human Pregnancy Plasma Proteins", Steroids, 21, 423-431, 1973.

Mauvais-Jarvis, P., O. Crepy, and J.P. Bercovici, "Futher Studies on the Pathophysiology of Testicular Feminization Syndrom," J. Clin Endocrinol Metab, 32, 568-571, 1971.

Mc. Cormack, S.A., "Plasma Testosterone Concentration and Binding in the Chimpanzee, Effect of Age", Endocrinology, 89, 1171-1177, 1971.

Mercier-Bodard, C., A. Alfsen, and E.E. Baulieu, "Androgen in Normal and Pathological Conditions", Excepta Medica Foundation, 101, 212, 1966.

Mercier-Bodard, C., A. Alfsen, and E.E. Baulieu, "_____", C.R. Acad. Sci. (Paris), 264, 122-124, 1967.

Mercier-Bodard, C., A. Alfsen, and E.E. Baulieu, "Sex Steroid Binding Plasma Protein (SBP)," Acta Endocrinol Suppl, 64, 204-221, 1970.

Motohashi, T., C.H. Wu, H.A. Abdel Rahman, N. Marymor, and G. Mikhall, "Estrogen Androgen Balance in Health and Disease," Am. J. Obstet Gynecol, 135, 89-95, 1979.

Murray, M.A.F., D.C. Anderson, J.H.J. Bangroft, T.G. Tennant and P.J. Carr, "Sex Hormone Binding Globulin, Luteinizing Hormone and Testosterone in Man : Effects of Oestrogen and Cyproterone Acetate". J. Endocrinol (Proceedings), 59 : XXI (Abstract), 1973.

Murrphy, B.E.P., "Further Studies of the Specificity of the Sex Hormone Binding Globulin of Human Plasma," Steroids, 16,791-798, 1970

O'Connor, S., H.W.G. Baker, A. Dulmanis, and B.H. Hudson, "The Measurement of Sex Steroid Binding Globulin by Differential Ammonium Sulfate Pricipitation", J. Steroid Biochem, 4, 331-339, 1973.

Odlind, V.,K. Elamsson, D.E. England, A. Victor, and E.D.B. Johansson, "Effects of Oestradiol on Sex Hormone Binding Globulin," Acta Endocrinol, 101, 248-253, 1982.

Pardridge, W.M., "Transport of Protein-Bound Hormones into Tissues in Vivo," Endocrine Review, 2(1), 103-123, 1981.

Pearlman, W.H., and O. Crepy, "Steroid Protein Interaction with Particular Reference to Testosterone Binding by Human Serum," J. Biol Chem, 242(2), 182-189, 1967.

Pearlman, W.H. O. Crepy, and M. Murphy, "Testesterone Binding Levels in the Serum of Women during the Normal Menstrual Cycle, Pregnancy, and the Post-partum Period," J. Clin Endocrinol Metab, 27, 1012-1018, 1967.

Petra, P.H., "The Serum Sex Steroid Binding Protein Purification Characterization and Immunological Properties of the Human and Rabbit Proteins," J. Steroid biochem, 11, 245-252, 1979.

Petra, P.H., S. Kumar, R. Hayes, L.H. Ericsson, and K. Titani, "Molecular Organization of the Sex Steroid binding Protein (SBP) of Human Plasma," J. Steroid Biochem, 24(1), 45-49, 1986.

Petra, P.H., and H.S. Schiller, "Sex Steroid Binding Protein in the Plasma of Macaca nemestrina," J. Steroid Biochem, 8, 655-661, 1977.

Philip, A., and B.E.P. Murphy, "Does sex Hormone binding Globulin Play a Role in the Transport of Estradiol in Vivo," Am. J. Obstet Gynecol, 148, 643-648, 1984.

Plymate, S.R., D.E. Moore, C.Y. Cheng, C.W. Bardin, M.B. Southworth, and M.J. Levinski, "Sex Hormone Binding Globulin Changes during the Menstrual Cycle", J. Clin Endocrinol Metab, 61, 993-996, 1985.

Ratajczak, T., E.M. Manoca, and R. Hahnel., "Determination of SHBG Bound Sex Hormones by Selective Ammonium Sulphate Precipitation," Clin. Chim. Acta, 110, 327-334, 1981.

Rosenbaum, W., N.P. Christy, and W.G. Kelly, "Electrophoretic Evidence for the Presence of an Estrogen-Binding β-globulin in Human Plasma," J. Clin Endocrinol Metab, 26, 1399-1403, 1966.

Rosenfield, R.L., " Plasma Testosterone Binding Globulin and Indexes of the Concentration of Unbound Plasma Androgens in Normal and Hirsute Subjects", J. Clin Endocrinol Metab, 32, 717-728, 1971.

Rosenfield, R.L., A.M. Lawrence., S. Liao, and R.L. Landau, "Androgen and Androgen Responsiveness in the Feminizing Testis Syndrome. Comparison of Complete and "Incomplete" Forms," J. Clin Endocrinol Metab, 32, 625-630, 1971.

Rosner, W., "A Simplified Method for the quantitative Determination of Testosterone Estradiol Binding Globulin Activity in Human Plasma," J. Clin Endocrinol Metab, 34, 983-988, 1972.

Rosner, W., R.A. Darmstadt, "Demonstration and Partial Characterization of a Rabbit Serum Protein which Binds Testosterone and Dihydrotestosterone," Endocrinology, 92, 1700-1707, 1973.

Rosner, W., and S.M. Deakins, "Testosterone Binding Globulin in Human Plasma : Studies on Sex Distribution and Specificity," J. Clin Invest, 47, 2109-2116, 1968.

Rosner, W., and R.N. Smith, "Isolation and Characterization of the Testosterone Estradiol Binding Globulin from Human Plasma. Use of a Novel Affinity Column" Biochemistry, 14, 4813-4820, 1975.

Rosner, W., N.P. Christy, and W.G. Kelly, "Partial Purification and Preliminary Characterization of Estrogen-Binding Globulin from Human Plasma," Biochemistry, 8, 3100-3108, 1969.

Rudd, B.T., N.M. Duignan, and D.R. London, "A Rapid Method for the Measurement of Sex Hormone Binging Globulin Capacity of Sera," Clin. Chim Acta, 55, 165-178, 1974.

Shanbhag, V.P., R. Sodergard, H. Carstersen, and P.A. Albertsson, "A New Method for the Determination of the Binding Capacity of Testosterone Estradiol Binding Globulin in Human Plasma," J. Steroid Biochem, 4, 537-550, 1973.

Solomon, M., M. Iqbal, M. Dalton, S.L. Jeffcoate, and J. Ginsburg, "Sex Hormone Binding Globulin : An Additional Test for Ovulatory Function," Lancet, 5, 984, 1979.

Steeno, O., W. Heyns, H. Van Baelen, and P. De Moor, "Testosterone Binding in Human Plasma", Ann. Endocrinol, 29, 144-148, 1968.

Sufi, S., A. Donaldson, and S.L. Jeffcoate, WHO Method Mannual for RIA, 10th ed, 1986.

Tabei, T., K.E. Mickelson, S. Neuhaus, and P.H. Petra, "Sex Steroid Binding Protein (SBP) in Dog Plasma," J. Steroid Biochem, 9, 983-988, 1978.

Tangpraprutigul, P., and P. Varavudhi, "Lack of Breeding Seasonality in the Macaca fascicularis Studies in Bangkok Environment, J. Steroid Biochem, 17, xci, 1982.

Tavernetti, R.R., W. Rosenbaum, W.G. Kelly, N.P. Christy, and M.S. Roginsky, "Evidence for the Presence in Human Plasma of an Estrogen Binding Factor other than Albumin : Abnormal Binding of Estradiol in Men with Hepatic cirrhosis," J. Clin Endocrinol Metab, 27, 920-926, 1967.

Tochimoto, S., J. Olivo, A.L. Southren, and G.G. Gordon, "Studies of Plasma β-Globulin : Sex Difference and Effect of Ethinyl Estradiol and Testosterone," Proc. Soc. Exp. Biol. Med, 134, 700-702, 1970.

Tulchinsky, D., and I.J. Chopra, "Competitive Ligand Binding Assay for Measurement of Sex Hormone Binding Globulin (SHBG)," J. Clin Endocrinol Metab, 37, 873-881, 1973.

Van Baelen, H., W. Heyns, and P. De Moor, "Microheterogeneity of the Testosterone Binding Globulin of Human Pregnancy Serum Demonstrated by Isoelectric Focusing", Ann. Endocrinol, 30, 199-203, 1969.

Van Baelen, H., W. Heyns, E. Schonne, and P. de Moor, "An Estradiol Binding Globulin in Human Serum Partial Purification," Ann. Endocrinol, 29, 153-158, 1968.

Varavudhi, P., P. Tangpraprutigul, V. Yodyingyuad, and P. Lamsa-ad, "Regulation of Corpus Luteum Function in Tupaia glis and Macaca fascicularis," JAFES, 2(2), 91-102, 1982.

Vermeulen, A., T. Stoica, and L. Verdonck., "The Apparent Free Testosterone Concentration, and Index of Androgeneity," J. Clin Endocrinol Metab, 33, 759-767, 1971.

Vermeulen, A., and L. Verdonck, "Studies on the Binding of Testosterone to Human Plasma," Steroids, 11, 609-635, 1968.

Vermeulen, A., L. Verdonck, M.V. Straeten, and N. Orie, "Capacity of Testosterone-Binging Globulin in Human Plasma and Influence of Specific Binding of Testosterone on Its Metabolic Clearance Rate," J. Clin Endocrinol Metab, 29, 1470-1480, 1969.

Weick, R.F., D.J. Dierschke, F.J. Karsch, W.R. Butler, J. Hotchkiss, and E. Knobil "Peri Ovulatory Time Courses of Circulating Gonadotropic and Ovarian Hormones in the Rhesus Monkey" Endocrinology, 93, 1140-1147, 1973.

Wu, C.H., T. Motohashi, H.A. Abdel-Rohman, G.L. Flickinger, and G. Mikhail, "Free and Protein bound Plasma Estradiol-17β during Menstrual Cycle," J. Clin Endocrinol Metab, 43, 436-444, 1976.

ภาคผนวก

วิธีการคำนวณหาปริมาณ SHBG

1. นำค่า cpm ของ free form ที่ได้จากหลอดทดลองซึ่งทำการทดลองแบบ duplicate จากลิง # 23 วันที่ 30 ของรอบประจำเดือนมาทำการคำนวณ
2. นำค่า cpm ทั้ง 2 ค่ามาคูณด้วย 2 เนื่องจากปริมาตรทั้งหมดใน assay tube เท่ากับ 1 มล. แต่นำไปตรวจวัดปริมาณรังสีเพียง 0.5 มล.

ตารางที่ 9 ขั้นตอนการคำนวณหาปริมาณ sex hormone binding globulin

หลอดทดลอง	ความเข้มข้นของสารมาตรฐาน	cpm		F	B (T-F)	B/F	Bt (B/Txconc)	Free (B/Txconc)	Bn.s (Free x 0.13)
		1	2						
T_c	-	16488	16208	32696					
1	413.22	14066	14752	28818	3878	0.13	NSB		
2	5.51	5404	4992	10396	22300	2.15	3.76	1.75	0.23
3	2.755	2480	2732	5212	17484	5.27	2.31	0.44	0.06
4	1.377	1562	1676	3238	29458	9.10	1.24	0.14	0.02
5	0.689	1374	1382	2756	29940	10.86	0.63	0.06	0.00

3. นำค่าที่ได้ในตารางที่ 9 มาสร้าง Scatchard plot โดยคำนวณค่า X และ Y ตามตารางที่ 10

ตารางที่ 10 การคำนวณหาค่า X และ Y

ลำดับที่	Bsp Bt-Bns (ค่า X)	Bsp/Free (ค่า Y)
1	3.53	2.02
2	2.25	5.11
3	1.22	8.71
4	0.63	10.5

หมายเหตุ cpm = ค่า count per minute

F = ค่า free form

B = ค่า bound form

Bt = total bound ของสารมาตรฐาน

Free = ค่า free form ของสารมาตรฐาน

Bns = ค่า bound non specific

Bsp = ค่า bound specific

4. นำค่า x และ y จากตารางที่ 10 มาสร้างกราฟเส้นตรง (Scatchard plot) โดยใช้สมการ regression ดังแสดงตามรูปที่ 7

Regression equation $y = 12.13 - 2.95x$

ค่า $r = 0.99$

ปริมาณ SHBG = ระยะที่เส้น Scatchard plot ตัดแกน x คูณด้วย dilution ของซีรัมตัวอย่างซึ่งมีค่า final dilution = 40

ปริมาณ SHBG $= 4.1 \times 40$

$= 164$ nmol/L

5. หาค่า associate constant ได้จาก slope ของเส้น scatchard plot

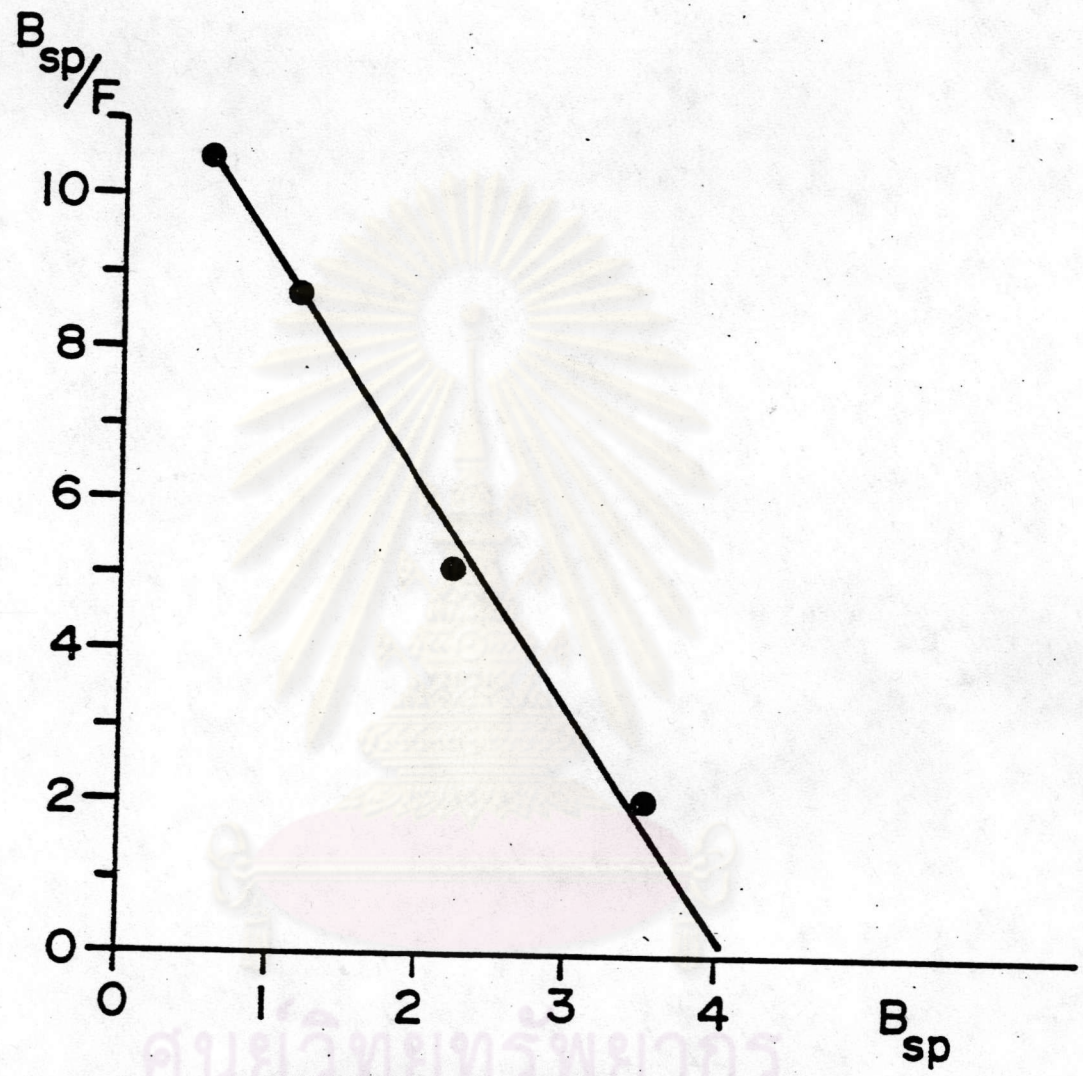
$$b = \frac{\sum xy - n\bar{x}\bar{y}}{\sum x_1^2 - n\bar{x}^2}$$

$$b = \frac{35.8693 - (4 \times 1.907 \times 6.585)}{19.34 - 4 \times (1.907)^2}$$

$$= \frac{35.8693 - 50.16}{4.66}$$

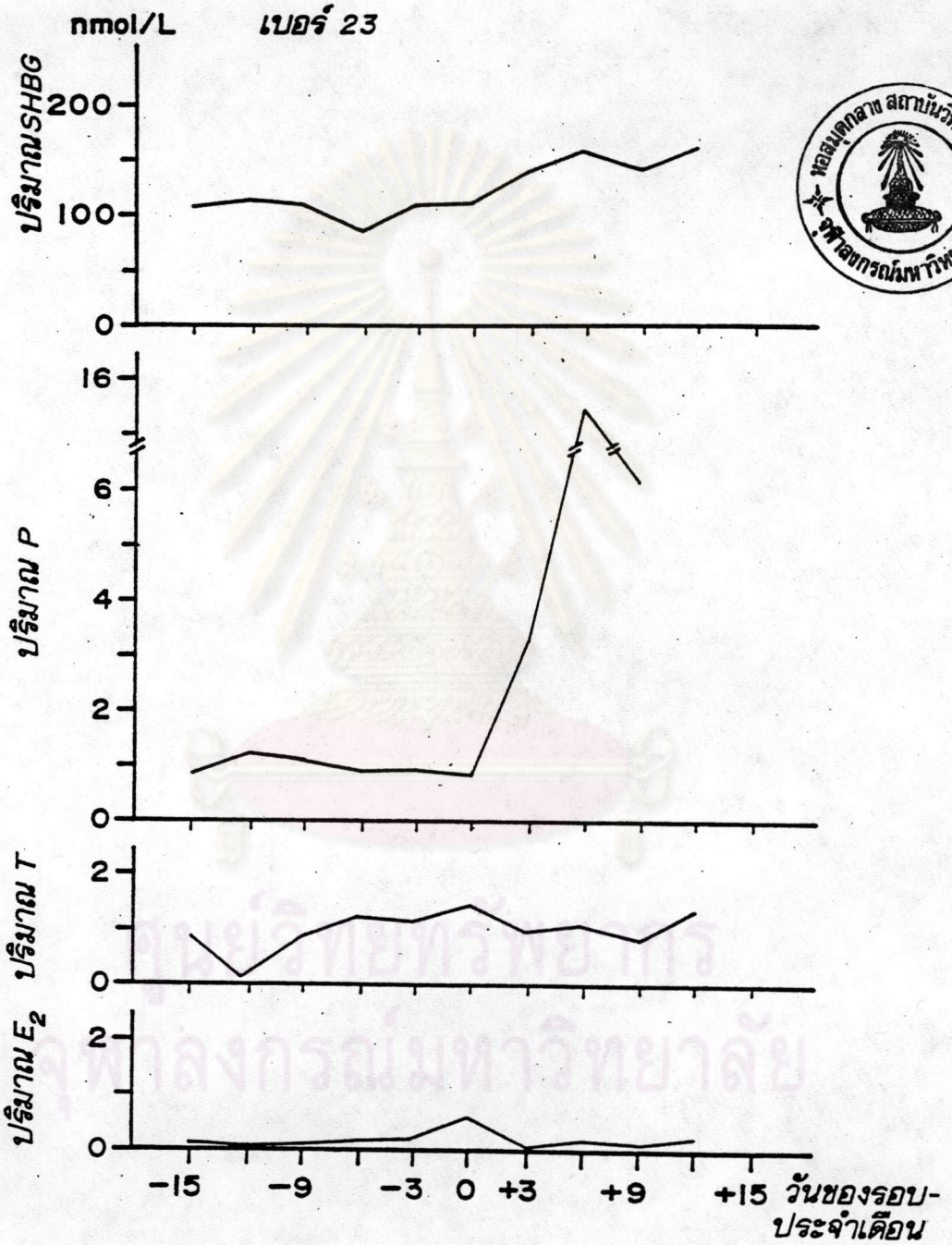
$$= -3.06$$

ค่า associate constant ที่ได้ คือ $3.06 \times 10^9\ M^{-1}$

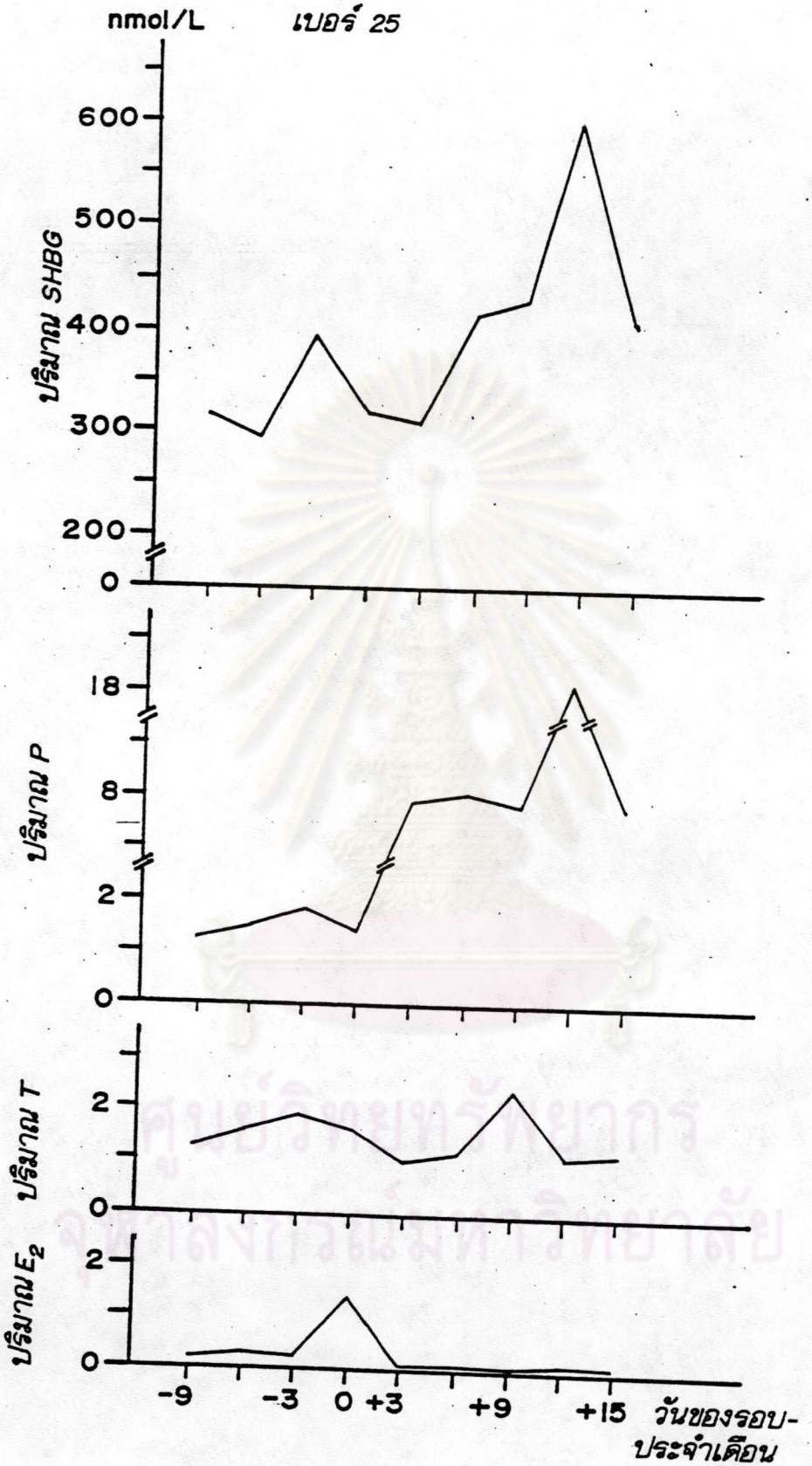


รูปที่ 7. แสดงการสร้าง SCATCHARD PLOT

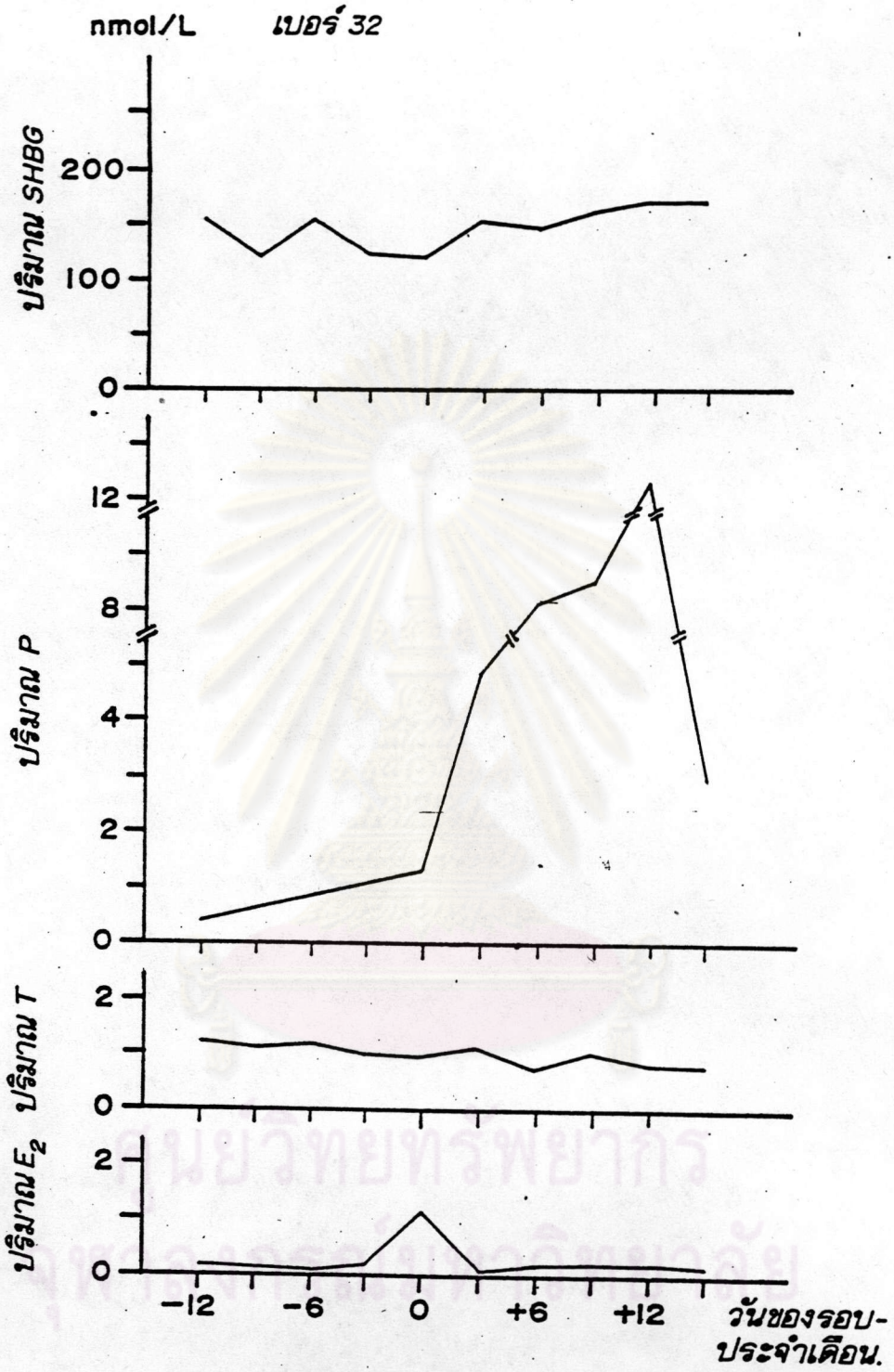
รูปที่ 8-16. แสดงปริมาณ SHBG, P, T และ E_2 ในระหว่างรอบ-ประจำเดือนของลิงหางยาวเพศเมียที่โตเต็มวัยแต่ละตัว.



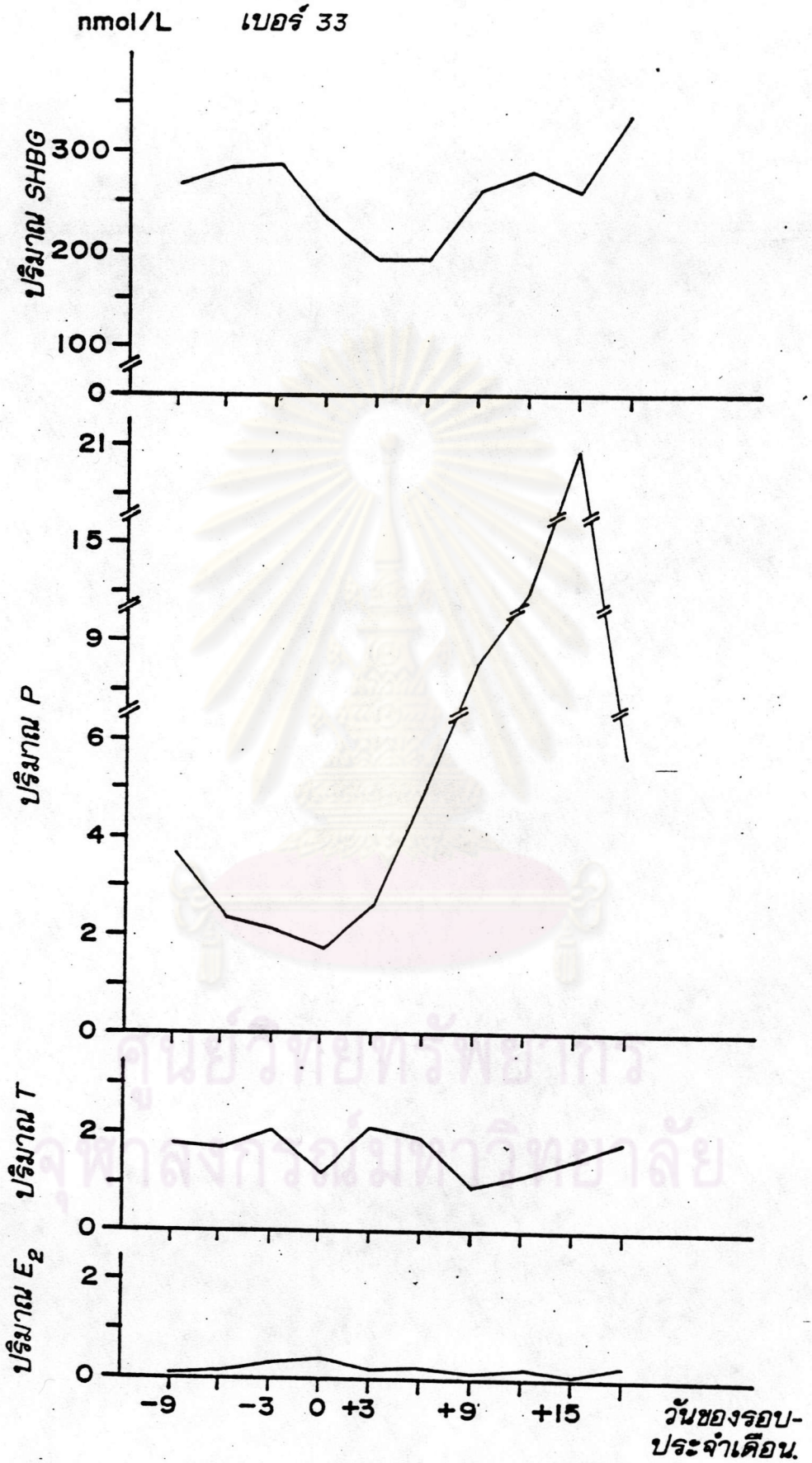
รูปที่ 8.


nmol/L
เบอร์ 25
ปริมาณ SHBG
600
500
400
300
200
0
ปริมาณ P
18
8
2
0
ปริมาณ T
2
0
ปริมาณ E_2
2
0
-9
-3
0
+3
+9
+15
วันของรอบ-
ประจำเดือน

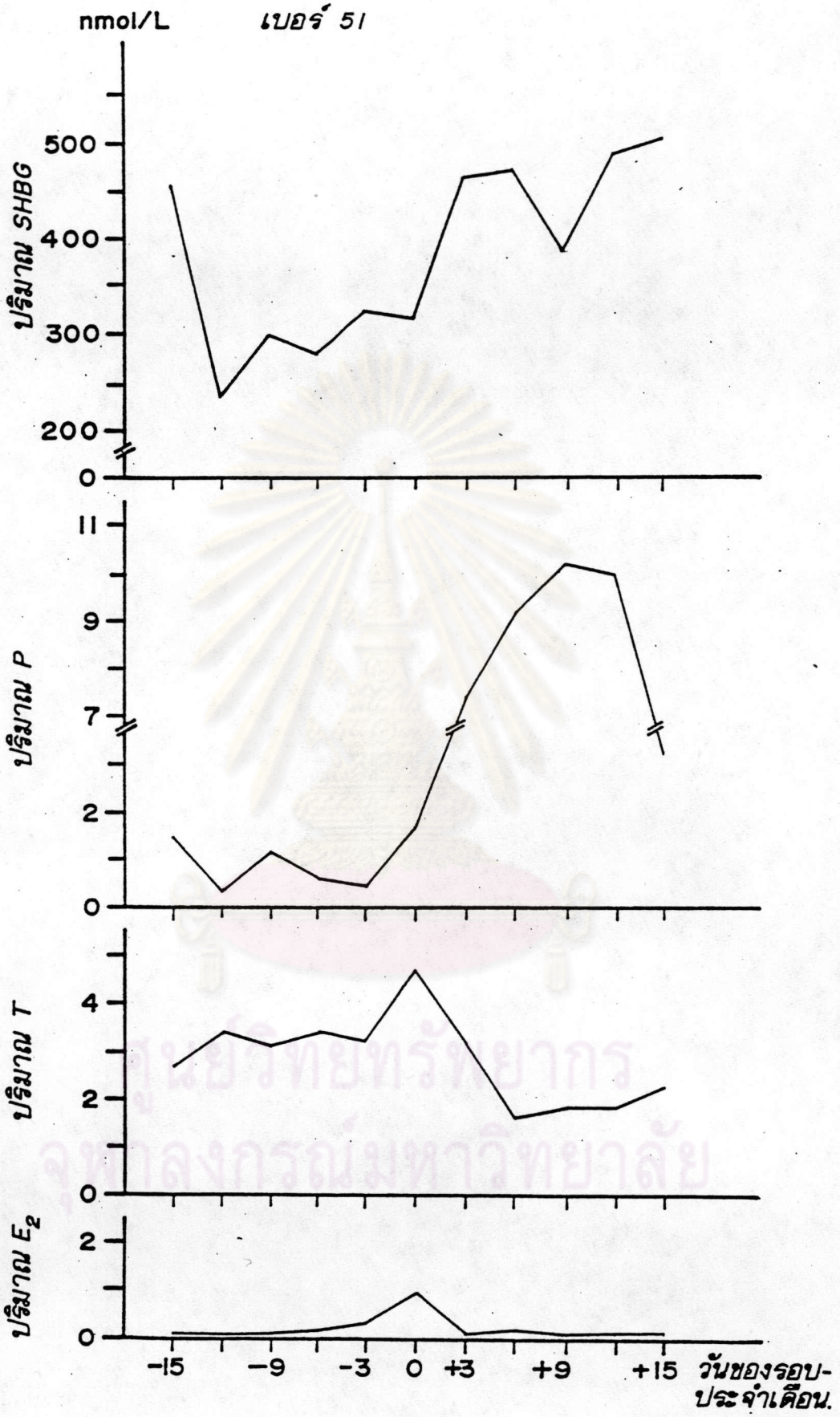
รูปที่ 9.


nmol/L
เบอร์ 32
ปริมาณ SHBG
200
100
0
ปริมาณ P
12
8
4
2
0
ปริมาณ T
2
0
ปริมาณ E_2
2
0
-12
-6
0
+6
+12
วันของรอบ-
ประจำเดือน.

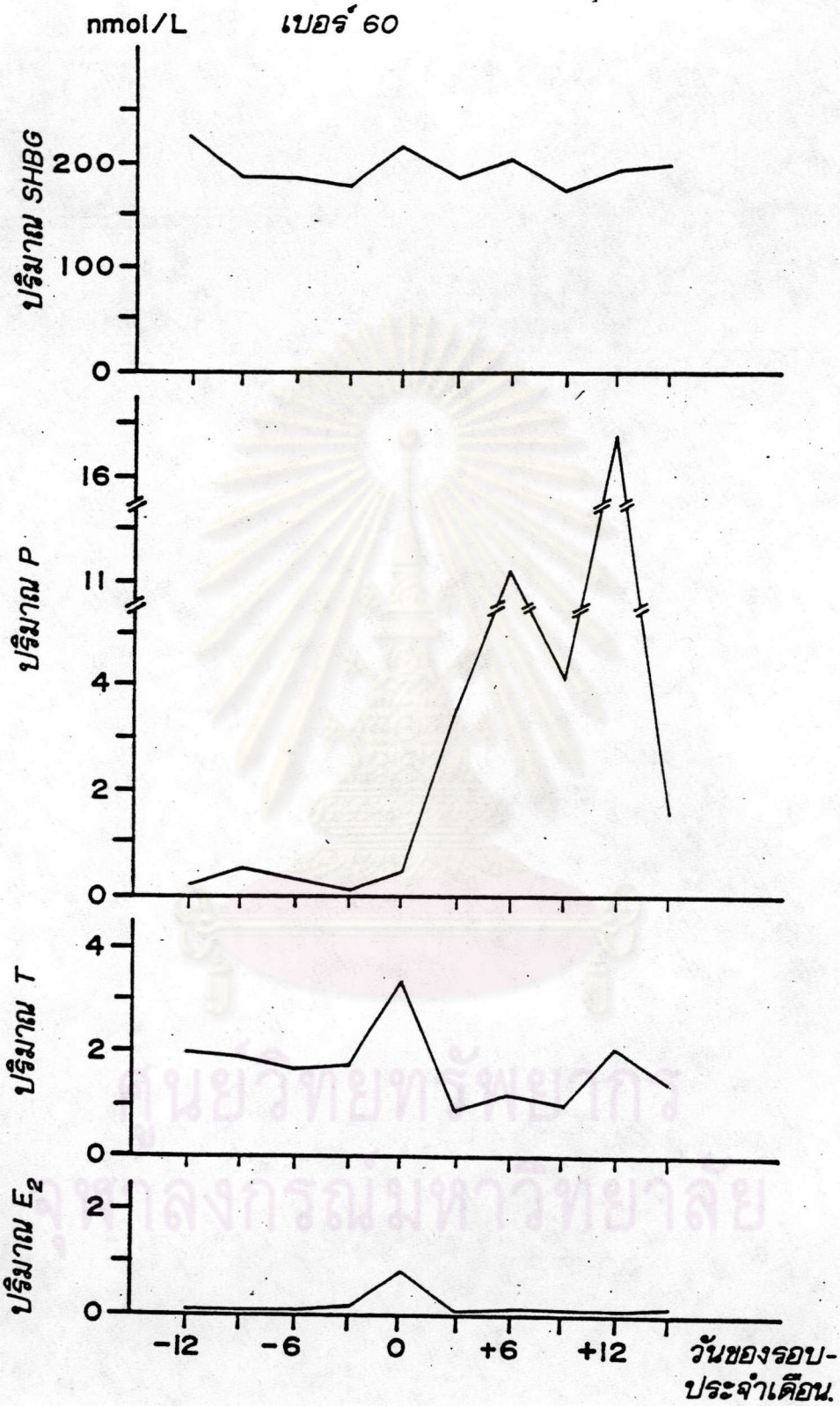
รูปที่ 10.


nmol/L
เบอร์ 33
ปริมาณ SHBG
300
200
100
0
21
15
9
6
4
2
0
ปริมาณ P
ปริมาณ T
2
0
ปริมาณ E_2
2
0
-9
-3
0
+3
+9
+15
วันของรอบ-
ประจำเดือน.

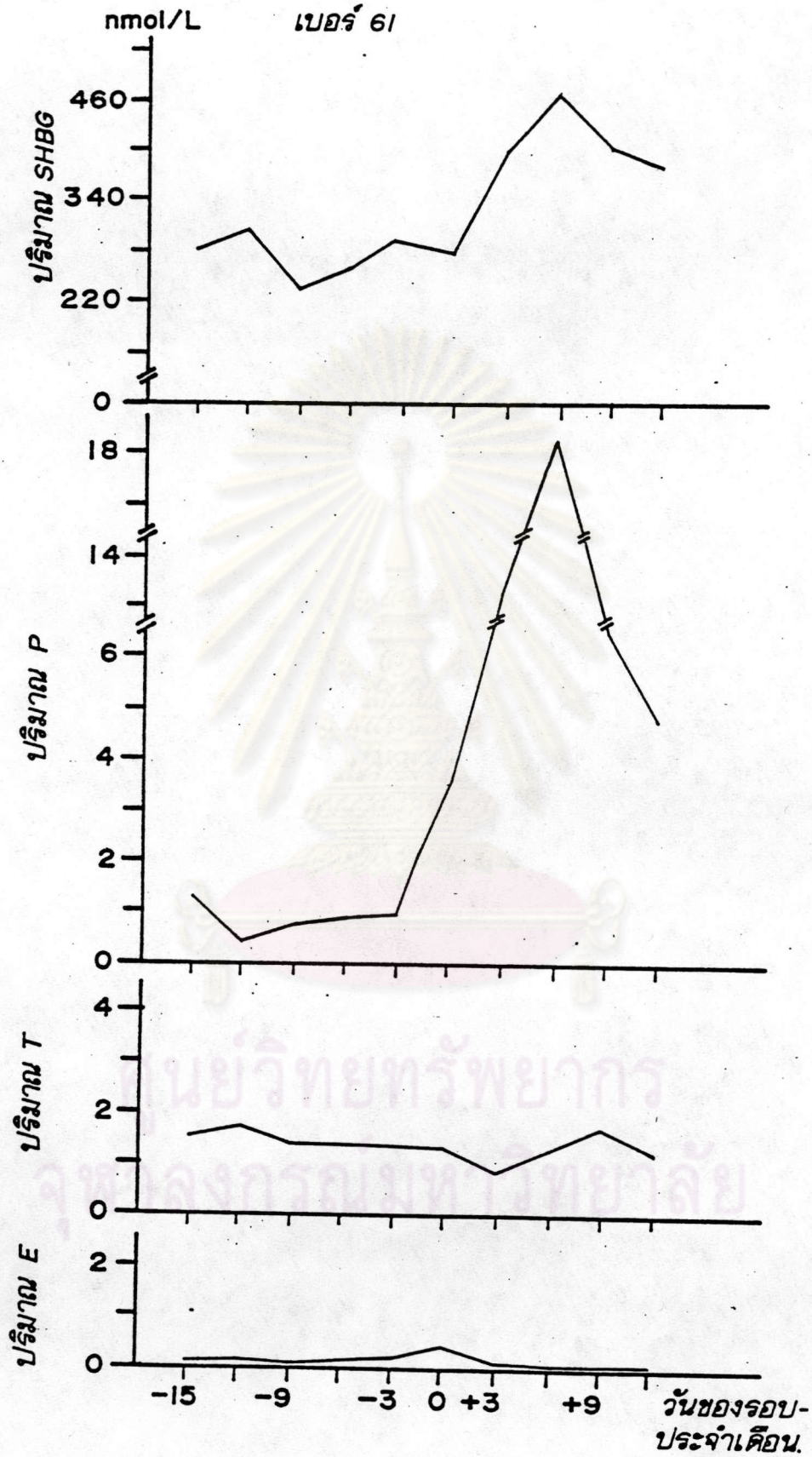
รูปที่ 11.


nmol/L
เบอร์ 51
ปริมาณ SHBG
500
400
300
200
0
ปริมาณ P
11
9
7
2
0
ปริมาณ T
4
2
0
ปริมาณ E_2
2
0
-15
-9
-3
0
+3
+9
+15
วันของรอบ-
ประจำเดือน.

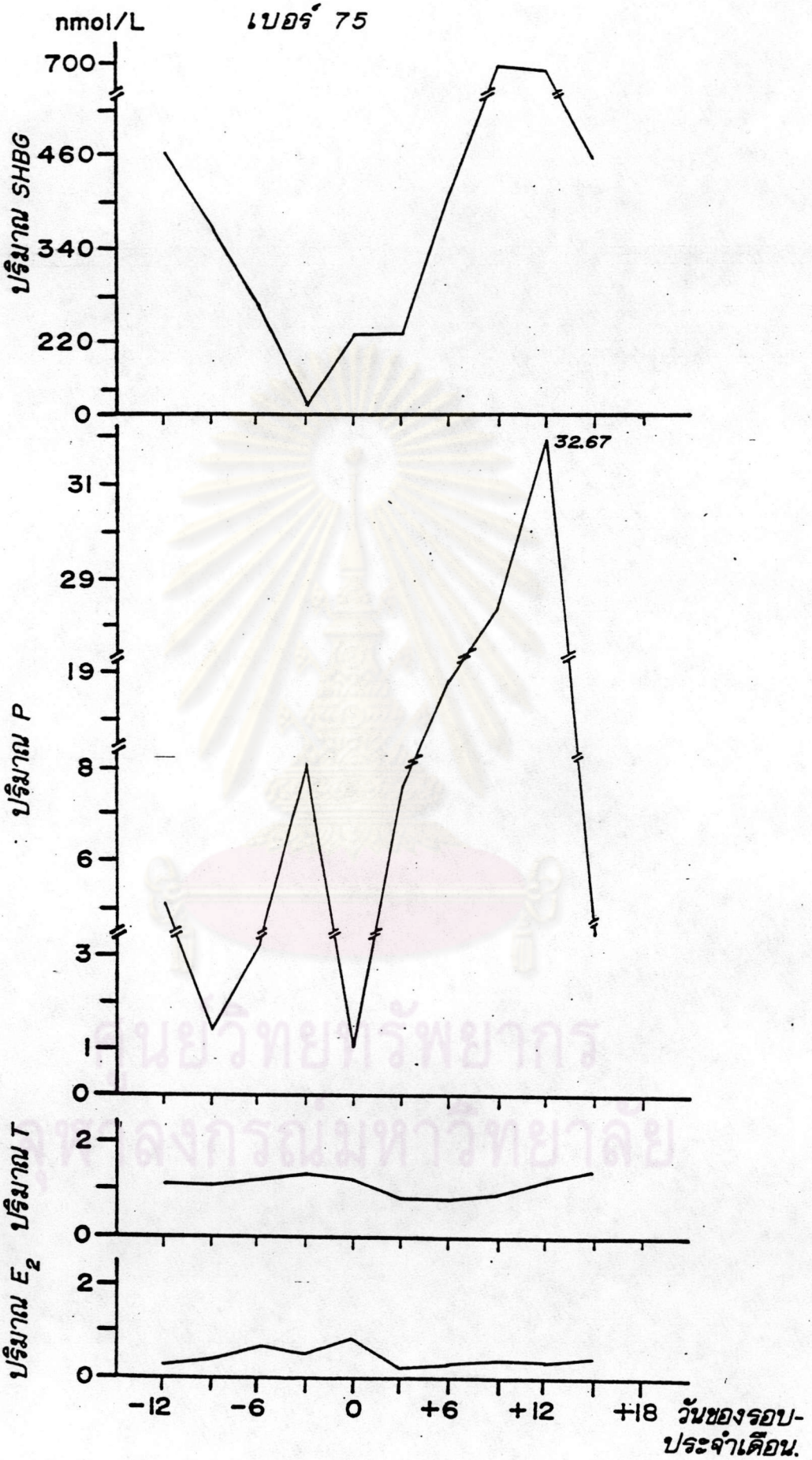
รูปที่ 12.


nmol/L
เบอร์ 60
ปริมาณ SHBG
200
100
0
ปริมาณ P
16
11
4
2
0
ปริมาณ T
4
2
0
ปริมาณ E_2
2
0
-12
-6
0
+6
+12
วันของรอบ-
ประจำเดือน.

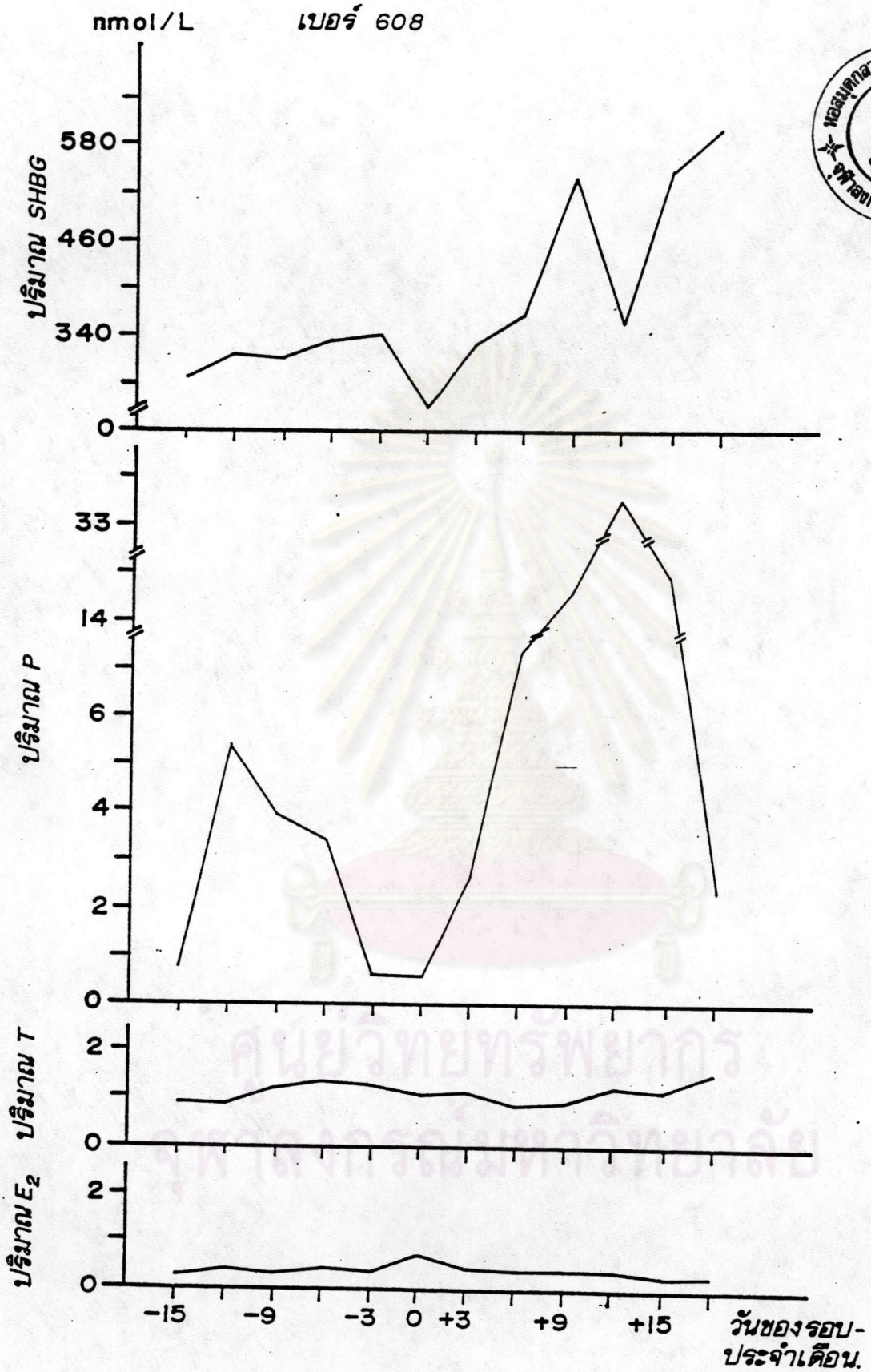
รูปที่ 13.


nmol/L
เบอร์ 61
ปริมาณ SHBG
460
340
220
0
ปริมาณ P
18
14
6
4
2
0
ปริมาณ T
4
2
0
ปริมาณ E
2
0
-15
-9
-3
0
+3
+9
วันของรอบ-
ประจำเดือน.

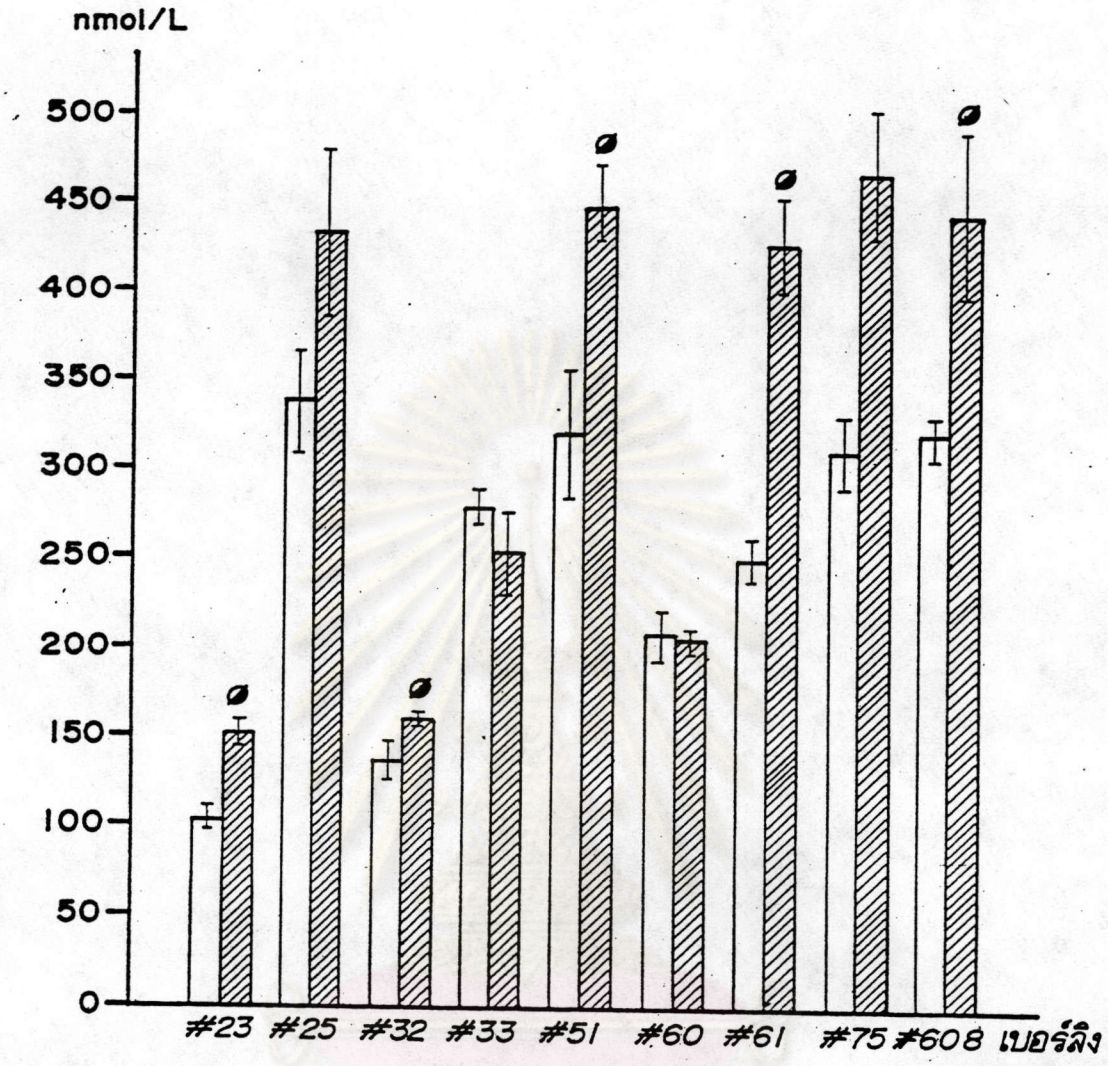
รูปที่ 14.


nmol/L
เบอร์ 75
700
460
340
220
0
ปริมาณ SHBG
32.67
31
29
19
8
6
3
1
0
ปริมาณ P
2
0
ปริมาณ T
2
0
ปริมาณ E_2
-12
-6
0
+6
+12
+18
วันของรอบ-
ประจำเดือน.

รูปที่ 15.

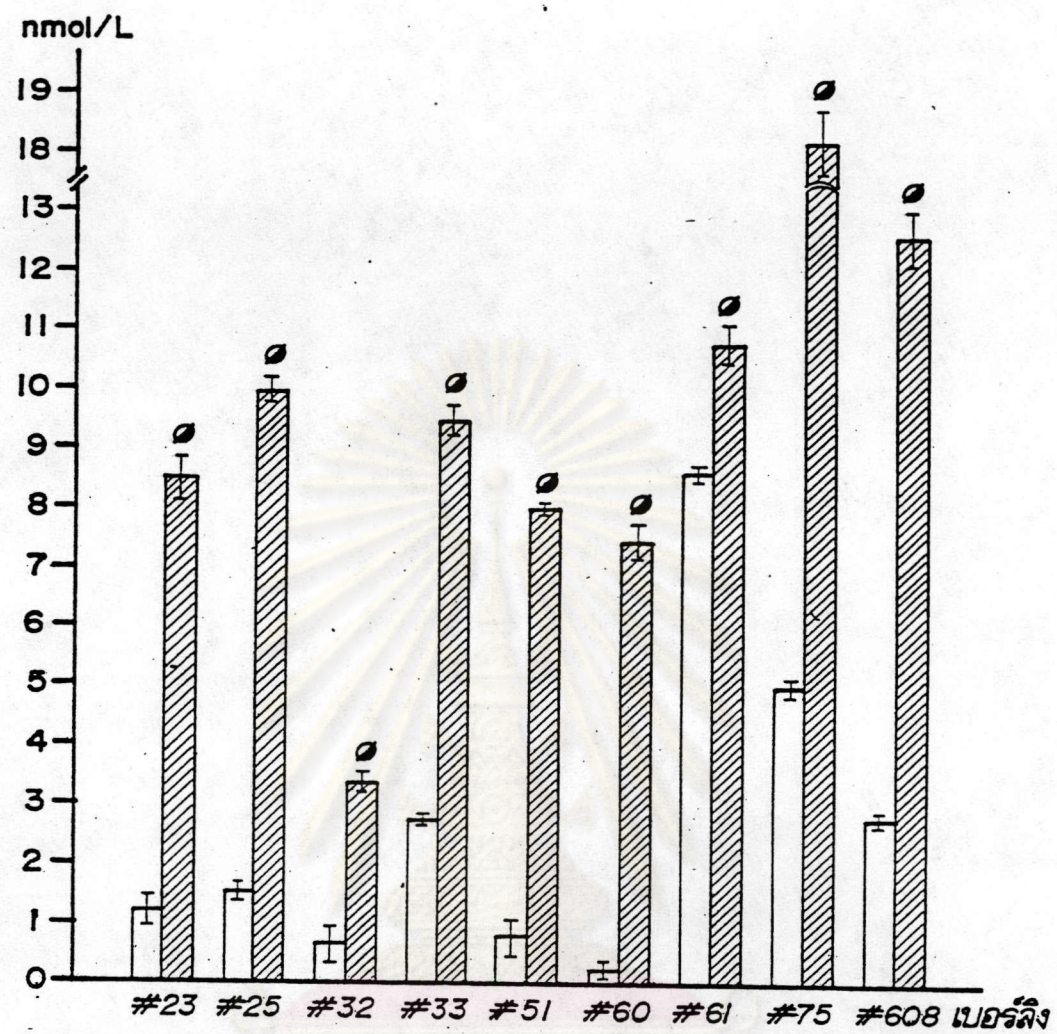

nmol/L
เบอร์ 608
ปริมาณ SHBG
580
460
340
0
ปริมาณ P
33
14
6
4
2
0
ปริมาณ T
2
0
ปริมาณ E_2
2
0
-15
-9
-3
0
+3
+9
+15
วันของรอบ-
ประจำเดือน.

รูปที่ 16.



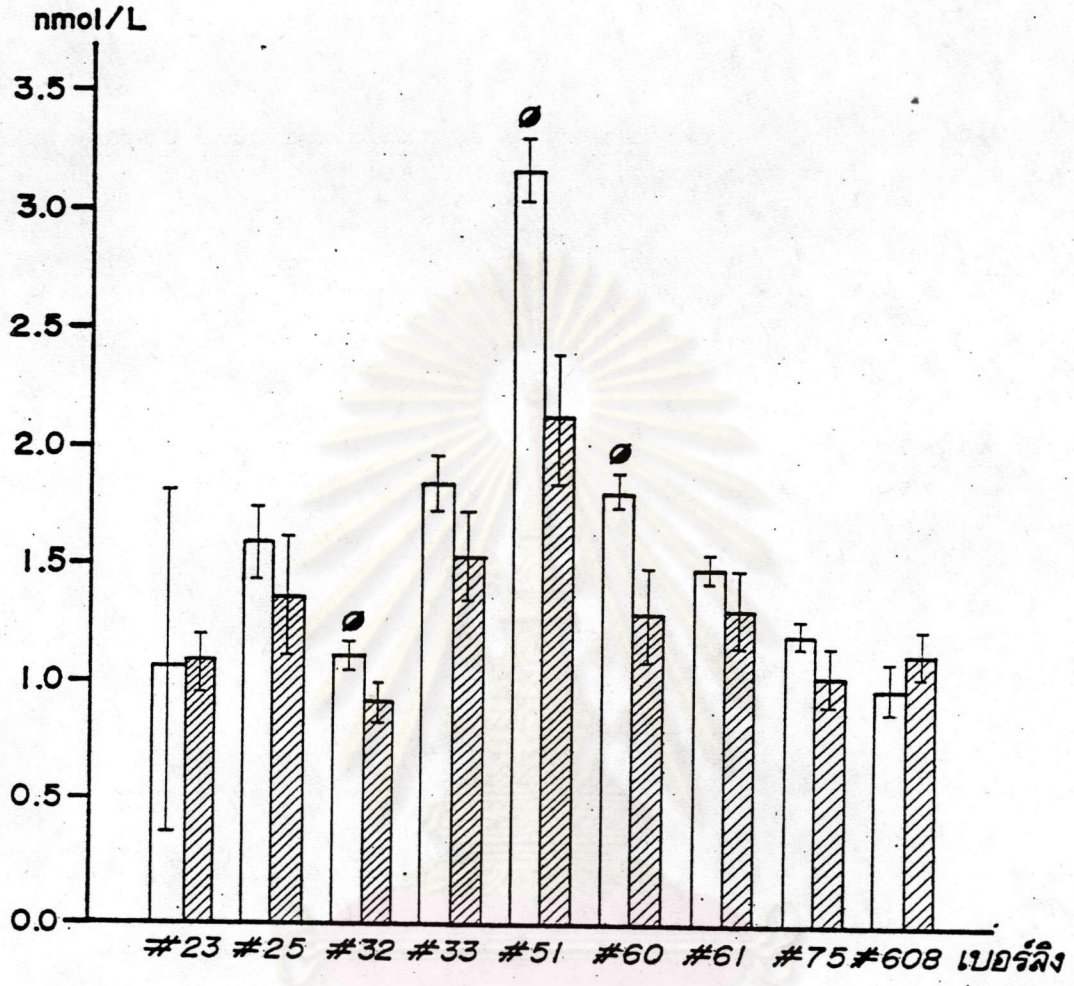
รูปที่ 17. แสดงค่าเฉลี่ย (± SEM) ของปริมาณ SHBG ระหว่างช่วง FOLLICULAR PHASE ☐ และ LUTEAL PHASE ▨ ในลิงหางยาวเพศเมียที่โตเต็มวัยแต่ละตัว.

หมายเหตุ ⌀ *LUTEAL PHASE มีระดับสูงกว่าในช่วง FOLLICULAR PHASE อย่างมีนัยสำคัญที่* $P < 0.05$.



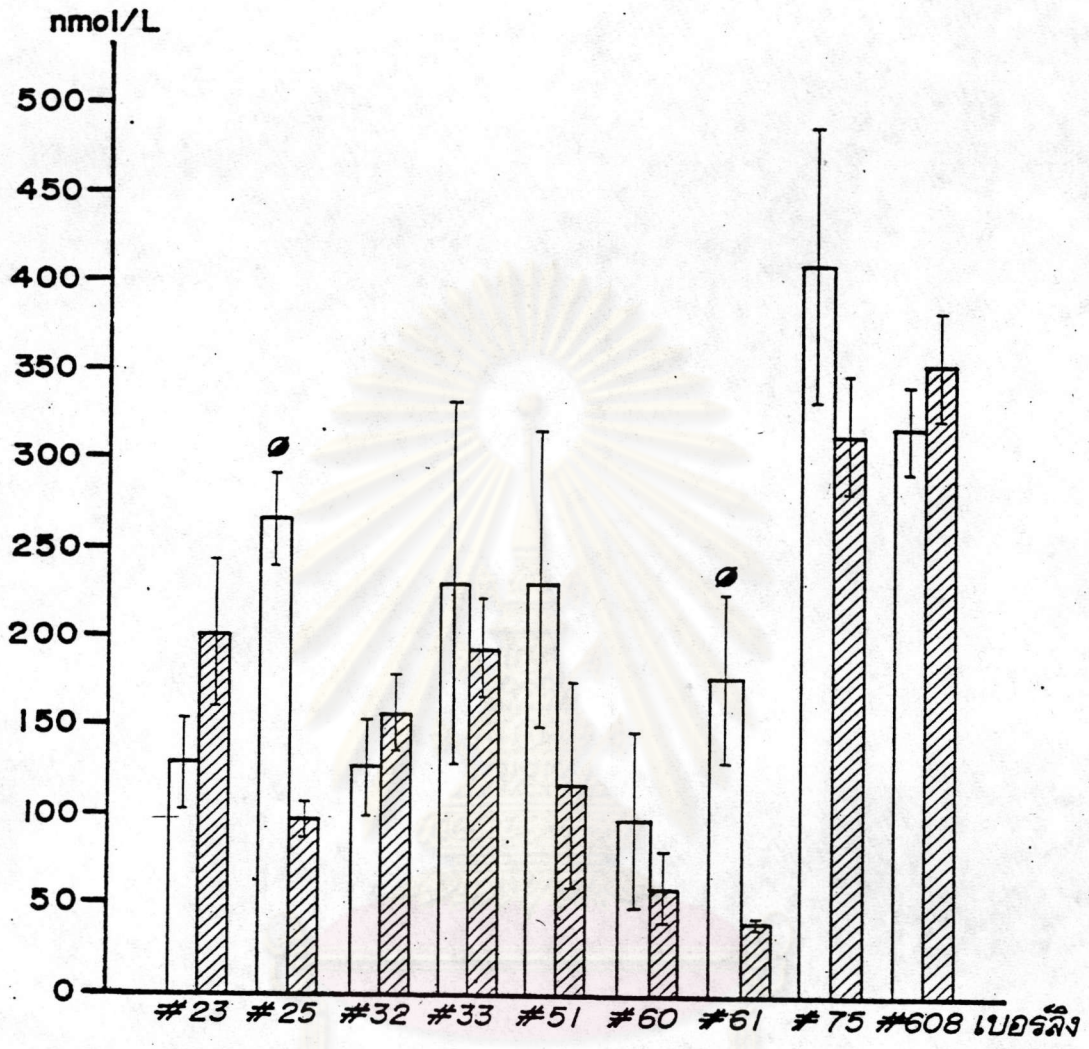
รูปที่ 18. แสดงค่าเฉลี่ย (±SEM) ของปริมาณ P ระหว่างช่วง FOLLICULAR PHASE □ และ LUTEAL PHASE ▨ ในลิงหางยาวเพศเมียที่โตเต็มวัยแต่ละตัว.

หมายเหตุ ø *LUTEAL PHASE มีระดับสูงกว่าในช่วง FOLLICULAR PHASE อย่างมีนัยสำคัญที่* $P < 0.05$.



รูปที่ 19. แสดงค่าเฉลี่ย (± SEM) ของปริมาณ T ระหว่างช่วง FOLLICULAR PHASE ☐ และ LUTEAL PHASE ▨ ในลิงหางยาวเพศเมียที่โตเต็มวัยแต่ละตัว.

หมายเหตุ ⌀ *FOLLICULAR PHASE มีระดับสูงกว่าในช่วง LUTEAL PHASE อย่างมีนัยสำคัญที่* $P < 0.05$.



รูปที่ 20. แสดงค่าเฉลี่ย (± SEM) ของปริมาณ E_2 ระหว่างช่วง FOLLICULAR PHASE □ และ LUTEAL PHASE ▨ ในลิงหางยาวเพศเมียที่โตเต็มวัยแต่ละตัว.

หมายเหตุ ø *FOLLICULAR PHASE มีระดับสูงกว่าในช่วง LUTEAL PHASE อย่างมีนัยสำคัญที่* $P < 0.05$.

ประวัติผู้เขียน

นางสาว พิมพรรณ องกิตติกุล เกิดเมื่อวันที่ 23 ตุลาคม พ.ศ.2500 ที่จังหวัดชัยนาท การศึกษาปริญญาพยาบาลศาสตรบัณฑิต คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล เมื่อปี พ.ศ.2524 ปัจจุบันรับราชการในตำแหน่งอาจารย์ระดับ4 วิทยาลัยพยาบาลชัยนาท กระทรวงสาธารณสุข