Szakdolgozat (FL)

Statisztika (GE)

December, 2017

Hipotézisek

1. Hüvelyi szülés után a medencefenék izmai megnyúlnak a császármetszéshez képest.
2. Az újszülött súlya szignifikáns összefüggést mutat a medencefenék izmainak megnyúlásával. A nagyobb születési súllyal megnő a medencefenék izmainak megnyúlása.
3. A szülések számával arányosan nő a medencefenék izmainak megnyúlása.
4. Az anyai BMI-vel arányosan nő a medencefenék izmainak megnyúlása.
5. A terhességi korral arányosan növekszig a medencefenék izmainak megnyúlása (mondjuk az első trimeszterbeli értékeket kellene összevetni a szülés előttivel).
6. A szülés előtti medencefenék (36. hetes UH) megnyúlása nagyobb a szülés utáni 6 hetes kontrollhoz képest.
7. Fiatalabb várandósoknál kisebb mértékú az izmok megnyúlása, mint az idősebbeknél
8. Fiatal várandósoknál nagyobb a szülés előtt és a szülés után mért izomnyúlás közötti különbség, mint az idősebb várandósoknál. (jobb a regenerációs hajlam fiatalabb korban)
9. Az izommegnyúlás mértéke korrelál a testmagassággal.
10. Szülés módja alapján a dL_9-dL_8 értékek nőnek hüvelyi szülés esetén

„Megnyúlnak” = delták. Abszolút érték számít. TODO

Magyarázat

Mag	Anyai magasság (cm)
Gr	Terhességek száma
Pa	Hüvelyi szülések száma
Cae	Császármetszések száma
Sz_mod	Szülés módja: PVN=hüvelyi, SC=császár
Sz_het	Szüléskor betöltött terhességi hetek száma
Sz_suly	Újszülött tömege
Tkor_	Terhességi kor napban kifejezve *-dik méréskor
CRL_	Ülőméret *-dik méréskor
BPD_	Biparietalis distance *-dik megjelenéskor
L1_; H1_...	Méretek nyugalomban (mm)
L2_; H2_...	Méretek hasprésre (mm)
Ttkg_	Anyai testtömeg -dik méréskor (kg)
dL_; dH_*	L1_ - L2_; H1_ - H2_...
Suly_	Magzat becsült tömege *-dik megjelenéskor

```
d = read.csv("~/Work/Education/Statisztikai_elemzesek/FarkasLajos_noi_klinika/STAT_DB.csv")
attach(d)
summary(d)
```

```
##      BetegID          BMI             Ék             MagM
##  Beteg001:  1   Min.   :16.5   Min.   :21.00   Min.   :1.470
##  Beteg002:  1   1st Qu.:21.5   1st Qu.:30.00   1st Qu.:1.630
##  Beteg003:  1   Median :23.6   Median :33.00   Median :1.670
##  Beteg004:  1   Mean   :24.5   Mean   :32.68   Mean   :1.667
##  Beteg005:  1   3rd Qu.:27.0   3rd Qu.:36.00   3rd Qu.:1.700
##  Beteg006:  1   Max.   :44.5   Max.   :43.00   Max.   :1.840
##  (Other) :213   NA's   :4                      NA's   :4
##       Mag              Gr             Pa              Cae
##  Min.   :147.0   Min.   :1.00   Min.   :0.0000   Min.   :0.0000
##  1st Qu.:163.0   1st Qu.:1.00   1st Qu.:0.0000   1st Qu.:0.0000
##  Median :167.0   Median :2.00   Median :1.0000   Median :0.0000
##  Mean   :166.7   Mean   :2.02   Mean   :0.9085   Mean   :0.7386
##  3rd Qu.:170.0   3rd Qu.:3.00   3rd Qu.:1.0000   3rd Qu.:1.0000
##  Max.   :184.0   Max.   :6.00   Max.   :4.0000   Max.   :3.0000
##  NA's   :4       NA's   :66     NA's   :66       NA's   :66
##  Sz_mod        Sz_het         Sz_suly         Tkor_1          CRL_1
##     :  4   Min.   :32.00   Min.   :1900   Min.   :37.00   Min.   : 1.00
##  PVN:108   1st Qu.:39.00   1st Qu.:3140   1st Qu.:44.00   1st Qu.: 6.25
##  SC :107   Median :39.00   Median :3455   Median :48.00   Median :10.10
##            Mean   :39.11   Mean   :3441   Mean   :50.61   Mean   :12.91
##            3rd Qu.:40.00   3rd Qu.:3700   3rd Qu.:57.00   3rd Qu.:18.20
##            Max.   :41.00   Max.   :4500   Max.   :76.00   Max.   :40.10
##            NA's   :6       NA's   :7      NA's   :60      NA's   :60
##       L1_1            H1_1            B1_1            C1_1
##  Min.   :18.00   Min.   : 2.30   Min.   : 9.80   Min.   :12.90
##  1st Qu.:23.80   1st Qu.: 8.15   1st Qu.:20.45   1st Qu.:18.40
##  Median :26.40   Median :11.40   Median :23.43   Median :21.70
##  Mean   :26.56   Mean   :11.73   Mean   :23.83   Mean   :22.46
##  3rd Qu.:29.15   3rd Qu.:14.40   3rd Qu.:27.82   3rd Qu.:25.70
##  Max.   :38.00   Max.   :30.50   Max.   :34.90   Max.   :36.10
##  NA's   :92      NA's   :92      NA's   :99      NA's   :126
##       L2_1            H2_1            B2_1            C2_1
##  Min.   : 0.00   Min.   : 3.70   Min.   :-6.50   Min.   : 7.80
##  1st Qu.:20.40   1st Qu.:10.30   1st Qu.:11.45   1st Qu.:17.15
##  Median :24.30   Median :14.30   Median :18.15   Median :20.60
##  Mean   :24.39   Mean   :15.47   Mean   :17.12   Mean   :20.76
##  3rd Qu.:28.60   3rd Qu.:19.05   3rd Qu.:23.35   3rd Qu.:24.45
##  Max.   :39.40   Max.   :43.80   Max.   :31.10   Max.   :34.90
##  NA's   :92      NA's   :92      NA's   :99      NA's   :124
##      Ttkg_1           dL_1            dH_1             dB_1
##  Min.   : 45.00   Min.   :-8.000   Min.   :-28.700   Min.   :-9.000
##  1st Qu.: 57.75   1st Qu.:-0.475   1st Qu.: -5.200   1st Qu.: 3.375
##  Median : 63.75   Median : 2.400   Median : -2.750   Median : 5.600
##  Mean   : 65.68   Mean   : 2.155   Mean   : -3.725   Mean   : 6.659
##  3rd Qu.: 72.00   3rd Qu.: 4.300   3rd Qu.: -1.300   3rd Qu.:10.500
##  Max.   :108.00   Max.   :25.900   Max.   : 12.900   Max.   :25.400
##  NA's   :151      NA's   :93       NA's   :93        NA's   :99
##       dC_1            Tkor_2          CRL_2           L1_2
##  Min.   :-10.900   Min.   : 44.00   Min.   : 6.47   Min.   :14.50
##  1st Qu.: -1.300   1st Qu.: 81.00   1st Qu.:54.70   1st Qu.:23.40
##  Median :  0.900   Median : 86.00   Median :60.10   Median :25.20
##  Mean   :  1.334   Mean   : 85.34   Mean   :59.69   Mean   :25.40
##  3rd Qu.:  4.200   3rd Qu.: 90.00   3rd Qu.:65.50   3rd Qu.:27.68
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##  Max.   : 12.300   Max.   :102.00   Max.   :93.20   Max.   :36.10
##  NA's   :126       NA's   :22       NA's   :22      NA's   :33
##       H1_2            B1_2            C1_2            L2_2
##  Min.   :-4.6   Min.   : 5.9   Min.   :-4.60   Min.   : 0.10
##  1st Qu.:10.0   1st Qu.:19.0   1st Qu.:17.95   1st Qu.:20.25
##  Median :12.4   Median :22.8   Median :20.40   Median :23.50
##  Mean   :13.1   Mean   :22.5   Mean   :20.73   Mean   :23.06
##  3rd Qu.:15.4   3rd Qu.:26.0   3rd Qu.:24.25   3rd Qu.:26.10
##  Max.   :52.2   Max.   :36.1   Max.   :35.30   Max.   :39.70
##  NA's   :34     NA's   :50     NA's   :92      NA's   :35
##       H2_2            B2_2            C2_2           Ttkg_2
##  Min.   : 2.70   Min.   :-7.90   Min.   : 7.70   Min.   : 45.00
##  1st Qu.:11.70   1st Qu.:10.55   1st Qu.:15.50   1st Qu.: 59.00
##  Median :14.30   Median :15.85   Median :19.30   Median : 65.00
##  Mean   :16.06   Mean   :15.48   Mean   :19.68   Mean   : 67.98
##  3rd Qu.:18.60   3rd Qu.:21.50   3rd Qu.:22.60   3rd Qu.: 74.00
##  Max.   :53.90   Max.   :34.20   Max.   :32.60   Max.   :132.00
##  NA's   :34      NA's   :49      NA's   :92      NA's   :69
##       dL_2             dH_2             dB_2             dC_2
##  Min.   :-14.000   Min.   :-26.600   Min.   :-10.900   Min.   :-17.600
##  1st Qu.: -0.200   1st Qu.: -4.800   1st Qu.:  2.900   1st Qu.: -0.850
##  Median :  2.000   Median : -2.200   Median :  6.850   Median :  1.200
##  Mean   :  2.592   Mean   : -2.966   Mean   :  6.891   Mean   :  1.046
##  3rd Qu.:  4.075   3rd Qu.: -0.600   3rd Qu.: 10.175   3rd Qu.:  3.850
##  Max.   : 26.900   Max.   : 10.000   Max.   : 28.000   Max.   : 12.700
##  NA's   :33        NA's   :34        NA's   :49        NA's   :92
##      Tkor_3          Suly_3          BPD_3           FRO_3
##  Min.   : 91.0   Min.   :103.0   Min.   :27.30   Min.   :33.90
##  1st Qu.:105.0   1st Qu.:141.0   1st Qu.:34.00   1st Qu.:42.15
##  Median :105.0   Median :155.0   Median :35.70   Median :44.10
##  Mean   :108.9   Mean   :160.3   Mean   :35.86   Mean   :44.49
##  3rd Qu.:112.0   3rd Qu.:169.5   3rd Qu.:37.60   3rd Qu.:46.28
##  Max.   :147.0   Max.   :275.0   Max.   :49.70   Max.   :63.00
##  NA's   :8       NA's   :132     NA's   :8       NA's   :8
##       HC_3            AC_3           FEM_3           L1_3
##  Min.   : 13.1   Min.   : 11.6   Min.   :13.60   Min.   :16.40
##  1st Qu.:121.8   1st Qu.:103.2   1st Qu.:19.05   1st Qu.:22.93
##  Median :127.4   Median :109.1   Median :20.30   Median :25.50
##  Mean   :127.6   Mean   :109.6   Mean   :20.70   Mean   :25.66
##  3rd Qu.:133.8   3rd Qu.:116.0   3rd Qu.:22.05   3rd Qu.:28.40
##  Max.   :178.5   Max.   :163.3   Max.   :34.40   Max.   :38.00
##  NA's   :8       NA's   :8       NA's   :8       NA's   :13
##       H1_3            B1_3           C1_3           L2_3
##  Min.   : 0.200   Min.   : 6.90   Min.   : 8.70   Min.   : 1.60
##  1st Qu.: 9.325   1st Qu.:18.60   1st Qu.:17.77   1st Qu.:19.43
##  Median :12.300   Median :22.00   Median :21.55   Median :23.00
##  Mean   :13.058   Mean   :22.14   Mean   :21.75   Mean   :22.87
##  3rd Qu.:15.600   3rd Qu.:25.52   3rd Qu.:25.10   3rd Qu.:26.98
##  Max.   :45.000   Max.   :34.00   Max.   :42.40   Max.   :34.70
##  NA's   :13       NA's   :27      NA's   :63      NA's   :13
##       H2_3            B2_3           C2_3           Ttkg_3
##  Min.   : 6.30   Min.   :-10.60   Min.   : 8.80   Min.   : 44.00
##  1st Qu.:12.72   1st Qu.:  9.25   1st Qu.:16.68   1st Qu.: 59.00
##  Median :15.50   Median : 15.70   Median :19.65   Median : 66.50
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##  Mean   :16.73   Mean   : 14.56   Mean   :20.23   Mean   : 68.72
##  3rd Qu.:19.57   3rd Qu.: 19.65   3rd Qu.:22.60   3rd Qu.: 74.25
##  Max.   :39.90   Max.   : 30.10   Max.   :42.10   Max.   :145.00
##  NA's   :13      NA's   :27       NA's   :63      NA's   :39
##       dL_3             dH_3              dB_3              dC_3
##  Min.   :-6.800   Min.   :-22.000   Min.   :-10.300   Min.   :-14.900
##  1st Qu.: 0.400   1st Qu.: -5.475   1st Qu.:  4.600   1st Qu.: -0.325
##  Median : 2.250   Median : -3.100   Median :  7.150   Median :  1.400
##  Mean   : 2.793   Mean   : -3.675   Mean   :  7.585   Mean   :  1.524
##  3rd Qu.: 4.500   3rd Qu.: -1.525   3rd Qu.: 10.525   3rd Qu.:  3.900
##  Max.   :23.300   Max.   :  5.900   Max.   : 32.200   Max.   : 12.700
##  NA's   :13       NA's   :13        NA's   :27        NA's   :63
##      Tkor_4          Suly_4          BPD_4           FRO_4
##  Min.   : 84.0   Min.   :250.0   Min.   :20.17   Min.   :50.60
##  1st Qu.:133.0   1st Qu.:317.5   1st Qu.:46.20   1st Qu.:59.77
##  Median :140.0   Median :353.0   Median :48.60   Median :62.55
##  Mean   :140.5   Mean   :364.8   Mean   :48.40   Mean   :62.40
##  3rd Qu.:147.0   3rd Qu.:396.5   3rd Qu.:50.90   3rd Qu.:64.80
##  Max.   :168.0   Max.   :539.0   Max.   :62.20   Max.   :78.40
##  NA's   :2       NA's   :128     NA's   :2       NA's   :3
##       HC_4            AC_4           FEMU_4           L1_4
##  Min.   : 39.3   Min.   : 64.0   Min.   :23.90   Min.   :15.50
##  1st Qu.:169.7   1st Qu.:148.2   1st Qu.:31.31   1st Qu.:22.90
##  Median :177.1   Median :156.9   Median :33.10   Median :26.05
##  Mean   :176.9   Mean   :157.0   Mean   :33.37   Mean   :25.65
##  3rd Qu.:184.3   3rd Qu.:164.8   3rd Qu.:35.16   3rd Qu.:28.20
##  Max.   :219.6   Max.   :209.3   Max.   :46.60   Max.   :37.10
##  NA's   :2       NA's   :2       NA's   :2       NA's   :7
##       H1_4            B1_4            C1_4            L2_4
##  Min.   : 3.20   Min.   : 2.50   Min.   :10.70   Min.   :-6.20
##  1st Qu.: 9.70   1st Qu.:17.80   1st Qu.:18.86   1st Qu.:18.85
##  Median :12.55   Median :21.30   Median :21.17   Median :23.00
##  Mean   :12.88   Mean   :21.19   Mean   :21.65   Mean   :22.55
##  3rd Qu.:15.50   3rd Qu.:25.15   3rd Qu.:23.48   3rd Qu.:26.50
##  Max.   :26.50   Max.   :34.00   Max.   :40.70   Max.   :38.90
##  NA's   :7       NA's   :12      NA's   :49      NA's   :7
##       H2_4            B2_4             C2_4           Ttkg_4
##  Min.   : 3.50   Min.   :-11.600   Min.   :11.30   Min.   : 45.00
##  1st Qu.:13.30   1st Qu.:  7.825   1st Qu.:17.82   1st Qu.: 61.00
##  Median :15.90   Median : 13.100   Median :20.10   Median : 68.00
##  Mean   :16.83   Mean   : 12.614   Mean   :20.49   Mean   : 71.06
##  3rd Qu.:19.80   3rd Qu.: 18.200   3rd Qu.:22.77   3rd Qu.: 78.00
##  Max.   :36.50   Max.   : 31.700   Max.   :30.50   Max.   :148.00
##  NA's   :7       NA's   :13        NA's   :49      NA's   :21
##       dL_4             dH_4              dB_4             dC_4
##  Min.   :-10.600   Min.   :-19.300   Min.   :-8.200   Min.   :-11.10
##  1st Qu.:  0.900   1st Qu.: -6.000   1st Qu.: 5.100   1st Qu.: -1.00
##  Median :  2.800   Median : -3.800   Median : 8.000   Median :  0.90
##  Mean   :  3.079   Mean   : -3.926   Mean   : 8.598   Mean   :  1.16
##  3rd Qu.:  5.000   3rd Qu.: -1.500   3rd Qu.:11.000   3rd Qu.:  2.65
##  Max.   : 28.400   Max.   : 10.100   Max.   :32.200   Max.   : 18.70
##  NA's   :6         NA's   :6         NA's   :11       NA's   :48
##      Tkor_5          Suly_5          BPD_5           FRO_5
##  Min.   : 98.0   Min.   : 516.0   Min.   :29.60   Min.   :  58.0
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```
##  1st Qu.:161.0   1st Qu.: 642.0   1st Qu.:58.80   1st Qu.:  76.3
##  Median :168.0   Median : 698.0   Median :61.60   Median :  79.0
##  Mean   :167.1   Mean   : 722.3   Mean   :61.41   Mean   : 113.8
##  3rd Qu.:168.0   3rd Qu.: 795.0   3rd Qu.:63.90   3rd Qu.:  81.6
##  Max.   :196.0   Max.   :1122.0   Max.   :74.53   Max.   :7608.0
##  NA's   :2       NA's   :130      NA's   :2       NA's   :2
##       HC_5            AC_5           FEMU_5           L1_5
##  Min.   :115.2   Min.   : 22.3   Min.   :34.30   Min.   :13.10
##  1st Qu.:215.9   1st Qu.:192.7   1st Qu.:42.50   1st Qu.:22.62
##  Median :223.4   Median :201.2   Median :44.36   Median :25.60
##  Mean   :223.3   Mean   :200.3   Mean   :44.62   Mean   :25.89
##  3rd Qu.:232.0   3rd Qu.:208.5   3rd Qu.:46.50   3rd Qu.:28.55
##  Max.   :267.2   Max.   :245.2   Max.   :54.60   Max.   :39.60
##  NA's   :2       NA's   :2       NA's   :2       NA's   :13
##       H1_5            B1_5            C1_5            L2_5
##  Min.   : 3.20   Min.   : 3.80   Min.   :11.20   Min.   :-4.40
##  1st Qu.:10.00   1st Qu.:17.70   1st Qu.:17.70   1st Qu.:18.43
##  Median :12.50   Median :21.50   Median :20.35   Median :22.05
##  Mean   :12.58   Mean   :21.44   Mean   :21.00   Mean   :22.22
##  3rd Qu.:15.18   3rd Qu.:25.30   3rd Qu.:23.70   3rd Qu.:25.80
##  Max.   :24.00   Max.   :37.90   Max.   :39.30   Max.   :44.20
##  NA's   :13      NA's   :14      NA's   :41      NA's   :13
##       H2_5            B2_5            C2_5           Ttkg_5
##  Min.   : 2.70   Min.   :-17.30   Min.   : 9.00   Min.   : 49.00
##  1st Qu.:13.47   1st Qu.:  8.00   1st Qu.:17.73   1st Qu.: 63.00
##  Median :16.80   Median : 13.20   Median :20.45   Median : 70.00
##  Mean   :17.00   Mean   : 12.83   Mean   :20.81   Mean   : 73.07
##  3rd Qu.:19.60   3rd Qu.: 17.80   3rd Qu.:22.98   3rd Qu.: 80.00
##  Max.   :31.10   Max.   : 35.10   Max.   :35.30   Max.   :150.00
##  NA's   :13      NA's   :14       NA's   :41      NA's   :31
##       dL_5             dH_5             dB_5             dC_5
##  Min.   :-16.200   Min.   :-15.700   Min.   :-11.200   Min.   :-11.0000
##  1st Qu.:  1.600   1st Qu.: -6.975   1st Qu.:  5.900   1st Qu.: -2.5000
##  Median :  3.400   Median : -4.350   Median :  8.300   Median :  0.2000
##  Mean   :  3.672   Mean   : -4.416   Mean   :  8.605   Mean   :  0.1977
##  3rd Qu.:  5.550   3rd Qu.: -2.225   3rd Qu.: 11.000   3rd Qu.:  2.6000
##  Max.   : 31.200   Max.   : 10.500   Max.   : 35.800   Max.   : 13.7000
##  NA's   :13        NA's   :13        NA's   :14        NA's   :42
##      Tkor_6        Suly_6         BPD_6           FRO_6
##  Min.   :161   Min.   : 920   Min.   :57.20   Min.   : 78.00
##  1st Qu.:196   1st Qu.:1212   1st Qu.:72.20   1st Qu.: 92.30
##  Median :203   Median :1326   Median :75.29   Median : 94.50
##  Mean   :202   Mean   :1365   Mean   :75.02   Mean   : 94.55
##  3rd Qu.:210   3rd Qu.:1473   3rd Qu.:77.90   3rd Qu.: 97.30
##  Max.   :287   Max.   :2532   Max.   :98.20   Max.   :108.20
##  NA's   :4     NA's   :131    NA's   :4       NA's   :4
##       HC_6            AC_6           FEMU_6           L1_6
##  Min.   : 26.4   Min.   : 32.5   Min.   : 41.60   Min.   :15.00
##  1st Qu.:263.5   1st Qu.:236.8   1st Qu.: 53.00   1st Qu.:23.30
##  Median :270.5   Median :247.2   Median : 55.00   Median :25.80
##  Mean   :269.7   Mean   :246.7   Mean   : 56.03   Mean   :25.88
##  3rd Qu.:278.9   3rd Qu.:257.5   3rd Qu.: 56.78   3rd Qu.:28.70
##  Max.   :311.0   Max.   :323.4   Max.   :263.10   Max.   :38.90
##  NA's   :4       NA's   :4       NA's   :4        NA's   :18
```

```
##       H1_6           B1_6           C1_6           L2_6
##  Min.   : 4.6   Min.   : 9.2   Min.   :10.20   Min.   : 9.70
##  1st Qu.:10.2   1st Qu.:17.3   1st Qu.:17.55   1st Qu.:19.50
##  Median :12.3   Median :21.3   Median :20.40   Median :22.55
##  Mean   :12.6   Mean   :21.0   Mean   :20.84   Mean   :22.65
##  3rd Qu.:14.9   3rd Qu.:25.2   3rd Qu.:23.20   3rd Qu.:26.15
##  Max.   :24.9   Max.   :34.2   Max.   :36.60   Max.   :39.80
##  NA's   :18     NA's   :18     NA's   :28      NA's   :19
##       H2_6           B2_6           C2_6           Ttkg_6
##  Min.   : 6.30   Min.   :-9.60   Min.   : 9.20   Min.   : 51.00
##  1st Qu.:13.30   1st Qu.: 7.30   1st Qu.:17.10   1st Qu.: 65.00
##  Median :16.20   Median :12.50   Median :19.80   Median : 73.00
##  Mean   :16.84   Mean   :11.96   Mean   :20.13   Mean   : 75.17
##  3rd Qu.:19.52   3rd Qu.:16.95   3rd Qu.:22.77   3rd Qu.: 82.00
##  Max.   :31.50   Max.   :29.20   Max.   :37.70   Max.   :153.00
##  NA's   :19      NA's   :19      NA's   :29      NA's   :25
##       dL_6           dH_6           dB_6           dC_6
##  Min.   :-6.700   Min.   :-15.000   Min.   :-3.700   Min.   :-15.8000
##  1st Qu.: 1.200   1st Qu.: -6.600   1st Qu.: 6.300   1st Qu.: -1.6500
##  Median : 3.000   Median : -4.000   Median : 8.800   Median :  0.8000
##  Mean   : 3.218   Mean   : -4.235   Mean   : 9.011   Mean   :  0.7005
##  3rd Qu.: 5.000   3rd Qu.: -2.200   3rd Qu.:11.400   3rd Qu.:  3.1000
##  Max.   :19.800   Max.   :  4.900   Max.   :27.000   Max.   : 10.9000
##  NA's   :18       NA's   :18        NA's   :18       NA's   :28
##      Tkor_7         Suly_7         BPD_7          FRO_7
##  Min.   :189.0   Min.   :1567   Min.   :69.50   Min.   : 11.3
##  1st Qu.:224.0   1st Qu.:1903   1st Qu.:82.15   1st Qu.:103.0
##  Median :231.0   Median :2052   Median :85.60   Median :106.3
##  Mean   :233.2   Mean   :2104   Mean   :85.24   Mean   :105.6
##  3rd Qu.:238.0   3rd Qu.:2267   3rd Qu.:87.82   3rd Qu.:109.3
##  Max.   :287.0   Max.   :3100   Max.   :98.30   Max.   :119.1
##  NA's   :8       NA's   :134    NA's   :8       NA's   :8
##       HC_7           AC_7          FEMU_7          L1_7
##  Min.   :  9.39   Min.   :179.4   Min.   :51.20   Min.   :16.90
##  1st Qu.:297.15   1st Qu.:278.6   1st Qu.:60.80   1st Qu.:22.90
##  Median :304.30   Median :289.4   Median :63.10   Median :26.00
##  Mean   :302.62   Mean   :289.6   Mean   :63.31   Mean   :26.29
##  3rd Qu.:312.50   3rd Qu.:302.6   3rd Qu.:65.55   3rd Qu.:29.20
##  Max.   :345.30   Max.   :363.6   Max.   :74.96   Max.   :42.10
##  NA's   :8        NA's   :8       NA's   :8       NA's   :17
##       H1_7           B1_7           C1_7          L2_7
##  Min.   : 4.10   Min.   : 4.10   Min.   :11.2   Min.   : 5.30
##  1st Qu.:10.70   1st Qu.:16.80   1st Qu.:17.7   1st Qu.:19.10
##  Median :12.50   Median :20.30   Median :20.2   Median :22.30
##  Mean   :13.42   Mean   :20.31   Mean   :20.9   Mean   :22.81
##  3rd Qu.:16.50   3rd Qu.:23.98   3rd Qu.:23.9   3rd Qu.:25.98
##  Max.   :23.30   Max.   :39.00   Max.   :34.8   Max.   :38.50
##  NA's   :17      NA's   :17      NA's   :29     NA's   :17
##       H2_7           B2_7           C2_7          Ttkg_7
##  Min.   : 6.80   Min.   :-8.100   Min.   : 8.00   Min.   : 55.00
##  1st Qu.:14.43   1st Qu.: 6.625   1st Qu.:17.30   1st Qu.: 67.00
##  Median :17.30   Median :12.300   Median :19.95   Median : 75.00
##  Mean   :17.57   Mean   :11.497   Mean   :20.41   Mean   : 77.35
##  3rd Qu.:20.30   3rd Qu.:16.875   3rd Qu.:22.95   3rd Qu.: 85.00
```

```
##  Max.   :33.00   Max.   :31.200   Max.   :34.80   Max.   :155.00
##  NA's   :17      NA's   :17       NA's   :29      NA's   :24
##       dL_7             dH_7             dB_7             dC_7
##  Min.   :-6.500   Min.   :-14.400   Min.   :-7.300   Min.   :-8.8000
##  1st Qu.: 1.500   1st Qu.: -6.275   1st Qu.: 5.325   1st Qu.:-1.4500
##  Median : 3.450   Median : -3.700   Median : 8.350   Median : 0.8000
##  Mean   : 3.483   Mean   : -4.148   Mean   : 8.816   Mean   : 0.4853
##  3rd Qu.: 5.175   3rd Qu.: -2.100   3rd Qu.:12.125   3rd Qu.: 2.5000
##  Max.   :21.100   Max.   :  3.700   Max.   :28.400   Max.   :11.9000
##  NA's   :17       NA's   :17        NA's   :17       NA's   :28
##      Tkor_8          Súly_8         BPD_8            FRO_8
##  Min.   :147.0   Min.   :2314   Min.   : 49.40   Min.   : 11.2
##  1st Qu.:245.0   1st Qu.:2776   1st Qu.: 89.60   1st Qu.:110.0
##  Median :252.0   Median :2990   Median : 91.80   Median :113.1
##  Mean   :257.9   Mean   :2991   Mean   : 92.00   Mean   :112.1
##  3rd Qu.:266.0   3rd Qu.:3147   3rd Qu.: 94.96   3rd Qu.:116.7
##  Max.   :287.0   Max.   :3804   Max.   :105.90   Max.   :219.4
##  NA's   :12      NA's   :133    NA's   :12       NA's   :12
##       HC_8            AC_8           FEMU_8           L1_8
##  Min.   : 43.6   Min.   : 11.3   Min.   : 30.70   Min.   :16.20
##  1st Qu.:319.1   1st Qu.:317.5   1st Qu.: 68.80   1st Qu.:23.80
##  Median :327.5   Median :326.0   Median : 70.90   Median :26.60
##  Mean   :325.5   Mean   :320.4   Mean   : 71.98   Mean   :26.85
##  3rd Qu.:336.4   3rd Qu.:338.3   3rd Qu.: 73.30   3rd Qu.:29.70
##  Max.   :356.8   Max.   :371.5   Max.   :298.80   Max.   :43.20
##  NA's   :12      NA's   :12      NA's   :13       NA's   :19
##       H1_8            B1_8            C1_8            L2_8
##  Min.   : 2.30   Min.   :-1.30   Min.   : 8.90   Min.   :11.40
##  1st Qu.:11.75   1st Qu.:15.57   1st Qu.:17.60   1st Qu.:20.30
##  Median :14.00   Median :18.95   Median :20.00   Median :24.10
##  Mean   :14.53   Mean   :19.24   Mean   :20.79   Mean   :23.86
##  3rd Qu.:17.12   3rd Qu.:22.80   3rd Qu.:23.90   3rd Qu.:27.15
##  Max.   :28.20   Max.   :45.10   Max.   :39.00   Max.   :44.90
##  NA's   :19      NA's   :19      NA's   :23      NA's   :19
##       H2_8            B2_8            C2_8           Ttkg_8
##  Min.   : 8.10   Min.   :-9.000   Min.   : 9.30   Min.   : 54.00
##  1st Qu.:14.10   1st Qu.: 6.125   1st Qu.:17.12   1st Qu.: 70.00
##  Median :17.10   Median :10.750   Median :19.80   Median : 77.50
##  Mean   :17.48   Mean   :10.467   Mean   :19.95   Mean   : 78.88
##  3rd Qu.:20.20   3rd Qu.:15.650   3rd Qu.:22.43   3rd Qu.: 86.00
##  Max.   :33.30   Max.   :36.800   Max.   :35.50   Max.   :156.00
##  NA's   :19      NA's   :19       NA's   :23      NA's   :32
##       dL_8             dH_8             dB_8             dC_8
##  Min.   :-6.000   Min.   :-13.300   Min.   :-3.700   Min.   :-11.1000
##  1st Qu.: 1.100   1st Qu.: -4.925   1st Qu.: 5.950   1st Qu.: -1.4000
##  Median : 2.600   Median : -2.650   Median : 8.400   Median :  0.9000
##  Mean   : 2.993   Mean   : -2.950   Mean   : 8.772   Mean   :  0.8434
##  3rd Qu.: 4.800   3rd Qu.: -1.175   3rd Qu.:10.625   3rd Qu.:  3.0000
##  Max.   :14.500   Max.   : 11.600   Max.   :23.800   Max.   : 14.4000
##  NA's   :19       NA's   :19        NA's   :19       NA's   :23
##    X            L1_9            H1_9            B1_9           C1_9
##     :218   Min.   :13.30   Min.   : 3.60   Min.   :-0.8   Min.   : 3.90
##  ---:  1   1st Qu.:21.60   1st Qu.:10.70   1st Qu.:17.8   1st Qu.:18.38
##            Median :24.80   Median :13.40   Median :20.8   Median :21.30
```

```
##            Mean   :24.59   Mean   :13.57   Mean   :20.6   Mean   :21.26
##            3rd Qu.:27.40   3rd Qu.:16.40   3rd Qu.:24.5   3rd Qu.:23.85
##            Max.   :40.60   Max.   :23.90   Max.   :37.3   Max.   :35.80
##            NA's   :66      NA's   :66      NA's   :66     NA's   :71
##       L2_9            H2_9            B2_9            C2_9
##  Min.   : 9.10   Min.   : 6.30   Min.   :-18.2   Min.   :-0.50
##  1st Qu.:17.20   1st Qu.:13.30   1st Qu.:  6.4   1st Qu.:16.77
##  Median :21.70   Median :15.90   Median : 13.6   Median :18.85
##  Mean   :21.72   Mean   :16.74   Mean   : 11.6   Mean   :19.34
##  3rd Qu.:25.80   3rd Qu.:20.30   3rd Qu.: 17.6   3rd Qu.:23.10
##  Max.   :40.80   Max.   :29.30   Max.   : 28.9   Max.   :31.00
##  NA's   :66      NA's   :66      NA's   :66      NA's   :67
##      Ttkg_9            dL_9             dH_9              dB_9
##  Min.   : 48.00   Min.   :-5.800   Min.   :-14.000   Min.   :-5.500
##  1st Qu.: 61.00   1st Qu.: 0.600   1st Qu.: -6.000   1st Qu.: 5.700
##  Median : 70.00   Median : 2.800   Median : -2.800   Median : 8.500
##  Mean   : 72.94   Mean   : 2.875   Mean   : -3.167   Mean   : 9.004
##  3rd Qu.: 83.00   3rd Qu.: 5.100   3rd Qu.: -0.400   3rd Qu.:11.900
##  Max.   :122.00   Max.   :11.600   Max.   :  6.000   Max.   :32.300
##  NA's   :131      NA's   :66       NA's   :66        NA's   :66
##       dC_9
##  Min.   :-13.800
##  1st Qu.: -1.025
##  Median :  1.800
##  Mean   :  1.720
##  3rd Qu.:  3.850
##  Max.   : 17.000
##  NA's   :71
```

1. Hüvelyi szülés után a medencefenék izmai megnyúlnak a császármetszéshez képest.

TODO: abszolút érték vagy sem?

```
csoport = Sz_mod
valt = dL_9
valt_PVN = valt[csoport=="PVN"]
valt_SC  = valt[csoport=="SC"]
```

Leíró statisztikák

```
table(csoport)
```

```
## csoport
##     PVN  SC
##   4 108 107
```

```
summary(valt_PVN)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##  -3.700   2.375   4.300   4.303   6.600  11.300      32
```

```
summary(valt_SC)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##  -5.800  -0.100   1.500   1.465   3.200  11.600      30
```

```
sd(valt,na.rm=TRUE)
```

```
## [1] 3.561687
```

```
sd(valt_PVN,na.rm=T)
```

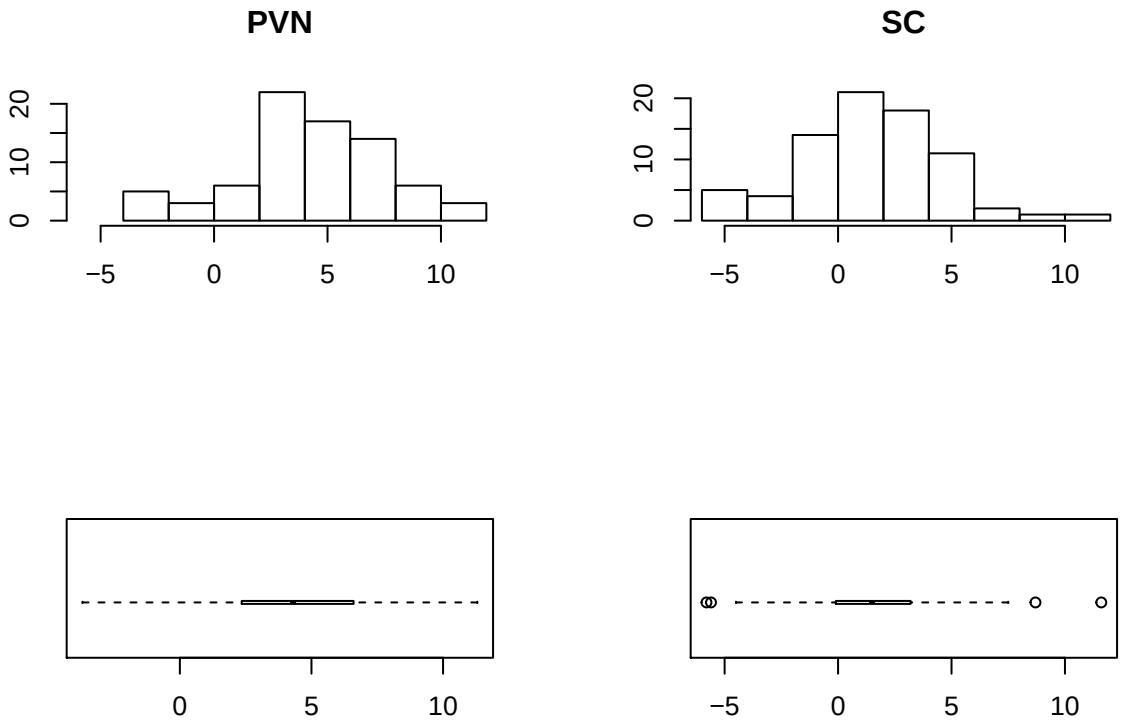
```
## [1] 3.361489
```

```
sd(valt_SC,na.rm=T)
```

```
## [1] 3.188333
```

Grafikonok

```
par(mfrow=c(2,2))
lim=c(min(min(valt_PVN,na.rm=T),min(valt_SC,na.rm=T)),max(max(valt_PVN,na.rm=T),max(valt_SC,na.rm=T)))
hist(valt_PVN,xlab="",ylab="",main="PVN",xlim=lim);hist(valt_SC,xlab="",ylab="",main="SC",xlim=lim)
boxplot(valt_PVN,horizontal=T,xlim=lim); boxplot(valt_SC,horizontal=T,xlim=lim)
```




```
par(mfrow=c(1,1))
```

Egyoldalas páros t-próba

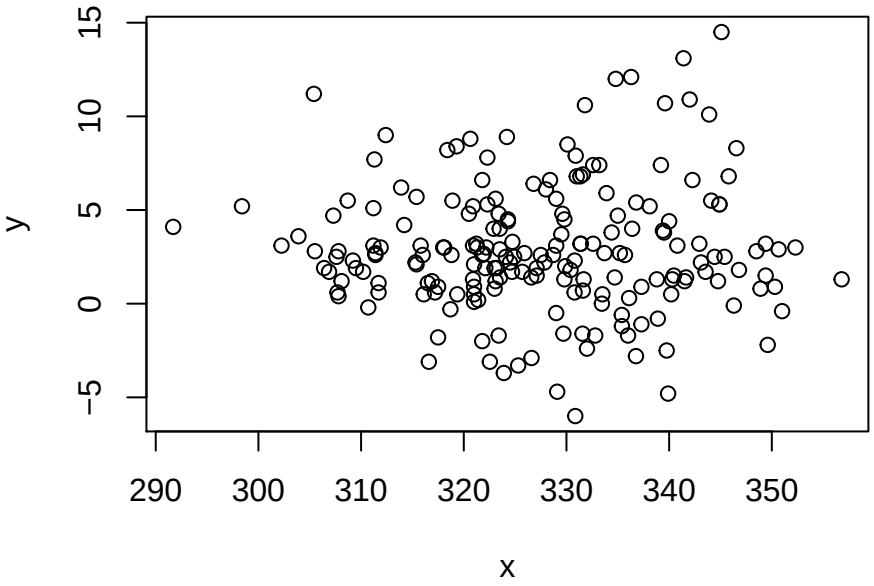
```
t.test(valt~csoport,alternative = "greater")
```

```
##
##  Welch Two Sample t-test
##
## data:  valt by csoport
## t = 5.3576, df = 150.346, p-value = 1.553e-07
## alternative hypothesis: true difference in means is greater than 0
## 95 percent confidence interval:
##  1.961624      Inf
## sample estimates:
## mean in group PVN  mean in group SC
##          4.303421          1.464935
```

2. Az újszülött súlya szignifikáns összefüggést mutat a medencefenék izmainak megnyúlásával. A nagyobb születési súllyal megnő a medencefenék izmainak megnyúlása.

TODO túl alacsony HC_8 értékek?

```
x = HC_8[HC_8>200]
y = dL_8[HC_8>200]
plot(x,y)
```




```
cor.test(x,y)
```

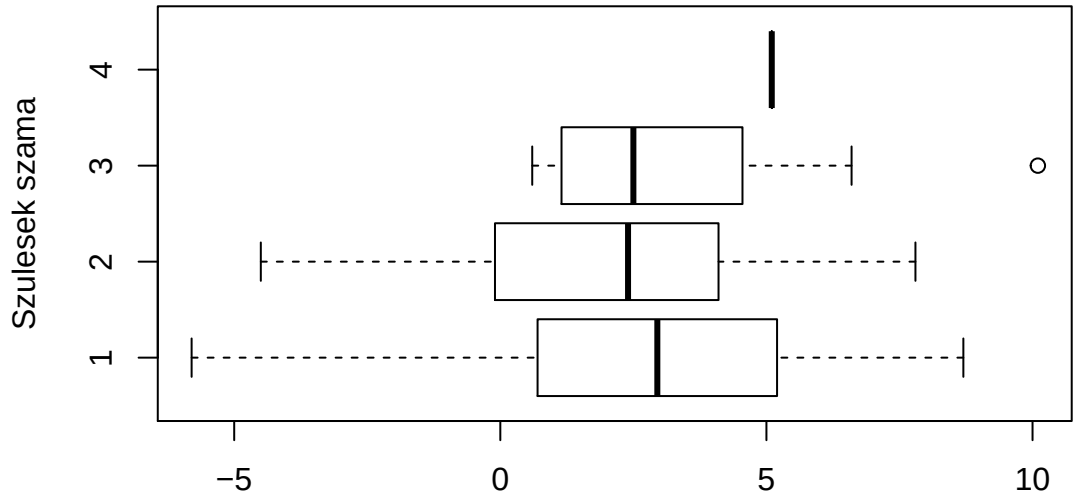
```
##
##  Pearson's product-moment correlation
##
## data:  x and y
## t = 0.274, df = 196, p-value = 0.7844
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.1202007  0.1585775
## sample estimates:
##        cor
## 0.01956877
```

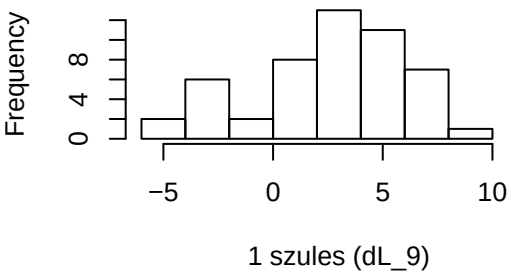
3. A szülések számával arányosan nő a medencefenék izmainak megnyúlása.

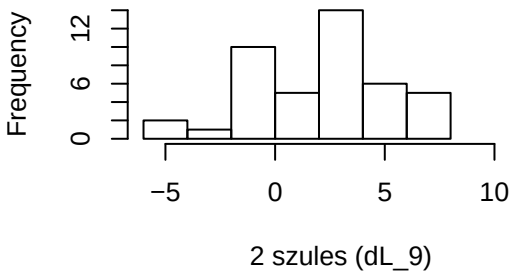
```
csoport = Pa + Cae; x = dL_9; table(csoport)
```

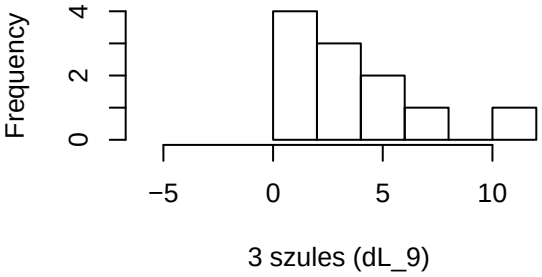
```
## csoport
##  1  2  3  4
## 73 62 17  1
```

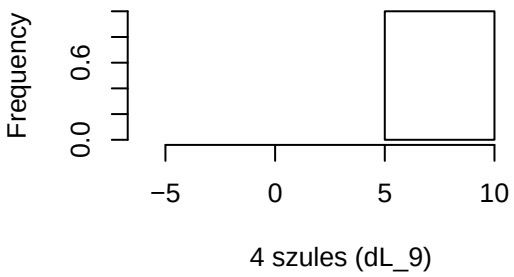
Ábrák











Egyszempontos ANOVA

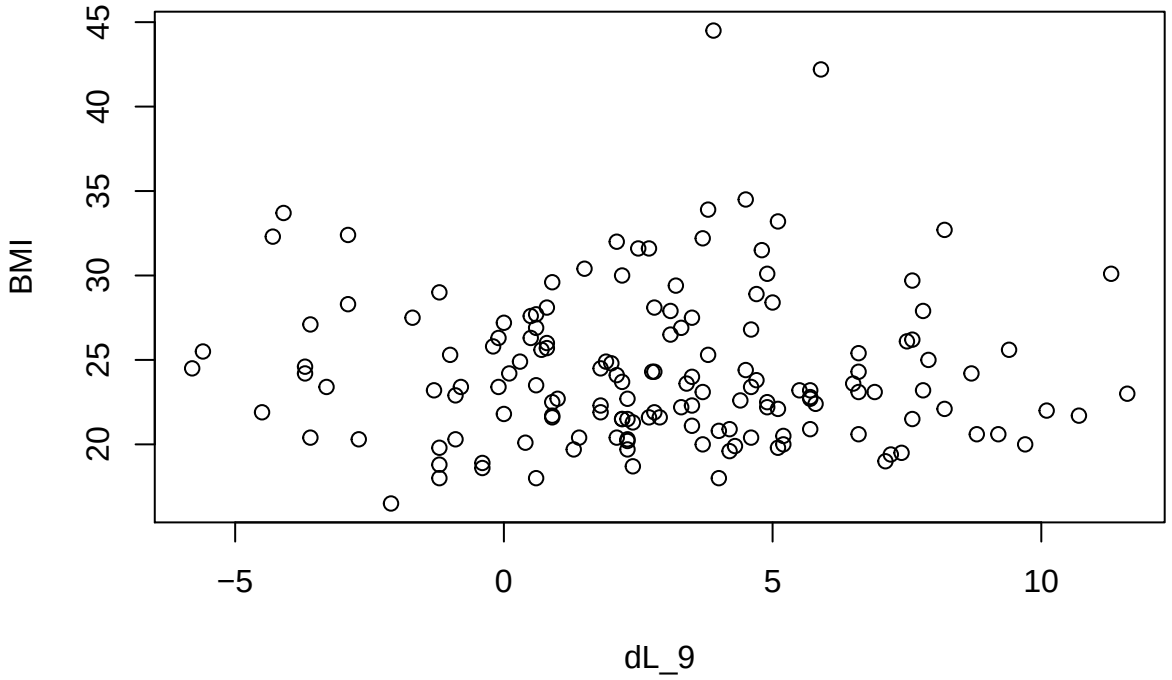
```
fit = aov(x~csoport)
summary(fit)
```

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## csoport       1    3.8   3.775   0.335  0.564
## Residuals   103 1162.0  11.281
## 114 observations deleted due to missingness
```

4. Az anyai BMI-vel arányosan nő a medencefenék izmainak megnyúlása.

TODO adatok tisztítása! Van egy 44.5-ös BMI, az reális?

```
x = dL_9
y = BMI
plot(x,y,xlab="dL_9",ylab="BMI")
```

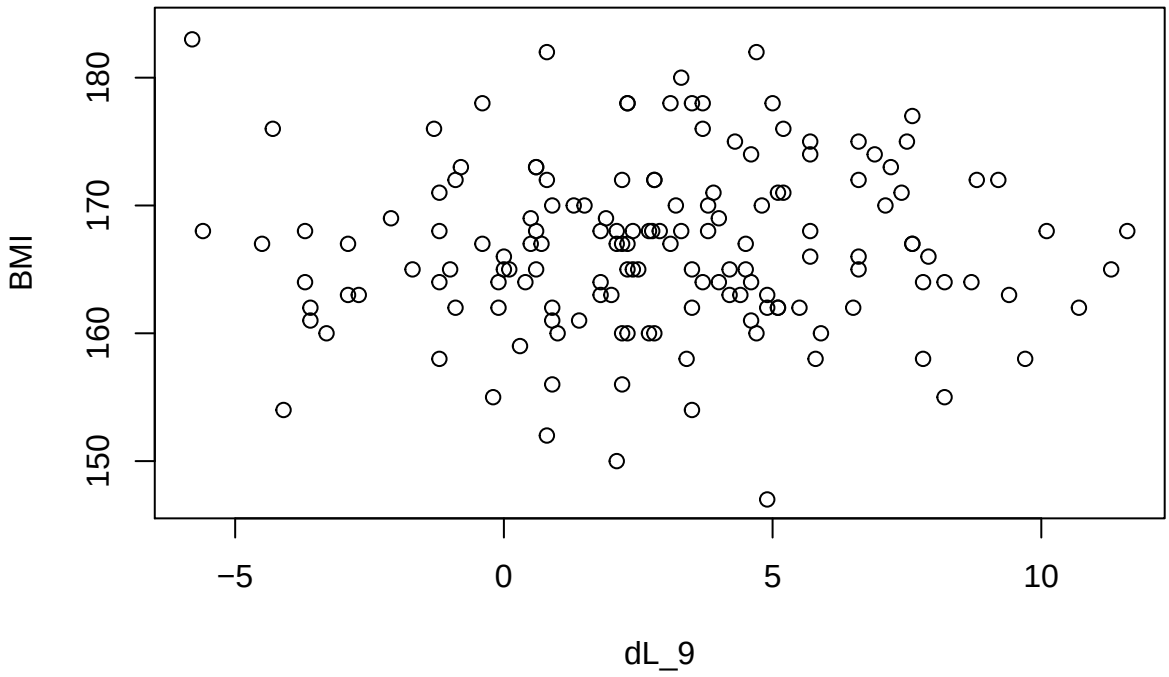



```
cor.test(x,y)
```

```
##
##  Pearson's product-moment correlation
##
## data:  x and y
## t = -0.2052, df = 150, p-value = 0.8377
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.1754861  0.1428282
## sample estimates:
##         cor
## -0.01675341
```

9. Az izommegnyúlás mértéke korrelál a testmagassággal.

```
x = dL_9
y = Mag
plot(x,y,xlab="dL_9",ylab="BMI")
```




```
cor.test(x,y)
```

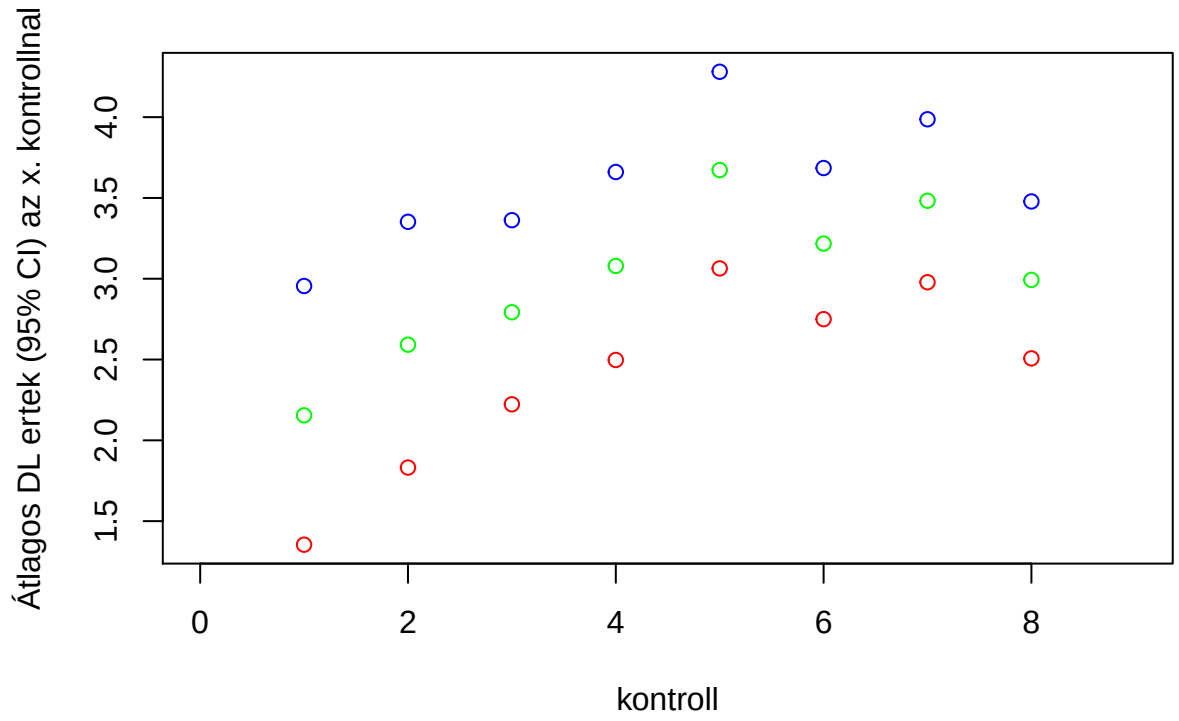
```
##
##  Pearson's product-moment correlation
##
## data:  x and y
## t = 0.2915, df = 150, p-value = 0.771
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.1359186  0.1823070
## sample estimates:
##        cor
## 0.02379702
```

5. A terhességi korral arányosan növekszig a medencefenék izmainak megnyúlása (mondjuk az első trimeszterbeli értékeket kellene összevetni a szülés előttivel).

```
df = data.frame(c(Tkor_1,Tkor_2,Tkor_3,Tkor_4,Tkor_5,Tkor_6,Tkor_7,Tkor_8),c(dL_1,dL_2,dL_3,dL_4,dL_5,dL
xTkor = df$c.Tkor_1..Tkor_2..Tkor_3..Tkor_4..Tkor_5..Tkor_6..Tkor_7..Tkor_8.
yDL = df$c.dL_1..dL_2..dL_3..dL_4..dL_5..dL_6..dL_7..dL_8.
summary(yDL)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
## -16.200   0.775   2.700   3.045   4.900  31.200     212
```

```
time = 1:8
yATLAG = c(mean(dL_1,na.rm=T),mean(dL_2,na.rm=T),mean(dL_3,na.rm=T),mean(dL_4,na.rm=T),mean(dL_5,na.rm=T
dL1 = t.test(dL_1); dL1_conf=c(dL1$conf.int[1],dL1$conf.int[2])
dL = t.test(dL_2); dL2_conf=c(dL$conf.int[1],dL$conf.int[2])
dL = t.test(dL_3); dL3_conf=c(dL$conf.int[1],dL$conf.int[2])
dL = t.test(dL_4); dL4_conf=c(dL$conf.int[1],dL$conf.int[2])
dL = t.test(dL_5); dL5_conf=c(dL$conf.int[1],dL$conf.int[2])
dL = t.test(dL_6); dL6_conf=c(dL$conf.int[1],dL$conf.int[2])
dL = t.test(dL_7); dL7_conf=c(dL$conf.int[1],dL$conf.int[2])
dL = t.test(dL_8); dL8_conf=c(dL$conf.int[1],dL$conf.int[2])
yConfLower = c(dL1_conf[1],dL2_conf[1],dL3_conf[1],dL4_conf[1],dL5_conf[1],dL6_conf[1],dL7_conf[1],dL8_
yConfUpper = c(dL1_conf[2],dL2_conf[2],dL3_conf[2],dL4_conf[2],dL5_conf[2],dL6_conf[2],dL7_conf[2],dL8_
yl=c(min(yConfLower),max(yConfUpper))
xl = c(0,9)
#plot(time,yATLAG,xlab="kontroll",ylab="Atlagos DL ertek az x. kontrollnal",xlim=xl,ylim=yl)
co=c("red","red","red","red","red","red","red","red","green","green","green","green","green","green","gr
plot(c(time,time,time),c(yConfLower,yATLAG,yConfUpper),col=co,xlab="kontroll",ylab="Átlagos DL ertek (95
```

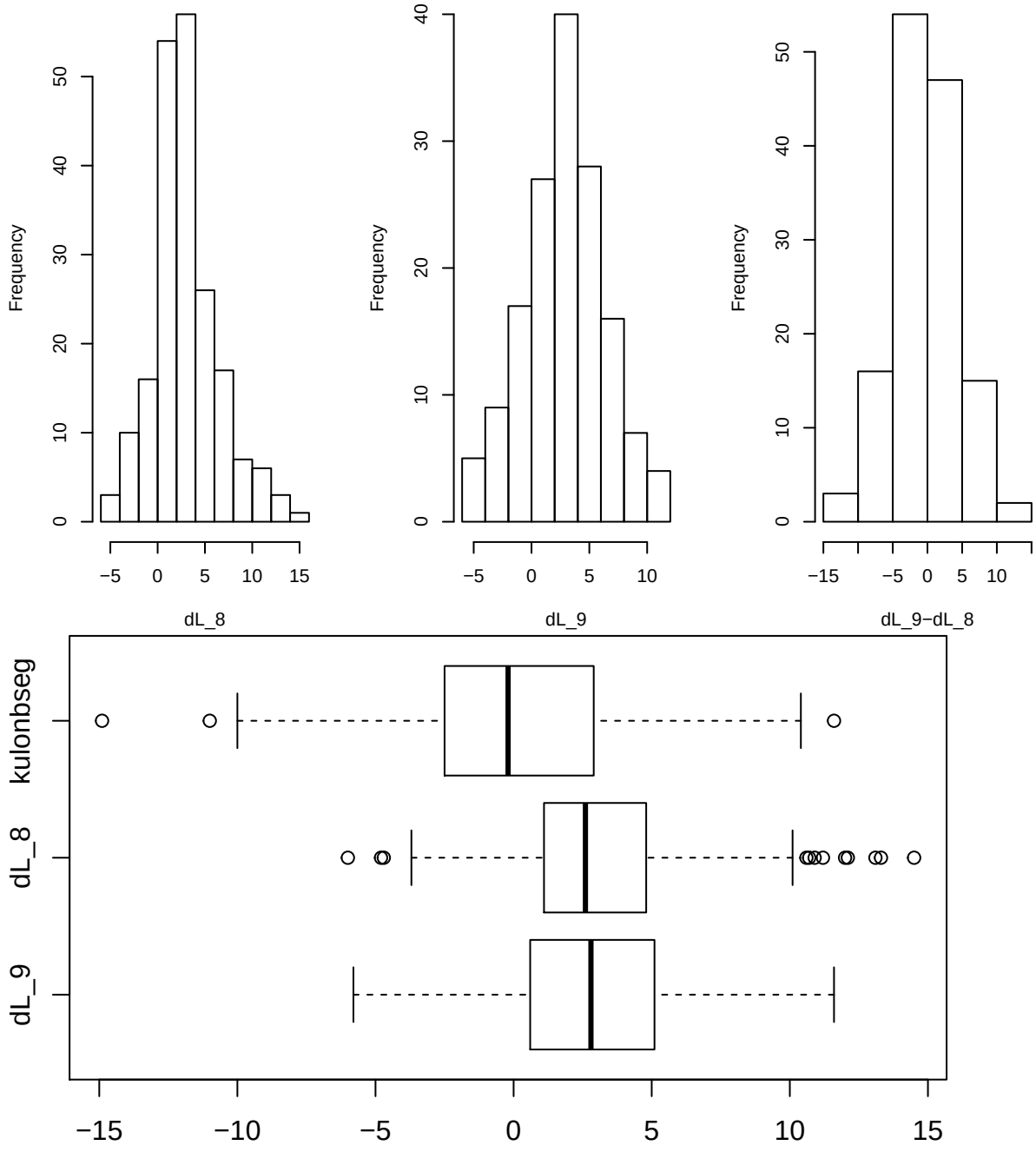


```
#par(new = TRUE);plot(time,yConfLower,col="blue",xlim=xl,ylim=yl, xlab='', ylab='', axes=F);par(new = F
#plot(x,y,xlab="Tkor",ylab="dL")
#cor.test(x,y)
```

6. A szülés előtti medencefenék (36. hetes UH) megnyúlása nagyobb a szülés utáni 6 hetes kontrollhoz képest.

```
kontroll_6hetes = dL_9
szules_elott = dL_8
kul = szules_elott - kontroll_6hetes
```

Ábrák



Páros t-próba

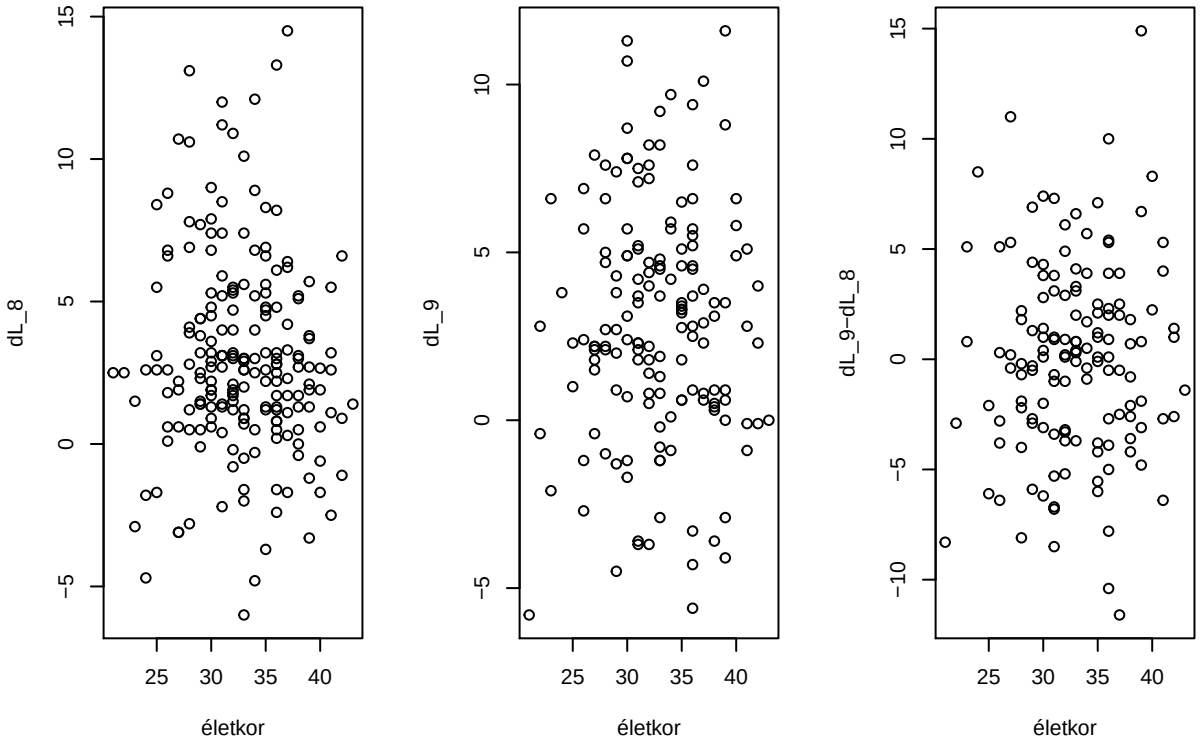
```
t.test(kontroll_6hetes,szules_elott,alternative="greater",paired=TRUE)
```

```
##
##  Paired t-test
##
## data:  kontroll_6hetes and szules_elott
## t = 0.1897, df = 136, p-value = 0.4249
## alternative hypothesis: true difference in means is greater than 0
## 95 percent confidence interval:
##  -0.5529987        Inf
## sample estimates:
## mean of the differences
##              0.07153285
```

7-8. Fiatalabb várandósoknál kisebb mértékű az izmok megnyúlása, mint az idősebbeknél. Fiatal várandósoknál nagyobb a szülés előtt és a szülés után mért izomnyúlás közötti különbség, mint az idősebb várandósoknál. (jobb a regenerációs hajlam fiatalabb korban)

```
x = Ék
y1 = dL_8
y2 = dL_9
yd = y2-y1
```

Ábrák



Korreláció vizsgálatok

```
cor.test(x,y1)
```

```
##
##  Pearson's product-moment correlation
##
## data:  x and y1
## t = -0.9001, df = 198, p-value = 0.3692
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.2007966  0.0755764
## sample estimates:
##         cor
## -0.06383395
```

```
cor.test(x,y2)
```

```
##
##  Pearson's product-moment correlation
##
## data:  x and y2
## t = 0.101, df = 151, p-value = 0.9197
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.1506567  0.1666787
## sample estimates:
##         cor
## 0.008217919
```

```
cor.test(x,yd)
```

```
##
##  Pearson's product-moment correlation
##
## data:  x and yd
## t = 0.5973, df = 135, p-value = 0.5513
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.1173896  0.2171821
## sample estimates:
##        cor
## 0.05133657
```

10. Szülés módja alapján a dL_9-dL_8 értékek nőnek hüvelyi szülés esetén

Leíró statisztikák

```
csoport = Sz_mod
valt = dL_9-dL_8
valt_PVN = valt[csoport=="PVN"]
valt_SC = valt[csoport=="SC"]
summary(valt);summary(valt_PVN);summary(valt_SC)
```

```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.      NA's
## -11.60000  -2.90000   0.20000   0.07153   2.50000  14.90000        82
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##  -8.500  -0.600   1.000   1.412   3.950  11.000      41
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
## -11.600  -3.550  -1.200  -1.211   1.300  14.900      37
```

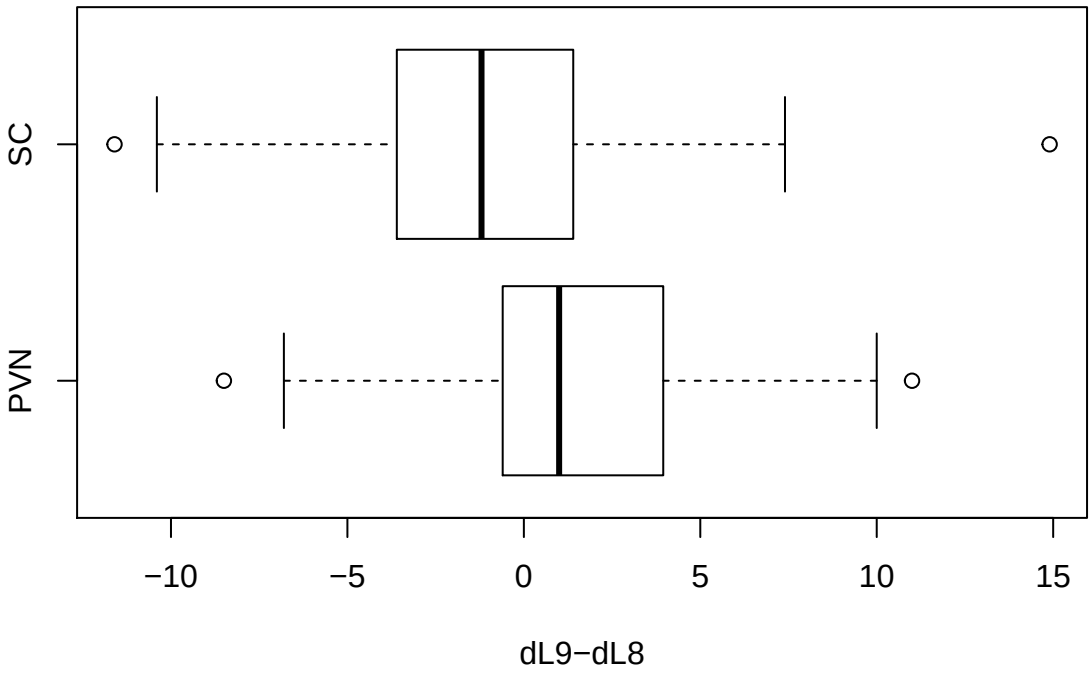
```
sd(valt,na.rm=TRUE);sd(valt_PVN,na.rm=TRUE);sd(valt_SC,na.rm=TRUE)
```

```
## [1] 4.413864
```

```
## [1] 4.166042
```

```
## [1] 4.287648
```

Ábrák



Kétmintás t-próba

```
t.test(valt_PVN,valt_SC,alternative="greater")
```

```
##
##  Welch Two Sample t-test
##
## data:  valt_PVN and valt_SC
## t = 3.6321, df = 134.968, p-value = 0.0001991
## alternative hypothesis: true difference in means is greater than 0
## 95 percent confidence interval:
##  1.427133      Inf
## sample estimates:
## mean of x mean of y
##  1.411940 -1.211429
```