



Using BIA method, VFA cannot be measured directly. However, with InBody's high accuracy, it is possible to use the regression method to get accurate information of VFA.

According to the principle of BIA methodology, impedance of a cylinder is proportionate to its length but inversely proportionate to its area.<sup>1</sup>

$$\begin{aligned} \text{Impedance} &= \rho (\text{Length} / \text{Area}) && \dots\dots 1 \\ \text{Volume} &= \text{Length} * \text{Area} && \dots\dots 2 \\ \text{Volume} &= \rho (\text{Length}^2 / \text{Impedance}) && \dots\dots 3 \end{aligned}$$

With trunk impedance and height\*, the volume of trunk is calculated<sup>3</sup> and by substituting volume and length to the equation, area can also be found<sup>2</sup>.

\*. Using total body height instead of segmental length does not cause significant changes.

**Bedogni G, Malavolti M, Severi S, Poli M, Mussi C, Fantuzzi AL, Battistini N.** Accuracy of an eight-point tactile-electrode impedance method in the assessment of total body water. *Eur J Clin Nutr.* 2002 Nov;56(11):1143-8.

VFA of InBody is predicted using the regression method. We measured VFA of subjects with CT scan and their impedance values as well. Then we came up with a related equation and confirmed its validity. It concerns impedance of trunk, body composition, age and gender.

### 1. VFA Scanning Location (Getting Area Using CT SCANNING)

#### Abdomen - Umbilical Level



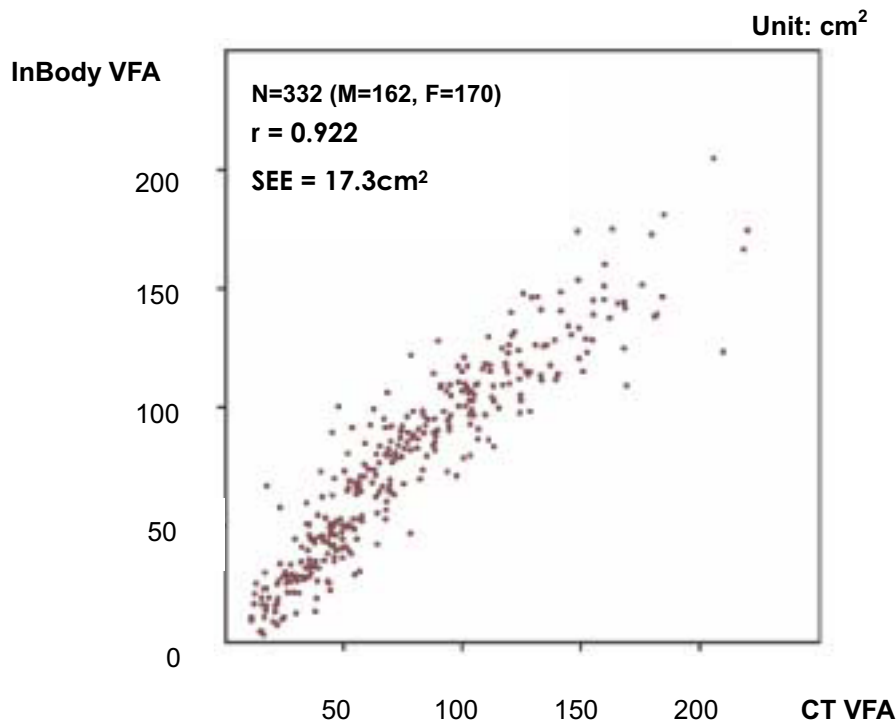
**Figure. Location of Abdomen CT**

Figure shows the scanning location (2/2 line).

## 2. Validity Study of the InBody VFA

1) N=332 R=0.922 SEE=17.3cm<sup>2</sup>

Total number of the Subjects: 332 (General people aging from 7 to 88)  
SOMATOM PLUS 24 (SIEMENS, GERMANY, 1994) was used at Sanggye Paik Hospital of Inje University.



2) Cut off (100 cm<sup>2</sup>) Reference

- 1) Kvist H, Chowdhury B, Grangard U, Tuyen U, Sjostrom L. Total and visceral adipose tissue volumes derived from measurements with computed tomography in adult men and women: predictive equations. Am J Clin Nutr 1988;48:1351-1361.
- 2) Borkan GA, Hulth DE, Gerzof SG, Robbins AH and Silbert CK., Age changes in body composition revealed by computed tomography., J Gerontol 1983 ; 38(6) :673-677.
- 3) Bernardo Leo Wajchenberg., Subcutaneous and Visceral Adipose Tissue: Their Relation to the Metabolic Syndrome, Endocrine Reviews 2000 ; 21(6) : 697-738.



- 4) Despre`s J-P, Lamarche B. Effects of diet and physical activity on adiposity and body fat distribution: implications for the prevention of cardiovascular disease. *Nutr Res Rev* 1993;6:137-159.
- 5) Saito Y, Kobayashi J, Seimiya K, Hikita M, Takahashi K, Murano S, Bujo H, Morisaki N. Contribution of visceral fat accumulation to postprandial hyperlipidemia in human obesity. Eighth International Congress on Obesity. *Int J Obes* ;[Suppl 3] P.496, p S226,1998.
- 6) Bernardo Leo Wajchenberg, Subcutaneous and visceral Adipose Tissue: Their Relation to the Metabolic Syndrome. *Endocrine Reviews* 21(6): 697-738, 2000
- 7) Barbara J. Nicklas, PHD<sup>1</sup>, Brenda W.J.H. Penninx, PHD<sup>1</sup>, Alice S. Ryan, PHD<sup>2</sup>, Dora M. Berman, PHD<sup>2</sup>, Nicole A. Lynch, PHD<sup>2</sup> and Karen E. Dennis, PHD<sup>3</sup>, Visceral Adipose Tissue Cutoffs Associated With Metabolic Risk Factors for Coronary Heart Disease in Women, *Diabetes Care* 26:1413-1420, 2003