well-established in humans or the intake or supply of which cannot be estimated. Specific priority is given in the following order: (1) protein and energy, (2) carbohydrates (% energy) and total lipids (% energy); (3) other nutrients (those in which the DRIs-J are given as EAR, RDA or AI) with their content indicated in the Standard Tables of Food Composition in Japan, 5th Revised Edition,[21)] as well as calcium and dietary fiber; (4) other nutrients (those with their dietary reference intake listed as DG) the nutritional content of which is listed in the aforementioned Standard Tables;[21)] (5) those nutrients, the nutritional content of which is not listed in the aforementioned Standard Tables.[21)]

4-5. Notes on Correlation with Food Composition Tables

In dietary assessment or planning, one may estimate the intake from the weight of the food consumed or determine the amount of food to be offered based on the nutrient content of that food. In such instances, the Standard Tables of Food Composition in Japan 5th Revised Edition[21)] is used most frequently. For the definition of nutrients, however, there is a slight inconsistency in the DRIs-J and the aforementioned Standard Tables[21)] that were published in 2000. Those nutrients that require special attention are listed in Table 12.

Table 12 Nutrients that are divergent and their details according to Dietary Reference Intakes for Japanese (DRIs-J) and Standard Tables of Food Composition in Japan, 5th Revised Edition (edited by The Resources Council of the Science and Technology Agency of Japan, November 22, 2000)

Nutrients	Cause for inconsistency		Notes when the intake or the amount given is estimated by using the Standard Tables of Food Composition in Japan, 5th Revised Edition and compared against the DRIs-J
	DRIs-J	Standard Tables of Food Composition in Japan, 5th Revised Edition	
Vitamin A	1/12 is used for the coefficient of β-carotene equivalent in computing retinol equivalents.	For the coefficient of β-carotene equivalents, 1/6 is used in computing retinol equivalent.	(Retinol + carotene/12) is used in computing the retinol equivalents.
Vitamin E	This is meant to be α-tocopherol only.	The α-tocopherol equivalent computed by using α-, β-, γ- and δ-tocopherol.	The total vitamin E (α-tocopherol equivalent) is interpreted to be α-tocopherol. (Neither β-, γ-, nor δ-tocophenol is converted to α-tocopherol; therefore α-tocopherol equivalent is not used.)
Niacin	Niacin equivalents (Nicotinamide [mg] +nicotinic acid [mg] +tryptophan [mg]/60) is used for niacin equivalents.)	Nicotinic acid equivalent is indicated (niacin that is synthesized in the body from tryptophan is not included).	This is expressed in the form, Niacin [mg] + protein (mg)/6,000. It is not accurate in a strict sense but the assumption that the quantity of tryptophan in food roughly amounts to 1/100 of protein does not appear to cause a problem in the application.

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II. PARTICULAR TOPIC
[ENERGY]

1. Basic Points

The role of energy [unit: kcal or MJ (M joule), 1.00 kcal = 4/18 kJ, M (mega)=10^6] in an adult is to provide basal metabolism—synthesis and degradation of body components, maintenance of body temperature, and minimal conservation of organ activities—and to resynthesis of adenosine triphosphate that is consumed in association with muscular activities during physical activity. In adults with no changes in body weight, energy expenditure and energy intake are equal. The energy that has not been consumed accumulates in the form of fat, mainly in fat cells. In the musculoskeletal system, the energy is stored as glycogen and triglyceride but the amount stored in the system is very scarce than that stored in the fat cells. A proliferation of fat cells takes the form of obesity, which constitutes a risk factor for many lifestyle-related diseases. If energy expenditure exceeds energy intake, on the other hand, the amount of fat that has accumulated in one's fat cells and the proteins in one's muscles are depleted, resulting in a deterioration of physical functions and quality of life. Therefore it is desirable for adults to take in the amount of energy that corresponds to the amount that is consumed.

Children and infants who are in the growth stage require energy not only to meet their daily needs but also to form tissues for their growth. Estimated Energy Requirement (EER) should be determined with the consideration. Pregnant and lactating women need energy for themselves, as well as for the growth of the fetus or production of milk.

2. Estimated Energy Requirement

2-1. Definition of the Estimated Energy Requirement (EER)

The concept of Dietary Reference Intakes for Japanese (DRIs-J) that is used for other nutrients cannot be applied to determine the dietary reference intakes for the energy. Like the practice in the United States and Canada in preparing their dietary reference intakes,[1, 2] the concept of Estimated Energy Requirement (EER) is applied. Therefore, the concept of EER was applied which is also the concept used in the United State and Canada's dietary reference intakes. EER is defined as "the energy intake that is estimated to have the highest probability for energy balance (for adults, energy expenditure – energy intake) to become zero (0)." Unlike the DRIs-J for other nutrients, the probability of achieving the appropriate energy balance is lower whenever the energy intake is excessive or insufficient. In other words, when the energy intake exceeds the EER for the specific gender or age group, the probability for weight gain increases; if the intake is inadequate, the probability for weight loss increases.

2-2. Basic Approach in Computation

As a rule, EER is computed as follows:

Basal Metabolic Rate (BMR, kcal/day) x PAL

Energy deposition is added for children considering increases of body tissue due to growth.

For pregnant women, the energy required for changes in tissue of the fetus and maternal body is added. For lactating women, the energy needed for lactation is added.

The BMR is computed as follows:

Reference BMR (kcal/kg weight/day) x reference weight (kg)

The BMR is measured early in the morning (before breakfast) while the subject is resting in the supine position in a comfortable indoor environment. A representative value for BMR per kg is based on a number of reports. This is called the reference BMR.

The adequacy of the reference BMR (Table 1) adopted by the 6th revision was reevaluated. Specifically, the reference BMR was compared against those in recent 5 reports (on 6 groups) where the determinations were known to be accurate (Table 2).[4-8] It was confirmed that the mean (kcal/day) of the "reference BMR" or the "reference BMR x reference weight" of Table 1 is within –5.5 ~ +4.2% of the mean of the "BMR per kg weight" or the "BMR (kcal/day)" given in the aforementioned 5 reports (Table 2). Therefore it was decided that the basic metabolic rate of Table 1 that was used in the previous revision was used as it is in the current revision.

The Physical Activity Level (PAL) is an index derived by subtracting the BMR per day from the energy expenditure per day.[9-11] The daily energy expenditure of a subject who engages in normal daily activities is determined most accurately by a doubly labeled water (DLW).[1, 2, 10] Based on the reports that accurately determined the energy expenditure (by DLW method) and the BMR, the reference value for PAL was established as follows.

2-3 Adults

Using the data (from "2003 project to estimate energy consumption by DLW method" the National Institute of Health and Nutrition) to determine the PAL of Japanese adults (n=139, 20 to 59 years), the group was divided into 3, using the 25th and 75th percentile values (1.60 and 1.90, respectively) (Table 3). Based on the results of stratification, the groups were labeled starting from the lowest activity level as level I (low, physical activity representative value = 1.50); level II (normal, physical activity, representative value = 1.75); and level III (high, physical activity representative value = 2.00). According to this classification, the numbers of individuals allocated to each level were roughly represented by ratios of 1: 2: 1.

According to the previous revision, the intensity of life activities was stratified into 4 levels. In the DRIs-J, however, we considered the fact that only a few exhibited a very high physical activity level (e.g., engaging in intense physical training or employed in work that require heavy physical exertion) and chose a 3-level classification omitting the fourth, heavy physical activity level. The United States and Canadian's dietary reference intakes, which is referenced frequently,[1,2] has 4 physical activity levels - 3 levels generally corresponding to the results of the current reversion plus a level for a "very low physical activity for those who rarely leave the house."

As shown in Table 3, the mean ± standard deviation (SD) for the physical activities of all subjects was 1.75 ± 0.22. The representative value (or mean) for Level I generally corresponds to "the mean − 1 x SD" for the entire group and the representative value (or mean) for Level III, "the mean + 1 x SD."

The results of studies on physical activities of relatively sedentary Japanese adults by employing a highly reliable method were compared against those of recent studies on Chinese and Americans. The outcome of these comparisons is shown in Table 4.[1, 5, 6, 12] Among the studies on Japanese, one had a special emphasis on the life activities of people who spent most of their time sitting[5] and was therefore excluded from the comparisons. The weighted average of the PAL for the remainder of the studies was 1.78 for men and 1.77 for women. According to the dietary reference intakes in the United States and Canada,[1] the corresponding figures were 1.75 for men and 1.78 for women (19 to 70 years). Furthermore, according to the record on the urban population in China (33 men and 40 women), the figures were 1.69 for men and 1.65 for women.[12] In addition to these statistical results, the data that have been reported[1, 10, 13] led to an estimate of the representative value for PAL for both men and women: 1.75, which corresponded to the mean for the subjects shown in Table 3.

Compared with the younger subjects, the PAL is lower in older people (aged 70 years and over), the mean being around 1.50 (SD, 0.2).[14-17] Considering such reductions in PAL due to aging, values of 1.3, 1.5, and 1.7, were set for those over 70 years (Table 5).

EER was computed for each PAL that has been described above.

2-4. Children

Children in the growth stage require energy not only for physical activities but also need to intake additional energy for tissue synthesis and for increased tissue (hereafter called energy deposition). The energy used for tissue synthesis is included in the amount of the total energy consumed. Therefore EER (kcal/day) can be computed as follows:

BMR (kcal/day) x PAL + energy deposition

Because PAL differs according to the age group, a systemic review was conducted on the reports for the determination of the PAL specific to children by employing the DLW technique (Fig. 1). It was found that the means for PALs were 1.4, 1.5, 1.7, 1.7, 1.7, and 1.75 for ages 1 through 2 years, 3 through 5 years, 8 through 9 years, 10 through 11 years, 12 through 14 years, and 15 through 17 years, respectively, showing a tendency for increases as they grow older. There were no reports on ages 6 through 7 years but it was assumed that the figure is most likely intermediate (i.e., 1.6) between the two preceding and succeeding age groups. The figures given above were used as the representative values for PALs of children (Table 5). A meta-analysis of 17 studies on the relationship between the age and PAL also concluded that the latter increases as children grow older.[18)]

Ages 1 through 2 years, 3 through 5 years, as well as 6 through 7 years, individual differences in PAL is considered to be relatively insignificant. Therefore it was decided not to make a distinction in PAL for these age categories. For age over 8 years, there are some children with a very high PAL because of extracurricular and club activities. Therefore their PALs were set at 1.7 and 1.9. The PALs for ages 15 through 17 years were set at 3 levels as in adults.

For the energy required for increased tissue, the increase in body weight per day was computed from the reference weight and multiplied by the energy density for increased tissue(Table 6).[20-22)] Refer to Table 6 for the details on the computation method.

2-5. Infants

Like young children, infants require an extra energy for tissue synthesis and energy deposition, in addition to that necessary for physical activities. The energy that is consumed in tissue formation is included in the total energy expenditure; therefore EER is computed as follows:

Total energy expenditure + energy deposition

Based on the results from an earlier study in which a DLW was used, FAO[23)] conducted studies on the relationships among gender, age (months), body weight, body height, and the total energy expenditure by infants. Subsequently, they reported that the last can be explained by the following regression equation, where body weight is the only variable:

Breastfed infants:

Total energy expenditure (kcal/day) = 92.8 x reference weight (kg) – 152.0

Formula-fed infants:

Total energy expenditure (kcal/day) = 82.6 x reference weight (kg) – 29.0

No reports on total energy expenditure of Japanese infants that was determined by employing a sufficiently reliable method are available; therefore, in the DRIs-J, the reference body weight for Japanese was used in these regression equations to compute the total energy expenditure (kcal/day).

For the energy deposition, like children, the increase in body weight per day was calculated from the reference weight, which was multiplied by the energy density for tissue proliferation (Table 6).[20)] Refer to Table 6 for the computational details.

Compared with breast-fed infants, total energy consumption is greater for formula-fed infants. Therefore EER was computed separately for these two groups of infants.

In addition, the energy content of human milk is 661kcal/L and multiplied by 0.78L/day, the mean volume of milk consumed by infant is estimated as 516kcal/day.

2-6. Pregnant and Lactating Women

For EER for pregnant women, FAO[23)] took the total energy expenditure of women of comparable age as well as its changes due to pregnancy and energy deposition into consideration and added a certain amount to each stage of pregnancy. Cross-sectional studies revealed that PAL is reduced during the early and late stages of pregnancy while the BMR markedly increases at the late stage of pregnancy.[23-26)] Consequently, the increases in total energy expenditure for early, middle, and late stage of pregnancy were expressed as 1%, 6%, and 17%, respectively, which generally correspond to the increases in body weight (2%, 8%, and 18%, respectively). Throughout pregnancy, the total energy expenditure per kg body weight generally remains constant; therefore based on the weight gain in each stage of pregnancy, the following adjustments were made for the changes in total energy consumption: early stage, +20kcal/day; mid-stage, +85kcal/day; late stage, +310kcal/day.[23)] The energy deposition was computed as the sum of energy deposition of protein and fat which are estimated from amount of protein and fat stored during each stage of pregnancy.[23)] Thus the following figures were found to represent the energy deposition for each stage of pregnancy: early stage, 48kcal/day; mid-stage, 182kcal/day; late stage, 185kcal/day.[23)] Ultimately, the amount of energy to be added at each stage of pregnancy was interpreted to be the sum of total energy expenditure plus the energy deposition (affected by pregnancy), which was rounded to 50kcal units as follows: early stage, 50kcal/day; mid-stage, 250kcal/day; late stage, 500kcal/day.

EER for lactating women was computed as follows:[23)]

Total energy expenditure + equivalent of milk secreted - amount of weight loss

It is believed that the total energy expenditure during the lactating period is similar to non-pregnant period.[23-27)] The amount of milk secreted was assumed to be equal to the amount suckled by the infant (0.78L/day);[28)] the energy of the human milk is set at 661kcal/L; and the energy conversion efficiency is assumed to be 80%.[23] Under these conditions, the following was formulated:

$$0.78\text{L/day} \times 661\text{kcal/L} \div 0.80 \approx 644\text{kcal/day}$$

The energy corresponding to the body weight reduction was set at 6,500kcal/kg and the amount of body weight lost at 0.8kg/month[23] and the energy to be subtracted in the equation shown above was computed as:

$$6{,}500\text{kcal/kg body weight} \times 0.8\text{kg/month} \div 30 \text{ days} \approx 173\text{kcal/day}$$

Thus the amount to be added for breast-feeding was computed to be 644 – 173 = 471kcal/day, which was rounded in 50kcal units to 450kcal/day.

3. Basic Approach in Application

3-1. Assessment of Energy Intake

As a rule, BMI is used for the assessment of energy intake. In other words, when BMI is within an appropriate range (over 18.5 and under 25.0),[29, 30] the energy intake is generally considered to be appropriate.

The energy intake data obtained from dietary surveys is rather not recommended to use as a main index for an assessment, but recommended to use as an auxiliary index. Two reasons are pointed out and those are the problem of underreporting and the difficulty in detecting one's habitual intake.

Although its extent may vary depending on the subjects or the survey method, foreign studies have estimated the underreporting to be between 5 to 20%.[31] In Japan, it is reported to be about 8%.[32] It is also known that this tendency is exaggerated among obese individuals.[31, 33, 34] The extent of underreporting has not been sufficiently elucidated.

Although, it is difficult to indicate a specific survey period needed to assess the "habitual intake" of energy, approximately one week is needed for habitual energy intake according to studies that observed day-to-day variations.[35-38] However, in view of the difficulty in conducting a survey for such a long period, it is more practical to research at least two days (preferably non-consecutive two days) and use the mean of the intake data when dietary record or recall methods is used.[39]

For the assessment of energy intake of a group, the percentage by which BMI is in an appropriate range (over 18.5 and under 25.0) is used as an index.

3-2. Planning of Energy Intake

When BMI is in an appropriate range (between 18.5 and 25.0), the basis of energy intake planning would be to maintain his/her current body weight. More specifically, it is to take EER.

For those BMI is over 25.0, the basic approach will be to cut down the energy intake and reduce the body weight by stepped-up physical activities. Of the two approaches to reduce body weight, the latter is considered to be more important. Placing limitations on energy intake is associated with a risk of reducing one's intake of various nutrients so this should not be regarded as the main instrument of weight reduction. Increase of physical activities increases one's energy requirement, while weight reduction causes reduction of the energy requirement. Energy intake is to be adjusted while observing these changes. Physical activities have effect not only through reduction of BMI but independently reduce the risk for various lifestyle-related diseases—especially myocardial infarction,[40] diabetes mellitus,[41] and colorectal cancer.[42, 43] Therefore, increase of physical activities is highly recommended.

When BMI is less than 18.5, the intake of energy is raised to increase the body weight, while the level of physical activity is maintained 'as is' (or increased). The increase in body weight is followed by an increase in the energy requirement. The energy intake is adjusted while these changes are being observed.

When an increase or reduction in body weight is desired, it is recommended that the body weight be monitored about every 4 weeks and the subject is followed-up for over 16 weeks. According to a meta-analysis on 493 interventional studies that were conducted to reduce body weight by restricting one's dietary intake, exercising or both (for example) the mean BMI was found to be 33.2, mean interventional period, 16 weeks, and the mean body weight loss, 11 kg.[44] The same study noted that the intervention by both dietary restrictions and exercise was more effective than dieting or exercise alone. The importance of weight control by employing both regimens is indicated.

In planning the intake of energy for a group, one should strive to maximize the percentage of those with their BMI in an optimum range (over 18.5 and below 25.0).

Table 1 Basal Metabolic Rate

Sex	Males			Females		
Age (years)	Reference BMR (kcal/kg weight/day)	Reference weights (kg)	BMR (kcal/day)	Reference BMR (kcal/kg weight/day)	Reference weights (kg)	BMR (kcal/day)
1-2	61.0	11.9	730	59.7	11.0	660
3-5	54.8	16.7	920	52.2	16.0	840
6-7	44.3	23.0	1020	41.9	21.6	910
8-9	40.8	28.0	1140	38.3	27.2	1040
10-11	37.4	35.5	1330	34.8	35.7	1240
12-14	31.0	50.0	1550	29.6	45.6	1350
15-17	27.0	58.3	1570	25.3	50.0	1270
18v29	24.0	63.5	1520	23.6	50.0	1180
30-49	22.3	68.0	1520	21.7	52.7	1140
50-69	21.5	64.0	1380	20.7	53.2	1100
≥70	21.5	57.2	1230	20.7	49.7	1030

BMR, basal metabolic rate

Table 2 Recently reported data on Basal Metabolic Rate of Japanese (mean±SD)

Ref. No.	Subjects	Sex (n)	Age (years)	BMR: actual value	BMR: estimated value	Gap between actual and estimated values[1]
4)	Adolescents (non-exercising group)	F (19)	20.1±0.7	23.3±2.3 (kcal/kg weight/day)	23.6 (kcal/kg weight/day)[2]	+1.3
5)	Adults	M (21)	30±11	1586±257 (kcal/day)	1649±261 (kcal/day)	+4.0
		F (20)	32±10	1155±123 (kcal/day)	1203±145 (kcal/day)	+4.2
6)	Adults	M (40)	50±12 (30-69)	1459±181 (kcal/day)	1435 (kcal/day)[2]	-1.7
7)	Adults	F (70)	60.6±4.2 (53-69)	21.9±2.2 (kcal/kg weight/day)	20.7 (kcal/kg weight/day)[2]	-5.5
8)	Aged	F (130)	79.5±7.0	20.9±3.8 (kcal/kg weight/day)	20.7 (kcal/kg weight/day)	-1.0

[1] (Estimated value – actual value)/actual value (%)

[2] Value estimated from the reported mean age and mean weight (not given in the text).

BMR, basal metabolic rate; M, male; F, female

Table 3 Attributes of subjects according to physical activity level and physical activity (mean±SD) (Project of the National Institute of Health and Nutrition, 2003)

PAL (range)	N	Sex ratio (% male)	Age (years)	BMI (kg/m^2)	PAL
Level I (<1.6)	38	55	40±11	23.9±2.5	1.50±0.08
Level II (≥1.6, ≤1.9)	65	52	39±11	22.8±3.1	1.74±0.08
Level III (>1.9)	36	39	40±9	21.3±2.6	2.03±0.13
Total	139	50	39±10	22.7±2.9	1.75±0.22

N, number; BMI, body mass index; PAL, physical activity level

Table 4 Reports on cases with known PAL[1] (mean±SD)

Ref No.	Subjects	Gender (n)	Age (years)	BMR (kcal/day)	Energy expenditure (kcal/day)	PAL
6)	Japanese	M (40)	50±12 (30-69)	1459±181	2672±369	1.85±0.28
5)	Japanese (reproducing the sedentary lifestyles)	M (21)	30±11	1586±257	2343±298[2]	1.49±0.11
		F (20)	32±10	1155±123	1772±151[2]	1.54±0.12
Foot-note[5]	Japanese	M (70)	39±11 (20-59)	1525±225[3]	2634±396	1.74±0.20
		F (69)	39±10 (20-56)	1189±175[3]	2083±270	1.77±0.23
12)	Chinese (residing in the urban district of Beijing)	M (33)	43.1±0.7	1649±24[4]	2892±72	1.69±0.04
		F (40)	42.6±0.6	1362±24[4]	2270±48	1.65±0.03
1)	American	M (48)	19-30	1769	3081	1.74
		M (59)	31-50	1675	3021	1.81
		M (24)	51-70	1524	2469	1.63
		M (38)	70+	1480	2238	1.52
		F (82)	19-30	1361	2436	1.80
		F (61)	31-50	1322	2404	1.83
		F (71)	51-70	1226	2066	1.70
		F (24)	70+	1183	1564	1.33

[1] Limited to those adults for whom energy expenditure was determined by doubly labeled water method or a human calorimeter

[2] Determination by a human calorimeter.

[3] Estimated from gender, age, body weight and basal metabolic rate reference value.

[4] Estimated from gender, age, body weight, and body height.

[5] Project of the National Institute of Health and Nutrition "Estimation of the Energy Expenditure by Doubly Labeled Water Method," 2003.

PAL, physical activity level; BMR, basal metabolic rate; M, male; F, female

Table 5 Grouping of PAL at each age group (both sexes)

Age (years) \ PAL	Level I	Level II	Level III
1-2 years	-	1.40	-
3-5	-	1.50	-
6-7	-	1.60	-
8-9	-	1.70	1.90
10-11	-	1.70	1.90
12-14	-	1.70	1.90
15-17	1.50	1.75	2.00
18-29	1.50	1.75	2.00
30-49	1.50	1.75	2.00
50-69	1.50	1.75	2.00
≥70	1.30	1.50	1.70

PAL, physical activity level

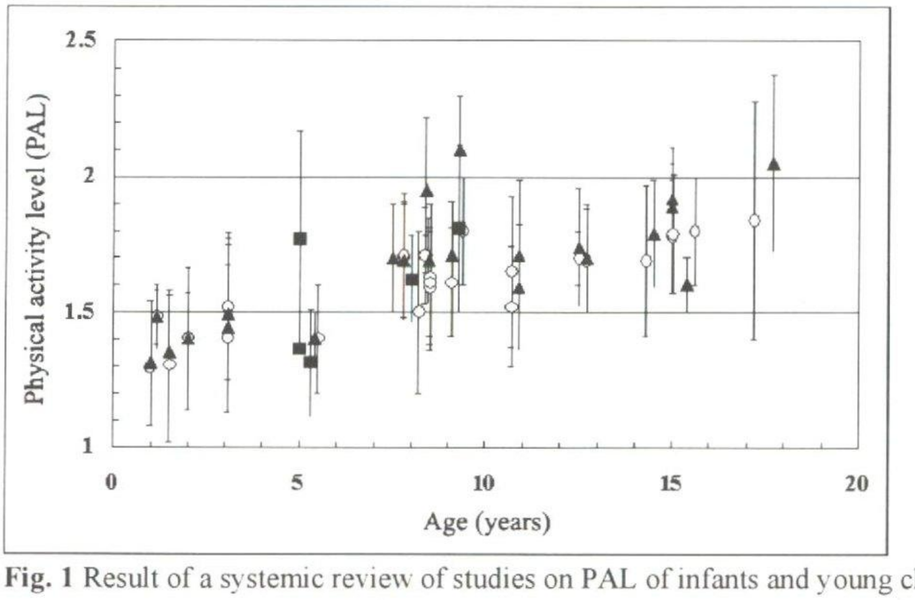

Fig. 1 Result of a systemic review of studies on PAL of infants and young children using a doubly labeled water method (▲, boys; ○, girls; ■, boys and girls; mean±SD)

Table 6 Energy for tissue increase associated with growth (energy deposition)

Sex	Males				Females			
Age	A. Reference weights (kg)	B. Weight increase (kg/yr)	Tissue increase		A. Reference weights (kg)	B. Weight increase (kg/yr)	Tissue increase	
			C. Energy density (kcal/g)	D. Energy deposition (kcal/day)			C. Energy density (kcal/g)	D. Energy deposition (kcal/day)
0-5 months	6.6	9.4	4.4[22]	115	6.1	8.4	5.0[22]	115
6-11	8.8	3.4	2.1[22]	20	8.2	3.2	2.1[22]	20
1-2 years	11.9	2.2	3.5[22]	20	11	2.1	2.4[22]	15
3-5	16.7	2.2	1.5[23]	10	16	2.1	2.0[23]	10
6-7	23	2.5	2.1[23]	15	21.6	2.5	2.8[23]	20
8-9	28	3.1	2.5[23]	20	27.2	3.5	3.2[23]	30
10-11	35.5	4.8	3.0[24]	40	35.7	4.1	2.6[24]	30
12-14	50	4.3	1.5[24]	20	45.6	2.7	3.0[24]	20
15-17	58.3	1.7	1.9[24]	10	50	0.7	4.7[24]	10

Weight increase (B) was computed from the reference body weight (A) based on proportional distribution as follows:

Example : weight increase (kg/year) in females from 6 to 11 months

X= [(reference weight between 6 and 11 months) - (reference weight between 0 and 5 months)] / [0.75 (years) - 0.25 (years)]

+[(reference weight between 1 and 2 years) - (reference weight between 6 and 11 months)] / [2 (years) - 0.75 (year)]

Weight increase = X/2

= [(8.2 - 6.1) / 0.5+(11.0 - 8.2) / 1.25] / 2

≈ 3.2

The energy density for tissue increase (C) was computed according to Butte et al.,[20] Fomon et al.[21] and Haschke et al.[22]

The energy deposition for tissue increase (D) was computed as the product of weight increase (B) and energy density of tissue increase (C).

Example : Energy (kcal/day) for tissue increase for females between 6 and 11 months

= [(3.2 kg/yr) x 1000/365] x 2.1 (kcal/g)

= 18

≈ 20

Table 7 Typical examples of the description and duration of physical activities classified by activity levels (ages15 through 69 years)[1]

PAL[2]		Low (I)	Moderate (II)	High (III)
		1.50 (1.40-1.60)	1.75 (1.60-1.90)	2.00 (1.90-2.20)
Details of daily activities		Subjects remain sedentary most of the time and engage mainly in less energetic activities.	Subjects remain sedentary most of the time but the activities include any of the following: move within the work site, work performed while standing, interactions with customers, commuting, shopping, housekeeping, and light sport activities.	Subjects engage in work that require moving or remain standing; or they customarily engage in active athletic activities.
Classification of each activity (hours/day)[3]	Sleeping (1.0)	8	7-8	7
	Sedentary or being still while standing (1.5 : 1.1-1.9)	13-14	11-12	10
	Slow walking or low-intensity activities such as housekeeping (2.5 : 2.0-2.9)	1-2	3	3-4
	Mid-intensity activities such as exercise or labor that can be sustained for an extended period (includes normal walking) (4.5 : 3.0-5.9)	1	2	3
	Highly-intensity activities, such as exercise or labor that requires frequent rest (7.0 : >6.0)	0	0	0-1

[1] Prepared using Black[10)] as a reference and, in particular, giving due consideration to the significant effects of occupation on PAL.[12)]

[2] Representative values. The range is shown in parentheses.

[3] Data in parentheses is an activity factor (Af: intensity per unit time of each physical activity, expressed in a multiple of the basal metabolism). (Representative value: lower threshold - upper threshold).

PAL, physical activity level