To the Editor:
Insulin-like growth factor-I (IGF-I) is an anabolic hormone primarily involved in skeleton and muscle development during the first two decades of life. Recent studies suggest that, in older persons, lower IGF-I levels are associated with an increased risk of disability and all-cause (1) and cardiovascular mortality (2).

Studies have suggested that IGF-I serum levels decline over the life span (3–5), but age-specific average levels in the population are still undefined. Additionally, it is unclear whether the annual rate of decline is constant or becomes higher at older ages. In the present report, we compared trends of age-related changes of IGF-I concentration across the adult life span from cross-sectional data collected in...
two large studies in different geographical areas: the Baltimore Longitudinal Study of Aging (BLSA) conducted in the United States and the Invecchiare nel CHIANTI (InCHIANTI) study in Italy. The aim of the study is to verify whether the age-associated decrease in IGF-I is consistent across different populations, and to quantify the rate of decline.

The BLSA is a long-term study of normal human aging conducted by the Intramural Research Program of the National Institute on Aging since 1958 as an open-panel study that continuously recruits community-dwelling volunteers from the Washington–Baltimore area. Total IGF-I was available for 604 participants (131 women and 473 men) ranging from 21 to 94 years old (mean age 56.15 ± 16.5 years), who were included in studies aimed to assess the age-related differences in IGF-I and to explore the possible effects of IGF-I on cancer (6,7). All blood samples were collected in the early morning after an overnight fast. All samples were thawed, aliquoted, refrozen, and sent to Endocrine Sciences, Inc. (Calabasas Hills, CA) to be assayed for IGF-I. Total IGF-I was measured using an IGF-II-blocked radioimmunoassay, in which, in the presence of an antibody highly specific for IGF-I, excess IGF-II was added to eliminate any influence of residual IGF binding proteins present after acid–ethanol extraction.

The InCHIANTI study is a large epidemiological study investigating factors affecting mobility in older persons. Participants (n = 1290) were randomly selected from the population registries of two small towns located in Tuscany, Italy. The present report is based on data from those 1290 participants (559 men and 731 women), ranging in age from 21 to 94 years (mean age 68.5 ± 15.5 years), with complete data on total IGF-I. An 8-hour fasting blood sample was collected in cold glass tubes containing ethylenediamine tetraacetic acid (EDTA) from each participant. Serum concentrations of IGF-I were measured in duplicate from frozen specimens by immunoradiometric assay, using commercial reagents (DSL, Webster, TX).

IGF-I data were analyzed using linear regression that included study, age, age², sex and two-way interactions between study, age, and sex as independent variables. The data for the BLSA and the InCHIANTI study are reported as scatterplots and summarized by lowess smoothing curves. The relationship between total IGF-I and age is shown for the BLSA and the InCHIANTI study in Figure 1. Age and sex-adjusted serum IGF-I levels were slightly higher in the BLSA than in the InCHIANTI participants. The slopes summarizing the age–IGF-I relationship for the two studies are remarkably similar. The IGF-I mean levels and average change per year estimated from the pooled population are reported in Table 1, according to sex and age-decade. In both men and women, the magnitude of per-year decline in IGF-I was highest at younger ages and lowest at older ages; the rate of decline was faster in women than in men before the age of 55, and similar in the two sexes at older ages. In participants older than 50 years, IGF-I declined linearly with age at the approximate rate of 1.7 ng/ml/year.

It is noteworthy, despite different populations, selection criteria, and measurement methods, that the age-related decline of IGF-I was highly consistent across the two studies.

Table 1. Insulin-Like Growth Factor-I (IGF-I) (ng/ml) by Age With Change in IGF-I per Year From Regression Model

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>Mean (95% CI)</th>
<th>Change IGF-I/Year (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 40</td>
<td>221 (80–362)</td>
<td>234 (71–397)</td>
</tr>
<tr>
<td>40–49.9</td>
<td>180 (72–288)</td>
<td>161 (61–261)</td>
</tr>
<tr>
<td>50–59.9</td>
<td>152 (62–242)</td>
<td>159 (34–284)</td>
</tr>
<tr>
<td>60–69.9</td>
<td>146 (38–254)</td>
<td>124 (14–234)</td>
</tr>
<tr>
<td>70–79.9</td>
<td>137 (29–245)</td>
<td>110 (8–212)</td>
</tr>
<tr>
<td>80–89.9</td>
<td>101 (9–193)</td>
<td>70 (15–122)</td>
</tr>
</tbody>
</table>

Note: CI = confidence interval.

References


LETTER TO THE EDITOR

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