Circadian variation in the serum concentration of C-terminal telopeptide of type I collagen (Serum CTx): Effects of gender, age, menopausal status, posture, daylight, serum cortisol, and fasting

We examined the diurnal variation in serum concentration of C-terminal telopeptide of type I collagen (serum CrossLaps, sCTx) under various conditions. The studies included a total of 100 individuals. Blood samples were collected every 3 h over 27 h. sCTx levels varied over the 24 h with a maximum at about 05:00 in the morning and a minimum of about 14:00 in the afternoon. The variation had a magnitude of about +/-40% around the 24 h mean and was similar in premenopausal and early and late postmenopausal women with normal and low bone mass. Furthermore, it was not affected by 5 days of bed-rest, by absence of a normal diurnal variation in cortisol production, or by absence of a normal light cycle (blindness). Nasal salmon calcitonin, an antiresorptive drug used for treatment of osteoporosis, was not able to break the circadian pattern whether the treatment was administered in the morning or the evening. The only parameter that showed a pronounced influence on the circadian variation was fasting, which reduced the variation significantly to about one fourth. From a practical point of view the results of this study demonstrate that samples for sCTx should be taken in the fasting state.

General information
State: Published
Organisations: Osteometer BioTech A/S, Center for Clinical and Basic Research
Contributors: Qvist, P., Christgau, S., Pedersen, B. J., Schlemmer, A., Christiansen, C.
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Research output: Research - peer-review › Journal article – Annual report year: 2002

Serum CrossLaps One Step ELISA. First application of monoclonal antibodies for measurement in serum of bone-related degradation products from C-terminal telopeptides of type I collagen

We have developed a two-site ELISA for measurement in serum of bone-related degradation products derived from C-terminal telopeptides of type I collagen. The assay is based on the application of two highly specific monoclonal antibodies against the amino acid sequence of AHD-beta-GGR, where the aspartic acid residue (D) is beta-isomerized. In a one-step incubation procedure, the degradation products containing cross-linked diisomerized EKAHD-beta-GGR peptides are captured by a biotinylated antibody and a peroxidase-conjugated antibody. The generated complex is then bound to the streptavidin surface via the biotin conjugate. Desalted urinary antigens are used for standardization, and parallelism is
observed with serum samples. Results are obtained in

**General information**
State: Published
Organisations: Osteometer BioTech A/S, Center for Clinical and Basic Research
Contributors: Rosenquist, C., Fledelius, C., Christgau, S., Pedersen, B. J., Bonde, M., Qvist, P., Christiansen, C.
Pages: 2281-2289
Publication date: 1998
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Journal: Clinical Chemistry
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ISSN (Print): 0009-9147
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.21 SJR 2.281 SNIP 1.695
Web of Science (2017): Impact factor 8.636
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.54 SJR 2.424 SNIP 1.7
Web of Science (2016): Impact factor 8.008
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 3.51 SJR 2.465 SNIP 1.775
Web of Science (2015): Impact factor 7.457
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 3.73 SJR 2.594 SNIP 2.049
Web of Science (2014): Impact factor 7.911
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 3.99 SJR 2.419 SNIP 2.156
Web of Science (2013): Impact factor 7.768
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 4.39 SJR 2.561 SNIP 2.366
Web of Science (2012): Impact factor 7.149
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 4.49 SJR 2.604 SNIP 2.228
Web of Science (2011): Impact factor 7.905
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.269 SNIP 1.899
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.075 SNIP 1.948
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.858 SNIP 1.704
Scopus rating (2007): SJR 1.614 SNIP 1.59
Scopus rating (2006): SJR 1.5 SNIP 1.473
Scopus rating (2005): SJR 1.506 SNIP 1.594
Scopus rating (2004): SJR 1.399 SNIP 1.601
Scopus rating (2003): SJR 1.329 SNIP 1.515
Type I collagen C-telopeptide degradation products as bone resorption markers

Degradation products of the C-telopeptides from type I collagen (CTC) can be measured with commercially available immunoassays (e.g., CrossLaps(TM) assays). It is well established that the urinary excretion of CTC fragments is closely correlated with the rate of bone degradation (resorption). Data obtained with a recently developed assay for CTC fragments in serum also suggest that serum CTC is a sensitive and specific index of bone resorption. Several structures of the CTC fragments have been elucidated. It has become clear that the peptide sequence measured in the CrossLaps assays can spontaneously beta-isomerize to produce unusual isoaspartyl peptides. This sign of protein aging is believed to ensure that the urinary CrossLaps ELISA and the Serum CrossLaps One Step ELISA, both specific for beta-isomerized fragments, measure degradation of relatively old bone. Conversely, the alpha-CrossLaps RIA, specific for non-isomerized CTC fragments, measures degradation of relatively young bone. Currently, the assays are being evaluated to clarify their potential clinical applications. They have also been shown to be efficient tools for monitoring antiresorptive therapy. Assessment of future risk of bone loss and fracture is being investigated with promising results. It is expected that the routine use of the CrossLaps assays will become established within the next few years.

General information

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Organisations: Center for Clinical and Basic Research, Osteometer BioTech A/S
Contributors: Ravn, P., Pedersen, B. J., Bonde, M.
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Journal: Journal of Clinical Ligand Assay
Volume: 21
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ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
Scopus rating (2011): SJR 0.133 SNIP 0.05
ISI indexed (2011): ISI indexed no
Scopus rating (2010): SJR 0.108 SNIP 0.048
Scopus rating (2009): SJR 0.108 SNIP 0.145
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.191 SNIP 0.086
Circadian variation in bone resorption is not related to serum cortisol

Serum osteocalcin, serum procollagen type I carboxyterminal propeptide (sPICP), and the urinary excretion of pyridinium crosslinks (biochemical markers of bone formation and resorption) all exhibit a circadian variation with a peak during the night. This study was performed to investigate the influence of the endogenous circadian rhythm in cortisol on the biochemical markers of bone turnover. Participants included 11 patients substituted with hydrocortisone due to either hypopituitarism (n = 7) or bilateral adrenalectomy (n = 4). Their daily tablet intake of hydrocortisone was divided in four equal doses in order to abrogate the known circadian variation in cortisol. 24 healthy postmenopausal women served as controls. The study design was performed over 24 h, with blood samples taken every 3 h, and urine collected in 3 h aliquots. Urinary pyridinium crosslinks (Pyr/Cr, d-Pyr/Cr), serum osteocalcin (sOC), and serum PICP were measured. Patients without a circadian variation in cortisol had normal circadian variation in the urinary excretion of pyridinium crosslinks and sPICP, but no circadian rhythm in serum osteocalcin. We conclude that the etiology of the circadian rhythm in the biochemical markers of bone turnover is still unknown. This study indicates that the circadian variation in sOC can be controlled by the endogenous circadian variation in serum cortisol, whereas this hormone does not control the circadian variation in either the serum PICP or the urinary excretion in pyridinium crosslinks. (Bone 21:83–88; 1997)
Changes in the carboxyl terminal propeptide of type I procollagen and other markers of bone formation upon five days of bed rest

This study was performed in order to investigate the influence of skeletal unloading on the serum concentration of the carboxyl-terminal propeptide of type I procollagen (sPICP) and other markers of bone formation. Blood samples were taken every third hour from nine healthy premenopausal women (22-29 years) in two 24 h studies, before and at the end of five days of bed rest. Furthermore, a set of samples were taken 12 h apart after three days of bed rest. We measured sPICP, the serum concentration of intact and N-terminal-Mid fragment osteocalcin (sOC), and the serum concentration of alkaline phosphatase (sAP). During the five days of bed rest a gradual increase in sOC was observed, while sPICP gradually decreased. sAP was unchanged. Five days of best rest resulted in the following overall changes in the 24 h mean values: sPICP: -14% (p = 0.002); sOC: +9% (p = 0.009); sAP: -1% (not significant). The circadian patterns did not change significantly after bed rest. It is puzzling that the changes in the bone formation markers are of different magnitude, and for sPICP and sOC even in opposite directions. The increase in sOC may be caused by an increase in OC secretion by the osteoblasts or a release of bone-incorporated OC from resorbing sites; the accompanying decrease in sPICP may indicate that bone formation is actually transiently decreased after short term bed rest.

General information

State: Published
Organisations: Center for Clinical and Basic Research
Contributors: Pedersen, B. J., Schlemmer, A., C, H., Christiansen, C.
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Publication information

Journal: Bone
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BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
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Scopus rating (2017): CiteScore 4.33 SJR 1.652 SNIP 1.446
Web of Science (2017): Impact factor 4.455
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.09 SJR 1.667 SNIP 1.442
Web of Science (2016): Impact factor 4.14
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 4.17 SJR 1.763 SNIP 1.51
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 4.18 SJR 1.819 SNIP 1.644
Web of Science (2014): Impact factor 3.973
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.55 SJR 1.868 SNIP 1.726
Web of Science (2013): Impact factor 4.461
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 4.09 SJR 1.6 SNIP 1.59
Web of Science (2012): Impact factor 3.823
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Circadian rhythm in type I collagen formation in postmenopausal women with and without osteopenia

A circadian rhythm in the serum concentration of the procollagen type I carboxyl-terminal propeptide (sPICP) has previously been demonstrated in premenopausal women. Blood samples were taken every third hour for 27 h from three groups of women: 12 early postmenopausal women (aged 55 +- 2 years; mean +- SD); 12 late postmenopausal women (aged 73 +- 1 years); and 12 osteopenic but otherwise healthy late postmenopausal women (aged 73 +- 1 years). A circadian rhythm in sPICP was found in all three groups, as shown by cosinor analysis (p = 0.000003-0.03). The circadian rhythm in sPICP was significantly different between the osteopenic group and the age-matched healthy group (p < 0.008). The amplitude of the circadian rhythm in sPICP was about twice as high in the osteopenic group, and the time of the maximum tended to be about 3 h later, as compared with the age-matched healthy group. The plasma concentration of osteocalcin, as measured by a recently developed two-site enzyme-linked immunosorbent assay, also showed a circadian rhythm in all three groups (p = 0.00001-0.05), with no significant differences between groups. In conclusion, we have found a significant circadian rhythm in sPICP in both early and late postmenopausal women. In osteopenic women the nightly peak in sPICP is larger and persists later into the night as compared with non-osteopenic women.

General information

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Organisations: Center for Clinical and Basic Research, Osteometer BioTech A/S
Contributors: Pedersen, B. J., Schlemmer, A., Rosenquist, C., H., Christiansen, C.
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Volume: 5
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Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.5 SJR 1.523 SNIP 1.534
Web of Science (2017): Impact factor 3.856
Two-dimensional gel analysis of human endometrial proteins: Cyclic changes in the expression of specific proteins during the normal menstrual cycle

High resolution two-dimensional (2-D) gel electrophoresis was used to compare the patterns of (35S)methionine-labelled cellular proteins in endometrial tissue from healthy, normally menstruating women. Samples of endometrial tissue were incubated with (35S)methionine for 20 h, and total cell lysates were processed for 2-D gel electrophoresis. Using this technique it was possible to study proteins with iso-electric points (pI) ranging from 3.5 to 11 and relative molecular weights (M-r) ranging from 10 000 to 300 000 Da. The fluorograms were compared by computer-aided analysis whereby a total of 1095 (35S)-labelled proteins were resolved on the iso-electric focusing gels (IEF, pI 3.5-7) and 488 on the non-
equilibrium pH gradient electrophoresis (NEPHGE) gels (pI 6.5 - 11). Of the proteins on the IEF gels, 125 showed
differential expression during the menstrual cycle. Of these, 36 were maximally expressed in proliferative phase
endometrium, 26 in the interval phase and 63 in secretory and/or late secretory phase endometrium. Correspondingly, on
the NEPHGE gels a total of 61 proteins exhibited cyclical variation, of which 30 were more prominent in proliferative
phase, 13 in interval phase and 18 in secretory phase endometrium. This study shows that 2-D gel electrophoresis is
eminently suited to the identification of proteins whose expression varies in a cyclical manner during the menstrual cycle. Further investigations should be carried out to isolate and characterize these proteins with the aim of establishing useful
markers for specific endometrial phases of the menstrual cycle.

General information
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Organisations: Center for Clinical and Basic Research
Contributors: Byrjalsen, I., Larsen, P. M., Fey, S. J., Thormann, L., Pedersen, B. J., Christiansen, C.
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Journal: Human Reproduction
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ISSN (Print): 0268-1161
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.6 SJR 2.643 SNIP 1.856
Web of Science (2017): Impact factor 4.99
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.62 SJR 2.69 SNIP 2.108
Web of Science (2016): Impact factor 5.02
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 4.42 SJR 2.379 SNIP 1.911
Web of Science (2015): Impact factor 4.621
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 4.32 SJR 2.376 SNIP 1.934
Web of Science (2014): Impact factor 4.569
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 4.59 SJR 2.686 SNIP 1.882
Web of Science (2013): Impact factor 4.585
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 4.55 SJR 2.564 SNIP 1.876
Web of Science (2012): Impact factor 4.67
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 4.42 SJR 2.601 SNIP 2.02
Web of Science (2011): Impact factor 4.475
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.263 SNIP 1.888
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Posture, Age, Menopause, and Osteopenia Do Not Influence the Circadian Variation in the Urinary Excretion of Pyridinium Crosslinks

This study was performed to investigate whether the circadian variation in urinary pyridinium crosslinks is related to physical activity, age, the menopause, and asymptomatic osteopenia. We measured urinary pyridinoline/creatinine (Pyr/Cr) and deoxypyridinoline/creatinine (D-Pyr/Cr) in 9 healthy premenopausal women in two 27 h studies, before and at the end of 5 days of total bed rest. Both Pyr/Cr and D-Pyr/Cr showed highly significant circadian variations, with the peak at night and the nadir during the day (p < 0.001). The 5 days of complete bed rest produced no changes in the circadian pattern, but a general increase of 28% was observed in pyridinium crosslinks. A group of 12 healthy, early postmenopausal women (aged 55 ± 2 years), 12 healthy, elderly postmenopausal women (aged 73 ± 1 years), and 12 elderly osteopenic but otherwise healthy women (aged 73 ± 1 years) were also studied for 27 h. All three groups showed highly significant (p < 0.001) circadian variations in the urinary excretion of pyridinium crosslinks. As expected, both Pyr/Cr (p < 0.05) and D-Pyr/Cr (p < 0.001) increased at the time of menopause, but the circadian variations in Pyr/Cr and D-Pyr/Cr were similar in all groups studied. We conclude that the circadian variation in the urinary excretion of pyridinium crosslinks is independent of physical factors. Furthermore, the circadian variation in pyridinium crosslinks was not related to age, menopausal status, or asymptomatic osteopenia.
Purification of human procollagen type I carboxyl-terminal propeptide cleaved as in vivo from procollagen and used to calibrate a radioimmunoassay of the propeptide

General information
State: Published
Organisations: Center for Clinical and Basic Research, Osteometer BioTech A/S
Contributors: Pedersen, B. J., Bonde, M.
Pages: 811-816
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Peer-reviewed: Yes

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ISSN (Print): 0009-9147
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BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.21 SJR 2.281 SNIP 1.695
Web of Science (2017): Impact factor 8.636
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.54 SJR 2.424 SNIP 1.7
Web of Science (2016): Impact factor 8.008
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 3.51 SJR 2.465 SNIP 1.775
Web of Science (2015): Impact factor 7.457
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 3.73 SJR 2.594 SNIP 2.049
Web of Science (2014): Impact factor 7.911
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 3.99 SJR 2.419 SNIP 2.156
Web of Science (2013): Impact factor 7.768
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 4.39 SJR 2.561 SNIP 2.366
Web of Science (2012): Impact factor 7.149
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 4.49 SJR 2.604 SNIP 2.228
Web of Science (2011): Impact factor 7.905
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.269 SNIP 1.899
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.075 SNIP 1.948
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.858 SNIP 1.704
Scopus rating (2007): SJR 1.614 SNIP 1.59
Scopus rating (2006): SJR 1.5 SNIP 1.473
Scopus rating (2005): SJR 1.506 SNIP 1.594
**Three cationic peroxidases of barley grain**

**General information**
State: Published
Organisations: Copenhagen University Hospital
Contributors: Hejgaard, J., F. Petersen, J., C. Veitch, N., Pedersen, B. J., Welinder, K.
Pages: 49-53
Publication date: 1991

**Host publication information**
Title of host publication: Biochemical, molecular and physiological aspects of plant peroxidases
Source: PublicationPreSubmission
Source-ID: 99797332
Research output: Research - peer-review › Report chapter – Annual report year: 1991