The nucleotide sequence of Atlantic salmon growth hormone cDNA

James Lorens, Audun H.Nerland, Rune Male, Ivar Lossius, Wenche Telle and Geir Totland

Marine Genetics A/S, Laboratory of Biotechnology, University of Bergen, PO Box 3152, Aarstad, 5001 Bergen, Norway

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A cDNA library constructed from Atlantic salmon (Salmo salar) pituitary mRNA in λgt10, was screened with oligonucleotide probes derived from conserved growth hormone sequences. Several clones were isolated and two were selected for sequencing. The 1169 bp nucleotide sequence (Figure 1) encodes a 210 amino acid prepeptide with a putative 22 amino acid leader sequence.

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   1                CAACCGACCACCGCACTTTCAAGTTAAGTAATCATCCTTGGCAATTAAGAGTAAAA ATG GGA CAA GTG TTT CTG CTG ATG CCA GTC TTA CTG
   1                                                                          M  G  Q  V  F  L  L  M  P  V  L  L

  93 GTC AGT TGT TTT CTG AGC CAA GGG GCA GCG ATG GAA AAC CAA CGG CTC TTC AAC ATC GCG GTC AAC CGG GTG CAA CAT CTC CAC CTA
  13  V  S  C  F  L  S  Q  G  A  A  M  E  N  Q  R  L  F  N  I  A  V  N  R  V  Q  H  L  H  L

 180 ATG GCT CAG AAG ATG TTC AAT GAC TTT GAA GGT ACC CTG TTG CCT GAT GAA CGC AGA CAG CTG AAC AAG ATA TTC CTG CTG GAC TTC
  42  M  A  Q  K  M  F  N  D  F  E  G  T  L  L  P  D  E  R  R  Q  L  N  K  I  F  L  L  D  F

 267 TGT AAC TCT GAC TCC ATC GTG AGC CCA ATC GAC AAG CTT GAG ACT CAG AAG AGT TCA GTC CTG AAG CTG CTC CAT ATC TCT TTC CGT
  71  C  N  S  D  S  I  V  S  P  I  D  K  L  E  T  Q  K  S  S  V  L  K  L  L  H  I  S  F  R

 354 CTG ATT GAA TCC TGG GAG TAC CCT AGC CAG ACC CTG ACC ATC TCC AAC AGC CTA ATG GTC AGA AAC TCC AAC CAG ATC TCT GAG AAG
 100  L  I  E  S  W  E  Y  P  S  Q  T  L  T  I  S  N  S  L  M  V  R  N  S  N  Q  I  S  E  K

 441 CTC AGC GAC CTC AAA GTG GGC ATC AAC CTG CTC ATC AAG GGG AGC CAG GAT GGC GTA CTG AGC CTG GAT GAC AAT GAC TCT CAG CAG
 129  L  S  D  L  K  V  G  I  N  L  L  I  K  G  S  Q  D  G  V  L  S  L  D  D  N  D  S  Q  Q

 528 CTG CCC CCC TAC GGG AAC TAC TAC CAG AAC CTG GGG GGC GAC GGC AAC GTC AGG AGG AAC TAT GAG TTG TTG GCC TGC TTC AAG AAG
 158  L  P  P  Y  G  N  Y  Y  Q  N  L  G  G  D  G  N  V  R  R  N  Y  E  L  L  A  C  F  K  K

 615 GAC ATG CAC AAG GTC GAG ACC TAC CTG ACC GTC GCC AAG TGC AGG AAG TCA CTG GAG GCC AAC TGC ACT CTG TAG ACGTGGGCTGGAGAG
 187  D  M  H  K  V  E  T  Y  L  T  V  A  K  C  R  K  S  L  E  A  N  C  T  L  -

 705 GCAGCCAGCAAGAGCCTGTCTCCAGGGTTCGGTTTCCCAGATACAGATTAGGCCTTGCCCTGCACTGAAGAGCATTTTCAATTGAGATTCTCCATTGAACGTGCTTTTTAGTCTT

 820 GAGTAGATTTAATTTGGATCTGGTAGAGCCTGACTCCAGGGGTTTCAGGAATTTGCATTTTGTTCTCTGAAATCAACAACAGCCACTTTCTATATTGACTATTACTCTGAGCTAC

 935 CATTGATTAGTAACATTTATAGAAAAAGGTTATTAAATGTCTTATTTAGATATATGATTCATGGTGGTGCTACTGTTTATGCATACATTCATATTTAGGGGTGAAATGGGAAGCTGT

1050 AGAGCTCCAAGCTTTTGGATAATATATTTTAGAGTTATTTCTTTAAGTATTTTCATTTCTTAATCTTATTGTTTGAAACTAATAGTGATACATTTTTCAATAAAGCTGTTGTTC

1165 TCTGC
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Figure 1.

The encoding sequence demonstrates a high degree of similarity with salmonid growth hormone sequences (Table 1).

Table 1.

	Degree of identity (%)			
	Nucleotides (coding region)	Signal peptide (aa 1-22)	Hormone (aa 23-210)	Ref.
Chum salmon	95.6	100	96.3	1
Coho salmon	97.0	100	93.8	2
Rainbow trout	96.5	91	96.3	3

The 5'-untranslated region is nearly identical among the salmonids, while the 3'-untranslated region is relatively less conserved. Genomic cloning has revealed two distinct sgh genes (unpublished results). This sequence corresponds to the locus denoted sgh I.

References:

1. Sekine S., et al. (1985) **Proc Natl Acad Sci USA** 82:4304-4310
2. Nicoll, C.S., et al. (1987) **Gen Comp Endocrinol** 68:387-399
3. Agellon, L.B. and Chen, T.T. (1986) **DNA** 5:463-471