

SECTION C — CHEMISTRY; METALLURGY

C07 ORGANIC CHEMISTRY

C07K PEPTIDES (peptides containing β -lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link than those which form their ring, e.g. piperazine-2,5-diones, C07D; ergot alkaloids of the cyclic peptide type C07D 519/02; single cell proteins, enzymes C12N; genetic engineering processes for obtaining peptides C12N 15/00) **[4]**

Note(s)

- In this subclass, the following terms or expressions are used with the meanings indicated:
 - "amino acids" are compounds in which at least one amino group and at least one carboxyl group are bound to the same carbon skeleton and the nitrogen atom of the amino group may form part of a ring;
 - "normal peptide link" is one between an alpha-amino group of an amino acid and the carboxyl group — in position 1 — of another alpha-amino acid;
 - "abnormal peptide link" is a link where at least one of the linked amino acids is not an alpha-amino acid or a link formed by at least one carboxyl or amino group being part of the side chain of an alpha-amino acid;
 - "peptides" are compounds containing at least two amino acid units, which are bound through at least one normal peptide link, including oligopeptides, polypeptides and proteins, where
 - "linear peptides" may comprise rings formed through S—S bridges, or through an hydroxy or a mercapto group of an hydroxy- or a mercapto-amino acid and the carboxyl group of another amino acid (e.g. peptide lactones) but do not comprise rings which are formed only through peptide links;
 - "cyclic peptides" are peptides comprising at least one ring formed only through peptide links; the cyclisation may occur only through normal peptide links or through abnormal peptide links, e.g. through the 4-amino group of 2,4-diamino-butanolic acid. Thus, cyclic compounds in which at least one link in the ring is a non-peptide link are considered as "linear peptides";
 - "depsipeptides" are compounds containing a sequence of at least two alpha-amino acids and at least one alpha-hydroxy carboxylic acid, which are bound through at least one normal peptide link and ester links, derived from the hydroxy carboxylic acids, where
 - "linear depsipeptides" may comprise rings formed through S—S bridges, or through an hydroxy or a mercapto group of an hydroxy-, or mercapto-amino acid and the carboxyl group of another amino- or hydroxy-acid but do not comprise rings formed only through peptide or ester links derived from hydroxy carboxylic acids, e.g. Gly-Ala-Gly—OCH₂CO₂H and Gly—OCH₂CO-Ala-Gly are considered as "linear depsipeptides", but HOCH₂CO-Gly-Ala-Gly does not contain an ester link, and is thus a derivative of Gly-Ala-Gly which is covered by C07K 5/08;
 - "cyclic depsipeptides" are peptides containing at least one ring formed only through peptide or ester links — derived from hydroxy carboxylic acids —, e.g. $\text{Gly-Ala-Gly-OCH}_2\text{CO}_2$;
 - "hybrid peptides" are peptides produced through fusion or covalent binding of two or more heterologous peptides.
- Attention is drawn to Note (3) after class C07, which defines the last place priority rule applied in the range of subclasses C07C-C07K and within these subclasses.
- Therapeutic activity of compounds is further classified in subclass A61P.
- When classifying in this subclass, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned.
- Fragments of peptides or peptides modified by removal or addition of amino acids, by substitution of amino acids by others, or by combination of these modifications are classified as the parent peptides. However, fragments of peptides having only four or less amino acids are also classified in group C07K 5/00.
- Peptides prepared by chemical processes and having an amino acid sequence derived from naturally occurring peptides are classified with the natural one.
- Peptides prepared by recombinant DNA technology are not classified according to the host, but according to the original peptide expressed, e.g. HIV peptide expressed in E. coli is classified with HIV peptides.

Subclass index

PEPTIDES

Preparation.....	1/00
of undefined number of amino acids.....	2/00
Having up to 20 amino acids in an undefined or only partially defined sequence.....	4/00
Having up to 20 amino acids in a fully defined sequence.....	5/00-9/00
Depsipeptides having up to 20 amino acids in a fully defined sequence.....	11/00
Having more than 20 amino acids.....	14/00
Immunoglobulins.....	16/00
Carrier-bound or immobilised peptides.....	17/00
Hybrid peptides.....	19/00

1/00 General processes for the preparation of peptides [4]

- 1/02 • in solution [4]
- 1/04 • on carriers [4]
- 1/06 • using protecting groups or activating agents [4]
- 1/08 • • using activating agents [4]
- 1/10 • using coupling agents [4]
- 1/107 • by chemical modification of precursor peptides [6]
- 1/113 • • without change of the primary structure [6]
- 1/12 • by hydrolysis [4]
- 1/13 • Labelling of peptides [6]
- 1/14 • Extraction; Separation; Purification [4, 6]
- 1/16 • • by chromatography [6]
- 1/18 • • • Ion-exchange chromatography [6]
- 1/20 • • • Partition-, reverse-phase or hydrophobic interaction chromatography [6]
- 1/22 • • • Affinity chromatography or related techniques based upon selective absorption processes [6]
- 1/24 • • by electrochemical means [6]
- 1/26 • • • Electrophoresis [6]
- 1/28 • • • • Isoelectric focusing [6]
- 1/30 • • by precipitation [6]
- 1/32 • • • as complexes [6]
- 1/34 • • by filtration, ultrafiltration or reverse osmosis [6]
- 1/36 • • by a combination of two or more processes of different types [6]

2/00 Peptides of undefined number of amino acids; Derivatives thereof [6]**4/00 Peptides having up to 20 amino acids in an undefined or only partially defined sequence; Derivatives thereof [6]**

- 4/02 • from viruses [6]
- 4/04 • from bacteria [6]
- 4/06 • from fungi [6]
- 4/08 • from algae; from lichens [6]
- 4/10 • from plants [6]
- 4/12 • from animals; from humans [6]

5/00 Peptides having up to four amino acids in a fully defined sequence; Derivatives thereof [4]**Note(s)**

In this group, the following expression is used with the meaning indicated:

- "first amino acid" means the first amino acid from the left side, i.e. the N-terminal amino acid, of the peptide sequence.
- 5/02 • containing at least one abnormal peptide link [4]
- 5/023 • • in which at least a beta-amino acid is involved [6]
- 5/027 • • in which at least a gamma-amino acid is involved, e.g. statine [6]
- 5/03 • • in which at least a delta-amino acid is involved, e.g. isosteres [6]
- 5/033 • • in which at least an epsilon- or zeta-amino acid is involved [6]
- 5/037 • • the abnormal link being formed by the side chain of an alpha-amino acid, e.g. gamma-Glu, epsilon-Lys, glutathione [6]
- 5/04 • containing only normal peptide links [4]
- 5/06 • • Dipeptides [4]
- 5/062 • • • the side chain of the first amino acid being acyclic, e.g. Gly, Ala [6]
- 5/065 • • • the side chain of the first amino acid containing carbocyclic rings, e.g. Phe, Tyr [6]

- 5/068 • • • the side chain of the first amino acid containing more amino groups than carboxyl groups, or derivatives thereof, e.g. Lys, Arg [6]
- 5/072 • • • the side chain of the first amino acid containing more carboxyl groups than amino groups, or derivatives thereof, e.g. Asp, Glu, Asn [6]
- 5/075 • • • • Asp-Phe; Derivatives thereof, e.g. aspartame [6]
- 5/078 • • • the first amino acid being heterocyclic, e.g. Pro, His, Trp [6]
- 5/08 • • Tripeptides [4]
- 5/083 • • • the side chain of the first amino acid being acyclic, e.g. Gly, Ala [6]
- 5/087 • • • the side chain of the first amino acid containing carbocyclic rings, e.g. Phe, Tyr [6]
- 5/09 • • • the side chain of the first amino acid containing more amino groups than carboxyl groups, or derivatives thereof, e.g. Lys, Arg [6]
- 5/093 • • • the side chain of the first amino acid containing more carboxyl groups than amino groups, or derivatives thereof, e.g. Asp, Glu, Asn [6]
- 5/097 • • • the first amino acid being heterocyclic, e.g. Pro, His, Trp, e.g. thyroliberin, melanostatin [6]
- 5/10 • • Tetrapeptides [4]
- 5/103 • • • the side chain of the first amino acid being acyclic, e.g. Gly, Ala [6]
- 5/107 • • • the side chain of the first amino acid containing carbocyclic rings, e.g. Phe, Tyr [6]
- 5/11 • • • the side chain of the first amino acid containing more amino groups than carboxyl groups, or derivatives thereof, e.g. Lys, Arg [6]
- 5/113 • • • the side chain of the first amino acid containing more carboxyl groups than amino groups, or derivatives thereof, e.g. Asp, Glu, Asn [6]
- 5/117 • • • the first amino acid being heterocyclic, e.g. Pro, His, Trp [6]
- 5/12 • • Cyclic peptides [4]

7/00 Peptides having 5 to 20 amino acids in a fully defined sequence; Derivatives thereof [4, 6]

- 7/02 • Linear peptides containing at least one abnormal peptide link [4]
- 7/04 • Linear peptides containing only normal peptide links [4]
- 7/06 • • having 5 to 11 amino acids [4]
- 7/08 • • having 12 to 20 amino acids [4, 6]
- 7/14 • • Angiotensins; Related peptides [4]
- 7/16 • • Oxytocins; Vasopressins; Related peptides [4]
- 7/18 • • Kallidins; Bradykinins; Related peptides [4]
- 7/22 • • Eledoisins; Related peptides [4]
- 7/23 • • Luteinising hormone-releasing hormone (LHRH); Related peptides [6]
- 7/28 • • Gramicidins A, B, D; Related peptides [4]
- 7/50 • Cyclic peptides containing at least one abnormal peptide link [4]
- 7/52 • • with only normal peptide links in the ring [4]
- 7/54 • • with at least one abnormal peptide link in the ring [4]
- 7/56 • • • the cyclisation not occurring through 2,4-diamino-butanoic acid [4]
- 7/58 • • • • Bacitracins; Related peptides [4]
- 7/60 • • • the cyclisation occurring through the 4-amino group of 2,4-diamino-butanoic acid [4]
- 7/62 • • • • Polymyxins; Related peptides [4]
- 7/64 • Cyclic peptides containing only normal peptide links [4]

7/66	• • Gramicidins S, C; Tyrocidins A, B, C; Related peptides [4]	14/19	• • • • Rubella virus [6]
9/00	Peptides having up to 20 amino acids, containing saccharide radicals and having a fully defined sequence; Derivatives thereof [4, 6]	14/195	• from bacteria [6]
11/00	Deptideptides having up to 20 amino acids in a fully defined sequence; Derivatives thereof [4, 6]	Note(s)	
11/02	• cyclic, e.g. valinomycins [4]	In groups C07K 14/20-C07K 14/365, where appropriate, after the bacteria terminology, the indication of the order (O), family (F) or genus (G) of the bacteria is given in brackets.	
14/00	Peptides having more than 20 amino acids; Gastrins; Somatostatins; Melanotropins; Derivatives thereof [6]	14/20	• • from Spirochaetales (O), e.g. Treponema, Leptospira [6]
14/005	• from viruses [6]	14/205	• • from Campylobacter (G) [6]
14/01	• • DNA viruses [6]	14/21	• • from Pseudomonadaceae (F) [6]
14/015	• • • Parvoviridae, e.g. feline panleukopenia virus, human parvovirus [6]	14/215	• • from Halobacteriaceae (F) [6]
14/02	• • • Hepadnaviridae, e.g. hepatitis B virus [6]	14/22	• • from Neisseriaceae (F), e.g. Acinetobacter [6]
14/025	• • • Papovaviridae, e.g. papillomavirus, polyomavirus, SV40, BK virus, JC virus [6]	14/225	• • from Alcaligenes (G) [6]
14/03	• • • Herpetoviridae, e.g. pseudorabies virus [6]	14/23	• • from Brucella (G) [6]
14/035	• • • • Herpes simplex virus I or II [6]	14/235	• • from Bordetella (G) [6]
14/04	• • • • Varicella-zoster virus [6]	14/24	• • from Enterobacteriaceae (F), e.g. Citrobacter, Serratia, Proteus, Providencia, Morganella, Yersinia [6]
14/045	• • • • Cytomegalovirus [6]	14/245	• • • Escherichia (G) [6]
14/05	• • • • Epstein-Barr virus [6]	14/25	• • • Shigella (G) [6]
14/055	• • • • Marek's disease virus [6]	14/255	• • • Salmonella (G) [6]
14/06	• • • • Infectious bovine rhinotracheitis virus [6]	14/26	• • • Klebsiella (G) [6]
14/065	• • • • Poxviridae, e.g. avipoxvirus [6]	14/265	• • • Enterobacter (G) [6]
14/07	• • • • Vaccinia virus; Variola virus [6]	14/27	• • • Erwinia (G) [6]
14/075	• • • Adenoviridae [6]	14/275	• • • Hafnia (G) [6]
14/08	• • RNA viruses [6]	14/28	• • from Vibrionaceae (F) [6]
14/085	• • • Picornaviridae, e.g. coxsackie virus, echovirus, enterovirus [6]	14/285	• • from Pasteurellaceae (F), e.g. Haemophilus influenza [6]
14/09	• • • • Foot-and-mouth disease virus [6]	14/29	• • from Rickettsiales (O) [6]
14/095	• • • • Rhinovirus [6]	14/295	• • from Chlamydiales (O) [6]
14/10	• • • • Hepatitis A virus [6]	14/30	• • from Mycoplasmatales, e.g. Pleuropneumonia-like organisms (PPLO) [6]
14/105	• • • • Poliovirus [6]	14/305	• • from Micrococcaceae (F) [6]
14/11	• • • Orthomyxoviridae, e.g. influenza virus [6]	14/31	• • • from Staphylococcus (G) [6]
14/115	• • • Paramyxoviridae, e.g. parainfluenza virus [6]	14/315	• • from Streptococcus (G), e.g. Enterococci [6]
14/12	• • • • Mumps virus; Measles virus [6]	14/32	• • from Bacillus (G) [6]
14/125	• • • • Newcastle disease virus [6]	14/325	• • • Bacillus thuringiensis crystal peptide (delta-endotoxin) [6]
14/13	• • • • Canine distemper virus [6]	14/33	• • from Clostridium (G) [6]
14/135	• • • • Respiratory syncytial virus [6]	14/335	• • from Lactobacillus (G) [6]
14/14	• • • Reoviridae, e.g. rotavirus, bluetongue virus, Colorado tick fever virus [6]	14/34	• • from Corynebacterium (G) [6]
14/145	• • • Rhabdoviridae, e.g. rabies virus, Duvenhage virus, Mokda virus, vesicular stomatitis virus [6]	14/345	• • from Brevibacterium (G) [6]
14/15	• • • Retroviridae, e.g. bovine leukaemia virus, feline leukaemia virus, human T-cell leukaemia-lymphoma virus [6]	14/35	• • from Mycobacteriaceae (F) [6]
14/155	• • • • Lentiviridae, e.g. human immunodeficiency virus (HIV), visna-maedi virus, equine infectious anaemia virus [6]	14/355	• • from Nocardia (G) [6]
14/16	• • • • • HIV-1 [6]	14/36	• • from Actinomyces; from Streptomyces (G) [6]
14/165	• • • • Coronaviridae, e.g. avian infectious bronchitis virus [6]	14/365	• • from Actinoplanes (G) [6]
14/17	• • • • Porcine transmissible gastroenteritis virus [6]	14/37	• from fungi [6]
14/175	• • • • Bunyaviridae, e.g. California encephalitis virus, Rift valley fever virus, Hantaan virus [6]	14/375	• • from Basidiomycetes [6]
14/18	• • • • Togaviridae, e.g. flavivirus, pestivirus, yellow fever virus, hepatitis C virus, japanese encephalitis virus [6]	14/38	• • from Aspergillus [6]
14/185	• • • • • Hog cholera virus [6]	14/385	• • from Penicillium [6]
		14/39	• • from yeasts [6]
		14/395	• • • from Saccharomyces [6]
		14/40	• • • from Candida [6]
		14/405	• from algae [6]
		14/41	• from lichens [6]
		14/415	• from plants [6]
		14/42	• • Lectins, e.g. concanavalin, phytohaemagglutinin [6]
		14/425	• • Zeins [6]
		14/43	• • Thaumatin [6]
		14/435	• from animals; from humans [6]
		14/44	• • from protozoa [6]

- 14/445 • • • Plasmodium [6]
- 14/45 • • • Toxoplasma [6]
- 14/455 • • • Eimeria [6]
- 14/46 • • from vertebrates [6]
- 14/465 • • • from birds [6]
- 14/47 • • • from mammals [6]
- 14/475 • • Growth factors; Growth regulators [6]
- 14/48 • • • Nerve growth factor (NGF) [6]
- 14/485 • • • Epidermal growth factor (EGF) (urogastrone) [6]
- 14/49 • • • Platelet-derived growth factor (PDGF) [6]
- 14/495 • • • Transforming growth factor (TGF) [6]
- 14/50 • • • Fibroblast growth factor (FGF) [6]
- 14/505 • • • Erythropoietin (EPO) [6]
- 14/51 • • • Bone morphogenic factor; Osteogenin; Osteogenic factor; Bone-inducing factor [6]
- 14/515 • • • Angiogenic factor; Angiogenin [6]
- 14/52 • • Cytokines; Lymphokines; Interferons [6]
- 14/525 • • • Tumour necrosis factor (TNF) [6]
- 14/53 • • • Colony-stimulating factor (CSF) [6]
- 14/535 • • • • Granulocyte CSF; Granulocyte-macrophage CSF [6]
- 14/54 • • • Interleukins (IL) [6]
- 14/545 • • • • IL-1 [6]
- 14/55 • • • • IL-2 [6]
- 14/555 • • • Interferons (IFN) [6]
- 14/56 • • • • IFN-alpha [6]
- 14/565 • • • • IFN-beta [6]
- 14/57 • • • • IFN-gamma [6]
- 14/575 • • Hormones [6]
- 14/58 • • • Atrial natriuretic factor complex; Atriopeptin; Atrial natriuretic peptide (ANP); Cardionatin; Cardiodilatin [6]
- 14/585 • • • Calcitonins [6]
- 14/59 • • • Follicle-stimulating hormone (FSH); Chorionic gonadotropins, e.g. HCG; Luteinising hormone (LH); Thyroid-stimulating hormone (TSH) [6]
- 14/595 • • • Gastrins; Cholecystokinins (CCK) [6]
- 14/60 • • • Growth hormone-releasing factor (GH-RF) (Somatoliberin) [6]
- 14/605 • • • Glucagons [6]
- 14/61 • • • Growth hormone (GH) (Somatotropin) [6]
- 14/615 • • • • Extraction from natural sources [6]
- 14/62 • • • Insulins [6]
- 14/625 • • • • Extraction from natural sources [6]
- 14/63 • • • Motilins [6]
- 14/635 • • • Parathyroid hormone (parathormone); Parathyroid hormone-related peptides [6]
- 14/64 • • • Relaxins [6]
- 14/645 • • • Secretins [6]
- 14/65 • • • Insulin-like growth factors (Somatomedins), e.g. IGF-1, IGF-2 [6]
- 14/655 • • • Somatostatins [6]
- 14/66 • • • Thymopoiетins [6]
- 14/665 • • derived from pro-opiomelanocortin, pro-enkephalin or pro-dynorphin [6]
- 14/67 • • • Lipotropins, e.g. beta- or gamma-lipotropin [6]
- 14/675 • • • Beta-endorphins [6]
- 14/68 • • • Melanocyte-stimulating hormone (MSH) [6]
- 14/685 • • • • Alpha-melanotropin [6]
- 14/69 • • • • Beta-melanotropin [6]
- 14/695 • • • Corticotropin (ACTH) [6]
- 14/70 • • • Enkephalins [6]
- 14/705 • • Receptors; Cell surface antigens; Cell surface determinants [6]
- 14/71 • • • for growth factors; for growth regulators [6]
- 14/715 • • • for cytokines; for lymphokines; for interferons [6]
- 14/72 • • • for hormones [6]
- 14/725 • • • T-cell receptors [6]
- 14/73 • • • • CD4 [6]
- 14/735 • • • Fc receptors [6]
- 14/74 • • • Major histocompatibility complex (MHC) [6]
- 14/745 • • Blood coagulation or fibrinolysis factors [6]
- 14/75 • • • Fibrinogen [6]
- 14/755 • • • Factors VIII [6]
- 14/76 • • Albumins [6]
- 14/765 • • • Serum albumin, e.g. HSA [6]
- 14/77 • • • Ovalbumin [6]
- 14/775 • • Apolipopptides [6]
- 14/78 • • Connective tissue peptides, e.g. collagen, elastin, laminin, fibronectin, vitronectin, cold insoluble globulin (CIG) [6]
- 14/785 • • Alveolar surfactant peptides; Pulmonary surfactant peptides [6]
- 14/79 • • Transferrins, e.g. lactoferrins, ovotransferrins [6]
- 14/795 • Porphyrin- or corrin-ring-containing peptides [6]
- 14/80 • • Cytochromes [6]
- 14/805 • • Haemoglobins; Myoglobins [6]
- 14/81 • Protease inhibitors [6]
- 14/815 • • from leeches, e.g. hirudin, eglin [6]
- 14/82 • Translation products from oncogenes [6]
- 14/825 • Metallothioneins [6]
- 16/00 Immunoglobulins, e.g. monoclonal or polyclonal antibodies [6]**
- 16/02 • from eggs [6]
- 16/04 • from milk [6]
- 16/06 • from serum [6]
- 16/08 • against material from viruses [6]
- 16/10 • • from RNA viruses [6]
- 16/12 • against material from bacteria [6]
- 16/14 • against material from fungi, algae or lichens [6]
- 16/16 • against material from plants [6]
- 16/18 • against material from animals or humans [6]
- 16/20 • • from protozoa [6]
- 16/22 • • against growth factors [6]
- 16/24 • • against cytokines, lymphokines or interferons [6]
- 16/26 • • against hormones [6]
- 16/28 • • against receptors, cell surface antigens or cell surface determinants [6]
- 16/30 • • • from tumour cells [6]
- 16/32 • • against translation products from oncogenes [6]
- 16/34 • • against blood group antigens [6]
- 16/36 • • against blood coagulation factors [6]
- 16/38 • against protease inhibitors of peptide structure [6]
- 16/40 • against enzymes [6]
- 16/42 • against immunoglobulins (anti-idiotypic antibodies) [6]
- 16/44 • against material not provided for elsewhere [6]
- 16/46 • Hybrid immunoglobulins (hybrids of an immunoglobulin with a peptide not being an immunoglobulin C07K 19/00) [6]
- 17/00 Carrier-bound or immobilised peptides; Preparation thereof [4]**
- 17/02 • Peptides being immobilised on, or in, an organic carrier [4]

- 17/04 • • entrapped within the carrier, e.g. gel, hollow fibre [4]
- 17/06 • • attached to the carrier via a bridging agent [4]
- 17/08 • • the carrier being a synthetic polymer [4]
- 17/10 • • the carrier being a carbohydrate [4]

- 17/12 • • • Cellulose or derivatives thereof [4]
- 17/14 • Peptides being immobilised on, or in, an inorganic carrier [4]
- 19/00 Hybrid peptides** (hybrid immunoglobulins composed solely of immunoglobulins C07K 16/46) [6]