Integrins (version 2019.4) in the IUPHAR/BPS Guide to Pharmacology Database

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Abstract

Integrins are unusual signalling proteins that function to signal both from the extracellular environment into the cell, but also from the cytoplasm to the external of the cell. The intracellular signalling cascades associated with integrin activation focus on protein kinase activities, such as focal adhesion kinase and Src. Based on this association between extracellular signals and intracellular protein kinase activity, we have chosen to include integrins in the 'Catalytic receptors' section of the database until more stringent criteria from NC-IUPHAR allows precise definition of their classification.

Integrins are heterodimeric entities, composed of α and β subunits, each 1TM proteins, which bind components of the extracellular matrix or counter-receptors expressed on other cells. One class of integrin contains an inserted domain (I) in its α subunit, and if present (in α1, α2, α10, α11, αD, αE, αL, αM and αX), this I domain contains the ligand binding site. All β subunits possess a similar I-like domain, which has the capacity to bind ligand, often recognising the RGD motif. The presence of an α subunit I domain precludes ligand binding through the β subunit. Integrins provide a link between ligand and the actin cytoskeleton (through typically short intracellular domains). Integrins bind several divalent cations, including a Mg²⁺ ion in the I or I-like domain that is essential for ligand binding. Other cation binding sites may regulate integrin activity or stabilise the 3D structure. Integrins regulate the activity of particular protein kinases, including focal adhesion kinase and integrin-linked kinase. Cellular activation regulates integrin ligand affinity via inside-out signalling and ligand binding to integrins can regulate cellular activity via outside-in signalling.

Several drugs that target integrins are in clinical use including: (1) abciximab (αIIbβ3) for short term prevention of coronary thrombosis, (2) vedolizumab (α4β7) to reduce gastrointestinal inflammation, and (3) natalizumab (α4β1) in some cases of severe multiple sclerosis.

Contents

This is a citation summary for Integrins in the Guide to Pharmacology database (GtoPdb). It exists purely as an adjunct to the database to facilitate the recognition of citations to and from the database by citation analyzers. Readers will almost certainly want to visit the relevant sections of the database which are given here under database links.

GtoPdb is an expert-driven guide to pharmacological targets and the substances that act on them. GtoPdb is a reference work which is most usefully represented as an on-line database. As in any publication this work should be appropriately cited, and the papers it cites should also be recognized. This document provides a
citation for the relevant parts of the database, and also provides a reference list for the research cited by those parts.

Please note that the database version for the citations given in GtoPdb are to the most recent preceding version in which the family or its subfamilies and targets were substantially changed. The links below are to the current version. If you need to consult the cited version, rather than the most recent version, please contact the GtoPdb curators.

**Database links**

**Integrins**
http://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=760

**Receptors and Subunits**

**Integrin α1β1**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2577

**Integrin α2β1**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2578

**Integrin αIIbβ3**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2579

**Integrin α4β1**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2580

**Integrin α4β7**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2770

**Integrin α5β1**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2581

**Integrin α6β1**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2867

**Integrin α10β1**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2868

**Integrin α11β1**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2869

**Integrin αEβ7**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2799

**Integrin αLβ2**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2582

**Integrin αVβ3**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2583

**Integrin, alpha 1 subunit**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2437

**Integrin, alpha 2 subunit (CD49B, alpha 2 subunit of VLA-2 receptor)**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2440

**Integrin, alpha IIb subunit (platelet glycoprotein IIb of IIb/IIIa complex, antigen CD41)**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2441

**Integrin, alpha 3 subunit (antigen CD49C, alpha 3 subunit of VLA-3 receptor)**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2442

**Integrin, alpha 4 subunit (antigen CD49D, alpha 4 subunit of VLA-4 receptor)**
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2443

**Integrin, alpha 5 subunit (fibronectin receptor, alpha polypeptide)**
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integrin, beta 1 subunit (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2455
integrin, beta 2 subunit (complement component 3 receptor 3 and 4 subunit)
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http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2461
integrin, beta 8 subunit
http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2462

References

1. Boehringer Ingelheim. LFA-1 (lymphocyte function-associated antigen-1) antagonist | BI-1950


